An analysis of the role of the oil sector in the Iraqi economy, 1953-75, and an appraisal of the petrochemical industry as a strategy for achieving future self-sustained development.

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AN ANALYSIS OF THE ROLE OF THE OIL SECTOR IN THE IRAQI ECONOMY 1953 - 75 AND AN APPRAISAL OF THE PETROCHEMICAL INDUSTRY AS A STRATEGY FOR ACHIEVING FUTURE SELF-SUSTAINED DEVELOPMENT

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A thesis submitted to the Council for National Academic Awards in partial fulfilment of the requirements for the degree of Doctor of Philosphy.

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To My Parents

DECLARATION

While registered as a candidate for the degree of Doctor of Philosophy, I have not been registered for another award of the C.N.A.A. or a university.

In partial fulfilment of the requirements of the degree of Ph.D I have undertaken a programme of advanced studies which included attendance on post-graduate courses in economics and production management at the Business School, R.G.I.T.

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ABSTRACT

AN ANALYSIS OF THE ROLE OF THE OIL SECTOR IN THE IRAQI ECONOMY 1953 - 75 AND AN APPRAISAL OF THE PETROCHEMICAL INDUSTRY AS A STRATEGY FOR ACHIEVING FUTURE SELF-SUSTAINED DEVELOPMENT

by Reiadh S. Auda

This thesis is an attempt to establish an alternative strategy that could enhance the economic development of Iraq. It does so with a feasibility study of a petrochemical complex geared towards fertilizer production.

The analysis outlined in this thesis has found that the Iraqi economy has been excessively dependent on oil revenues. This strategy has been insufficient to meet the requirements for the overall development of the economy. A major reason has been the neglect of integrating the oil sector within the rest of the economy. As a result the significant benefits that could have accrued to the economy from integrating the oil sector more closely with other industries have not been apparent. Therefore this thesis attempts to show that one of the most beneficial approaches for economic development in Iraq would be to stimulate the backward and forward linkages between oil and the other sectors of the economy.

The reduction of the heavy dependence on oil revenues, the thesis argues, can only be obtained by developing the other commodity sectors, namely the agricultural and the industrial. These sectors could create another important source of revenues, directly by increasing production and therefore value-added, and indirectly in terms of tax revenues. An examination of the structure of the Iraqi economy suggests that a feasible strategy would be to focus on the development of a petroleum-based fertiliser industry. Analysis of the domestic market for nitrogenous fertiliser has shown that there would be sufficient demand for the product of this industry. By increasing the application of nitrogenous fertiliser to lands presently under cultivation, yields could be significantly improved. In the longer term, it would also be possible to increase the amount of land used for agricultural production. This would obviously enhance rural incomes. As over a third of the population of the country depended on agriculture for income and employment, this strategy would provide an important stimulus to the overall development of the Iraqi economy. Apart from the benefits derived from increasing the backward and forward linkages between oil and the other sectors of the economy, such a strategy would provide favourable conditions for the industrialisation of Iraq. This can be seen in the build-up of a skilled labour-force and technology transformation.

To illustrate the benefits of this development strategy, a model was developed to measure the potential savings in terms of foreign exchange. This showed that significant savings could be made by applying domestic nitrogenous fertiliser to the agricultural sector. This is the result of saving on both imports of agricultural products, as a result of increasing domestic agricultural production, and replacing the import of nitrogenous fertiliser with cheaper domestic production.

ABBREVIATIONS

BPC	Basra Petroleum Company.
CBI	Central Bank of Iraq.
CSO	Central Statistical Organization.
DB	Development Board.
FAO	Food and Agricultural Organization of The United Nations.
IBRD	International Bank for Reconstruction and Development.
INOC	Iraq National Oil Company.
IPC	Iraq Petroleum Company.
MPC	Mosul Petroleum Compny.
N	Nitrogenous Fertilizer.
SPB	Statistical Pocket Book.
OAPEC	Organization of Arab Petroleum Exporting Countries.
OPEC	Organization of Petroleum Exporting Companies.
UNCTAD	United Nations Conference on Trade and Development.
UNIDO	United Nations Industrial Development Organization.

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INTRODUCTION

CHAPTER 1

The Iraqi Economy, 1953-75

The main objective of this chapter is to give a general introduction to the Iraqi economy and the behaviour of its various sectors during the period 1953-75. One reason for the choice of this period is the availability of reliable data. There is no official data available for the periods before 1953 and after 1975. This introduction will serve both the analysis and the conclusions to be elaborated in later chapters.

1.1 The Data

Obtaining data related to the Iraqi economy was not without difficulties. Appendix A explains in detail the methods and the major problems in attempting to collect more comprehensive and reliable data. Since official data (published by the government of Iraq) was very scarce, a great amount of statistics required for the analysis in this and the next chapters had to be assembled from various non-official sources. The access to many official and non-official sources, however, were still fraught with problems, both in terms of legality and finance. In addition to these difficulties, a large amount of non-official statistics appeared to be unreliable. To

avoid any confusion in the analysis, the most inaccurate statistics were discarded. Great effort and time was spent in choosing the most reliable and relevant data. This situation left limited statistical data available as a useful source of information.

1.2 Historical Background

Iraq is located in south east Asia and bounded in the north by Turkey, in the east by Iran, in the south by Kuwait and the Arab-Persian Gulf, in the south west by Saudi Arabia and Jordan and in the north west by Syria.

The old name of Iraq-Mesopotamia, or the land between the two rivers, refers to the physical geography of the country. It is the valley of the Tigris and the Euphrates rivers. These two rivers start in Turkey and Iran and run down south to join together near the city of Basra to form another river known as Shatt-Al-Arab. This river is the only water way which links the country with the rest of the world. Iraq occupies an area of 438,446 Sq. Km.

After the capital Baghdad, in the middle, the second largest city is Basra in the south followed by Mosul in the north. The majority of the population in the middle and southern regions are Arabs. In the north live the Kurds who compare about one fifth of the population.

One of the earliest civilisation was established in the lower part of Iraq around 4500-5000 B.C.. Urban centres such as Ur, Kish, Lagash and Babylon were built. A

highly developed agricultural economy based on a well organised irrigation system was one of the main features of th ancient Mesopotamia.[1] Later on in the eighth century A.D. the Abba Sin adopted the same system to develop one of the most prosperous societies at that time.

After the collapse of the late Babylonian state around 560 B.C., Iraq was ruled by Persians, Romans and Byzantines, until the rise of Islam around 630 A.D. when the country joined the new Islamic Empire and has remained since a major force in Arabia.

The civilisation which the Arabs built in Baghdad during the Abbasian rule was completely destroyed by the Mongol invasions in 1258 A.D. The country remained under the Mongols until 1514 when the Ottoman ruler, Sultan Suleyman, conquered Baghdad and declared Iraq to be part of his empire. The country then lost all independent sovereignty in the sense that all its affairs were directed from the Sultan's Office in Istanbul.

In 1918 the Ottoman rule ended when British forces occupied the southern part of the country. In April 1920 at the San Remo conference it was agreed to place Iraq under the British Mandate.[2] Due to strong opposition from local tribes to the British rule, Britain transferred power to a provincial government to be assisted by British advisers. In 1921 Faisal was proclaimed King of the first government in Iraq. The country became an independent

state on October 3rd, 1932 when it was admitted to the League of Nations.

The Hashemit family ruled the country until the 15th of July, 1958 when a group of army officers seized power. Since then the country has entered a new era characterised by political instability and a desire for improvement in economic and social conditions.

1.3. Population growth and Income per Capita

The population of Iraq has doubled in a period of twenty-three years from an estimated 5.676 million in 1953 to approximately 11.124 million in 1975 (Table 1.1). Its average rate of growth per annum was 2.9% in 1953-65, increasing to 3.2% in 1966-75. This phenomenal growth was due to two main developments, namely the increase in the birth rate from 46.9 per thousand in 1957 to 47.8 in 1974, and the decline in the death rate from 21.0 per thousand to 14.8 in the same period.(3)

Iraq's population is divided into two categories: urban and rural. The small numbers of Bedouin have been declining rapidly through their integration into both rural and urban areas. Urban population has grown at a rate distinctly higher then the rural population; the former averaging an annual rate of 1.06% compared to 0.99% and 1.03% for rural and total population respectively. This was mainly due to the continuous emigration of large numbers of people from rural to urban areas. Accordingly,

by 1975, the urban population comprised 63.7% of the total population compared to 37.9% in 1953.

According to Table 1.1, the average per capita income expanded continuously from 43.0 Iraqi Dinar (I.D.) in 1953 to I.D. 337.2 in 1975, an increase of 684.2%. The most significant rates of growth were seen in 1973-75 due to a considerable increase in the national income arising from a higher flow of oil production and an increase in oil prices during that period.[4] (Officially, the Iraqi Dinar equaled £1.92 in 1975).

1.4 Active Population and Structure of Labour Force

Before 1957, all those between the ages of 10-49 years were considered part of the "active population"[5]. According to this definition, about 3.3 million, or 47.7% of the total population were active in 1957. After this year the age range was changed to 15-59 years. This defined 3.7 million, or 45.1% of the total population in 1965 as making up the active population. In 1970, the total active population rose to 4.4 million, that is 46.8% of the total population in that year.

Total labour force is taken to constitute the active population excluding students (at all levels), members of armed forces and disabled people. According to Table 1.2, the total labour force almost doubled between 1960-74, increasing from 1.6 million in 1960 to 3.1 million in 1974. But the size of labour force as a portion of total active

TABLE 1.1

POPULATION AND INCOME, 1953-75

Year	(1) Population (Million)	(2) Urban population %	(3) Income per Capita (I.D.)
1953	5.676	37.9	43.0
1957	6.340	39.2	55.6
1965	8.097	45.0	84.5
1968	8.914	55.2	94.8
1970	9.440	57.8	101.9
1973	10.413	61.4	135.6
1975	11.124	63.7	337.2

Source: Appendix B , Table 1.

The Statistical Pocket Book (S.P.B.), Ministry of Planning, Baghdad, Iraq, PP. 34-35.

The U.N. ECWA 1977, Table 1.

population in 1974 dropped slightly compared to that of 1950. Though no data on members of the armed forces and disabled people is available, it seems that this decline was due to the rapid increase in the sizes of the above categories, in addition to that of students during the period.

It can be seen from Table 1.2 that employment in agriculture accounted for more than 50% of the total labour force during 1960-74. This also shared the highest rate of employment growth of 6.6%*per annum compared to that of other sectors. The number of people employed in agriculture amounted to about 1.6 million in 1974.

The second largest source of employment through the period was the Services Sector with a total of 0.245 million, or 15%, in 1960 increasing to 0.340 million, or 11% of the total labour force, in 1974.

Reflecting this sector's small size, total employment in the manufacturing made up only 7.97% (0.130 million) of the total labour force in 1960. Though the number of employees in this sector increased to 0.178 million in 1974, its proportion dropped to 5.83% of the total. This was due to the higher rates of growth in employment in other sectors, particularly the Services, specially during the sixties.(6)

Unemployment, on the other hand, also increased through the period to reach about 0.163 million in 1974, an increase of 418.1% over the 1960 figure of 0.031 million.

*All rates of growth in this page and the rest of this Chapter are calculated as annual average rates of growth for various periods (as mentioned in the text).

TABLE 1.2

Distribution of Employment by Economic Sectors, 1960-1974

Sector	1960 No. of employees	%	1965 No. of employees	%	1970 No. of employees	%	1973 No. of employees	%	1974 No. of employees	%
Agriculture	733900	44.99	1009600	47.00	1385700	51.99	1540400	52.00	1596600	52.21
Mining	11000	0.67	13500	0.63	16000	0.60	18500	0.62	19200	0.63
Manufacturing	130000	7.97	135000	6.28	150000	5.63	170000	5.74	178000	5.82
Elec. Gas & Water	11800	0.73	12200	0.57	13000	0.49	14300	0.48	14600	0.48
Construction	58000	3.56	61000	2.84	67000	2.51	73000	2.46	75000	2.45
Trade	100000	6.13	125000	5.28	150000	5.63	164000	5.54	166000	5.43
Transport	110000	6.74	129000	6.00	150000	5.63	162000	5.47	167000	5.46
Services	245000	15.02	270000	12.57	300000	11.26	330000	11.14	340000	11.12
Others	200000	12.26	230000	10.27	275000	10.32	290000	9.79	295000	9.64
Total Employment	1599700	98.07	1985300	92.43	2506700	94.06	2762200	93.24	2851400	93.25
Unemployment	31400	1.93	162700	7.57	158200	5.94	200100	6.75	206400	6.75
Total Labour Force	1631199	100.00	2148000	100.00	2664900	100.00	2962300	100.00	3057800	100.00

Source: Appendix B, Table 2

NOTES

1. It should be noted that the rapid increase seen in the number of people employed in the agricultural sector during the period 1960-75 was due to two main reasons:-

   a) The agrarian reform laws of 1958 and 1970 which redistributed the lands, thus benefiting great number of people. All those who benefited from these laws were counted as farmers. However, the majority of those benefiting were in urban areas (retired soldiers and policemen and other poor people who migrated to towns and cities before these laws were introduced) and thus very small numbers were actually moved to rural areas to cultivate their lands.

   b) The great numbers of Egyptians who were brought to the country at the beginning of the seventies were counted within the agricultural employment. In fact the majority of these workers never worked in agriculture and they stayed in urban areas (see Chapter 10).

2. Therefore, though the number of people employed in the agricultural sector is shown to be rapidly

The percentage of unemployed during these two years was 1.9% and 7.6% of total labour force respectively. The main factor behind this phenomenon was, and still is, the increasing number of rural people who emmigrated to the urban areas looking for better paid jobs.

1.5 National Income

Gross Domestic Product (GDP) by Economic Sectors

(1) One of the features that Iraq shares with many developing countries is its dependence on the production and export of a single primary commodity.

While the share of the oil sector has wildly fluctuated with changes in prices and output, oil production during the period 1953-75 remained without doubt the dominant sector in the economy. Its percentage contribution to GDP rose from 39.1% in 1953 to 57.4% in 1975. As a result of the increase in oil prices in 1973-75, this sector's value added more than trebled in the period affecting significantly the share of other sectors in GDP (Table 1.3).

(2) Unfortunately, the agricultural sector which was the second major contribution (22.1%) to GDP in 1953, continued to decline through the years to reach only 7.5% of GDP in 1975. This was mainly due to the accelarating growth of the oil sector. Despite its unstable situation, however, the agricultural sector grew at an average rate of 6.9% in 1953-75.

(3) In comparison with agriculture, manufacturing has received priority in both the private and public sectors. This has resulted in a continuing increase in its contribution to GDP from 6.1% in 1953 to 9.9% in 1973. This share however, dropped to 6.0% in 1975 as a result of the tremendous growth in the contribution of the oil sector.

(4) The increase in public administration and defence has been another paramount feature, not only in terms of its high growth, but also in terms of its rank and share in the economy. Significantly, its contribution to GDP has continued to increase despite the massive growth of that of the oil sector, indicating another sign of an imbalanced economic structure. During 1973-75, this sector grew significantly with an average rate of 41.8 p.a.[7] The question, however, remains whether such disproportionate growth is conducive to development or whether a significant proportion of this growth has been deflected into consumption.

Gross National Product (GNP) and National Income (NI)

The main observation is that GNP has grown at a rate higher than that of GDP. This was due to the fact that net factor payments abroad constituted a slightly declining proportion of GDP, (Appendix B, Table 3).[8] This was seen more evidently during the sharp rise in oil prices in 1973-75. While the average rate of growth of GDP during 1953-73

TABLE 1.3

Sectoral Contributions to GDP 1953-75
(at current prices - %)

Sector	1953	1958	1965	1970	1973	1975
Agriculture, Forestry & Fishing	22.1	19.1	17.1	17.2	14.2	7.5
Oil Extraction	39.1	36.2	32.4	30.2	35.5	57.4
Other Mining & Quarrying	0.3	0.4	0.6	0.7	0.7	0.2
Manufacturing	6.1	7.6	7.9	9.6	9.9	6.0
Construction	3.5	6.1	3.5	3.4	3.6	2.4
Elec., Gas & Water	0.5	0.6	1.4	1.5	1.0	0.5
Transport, Communication & Storage	6.6	6.3	6.7	5.9	5.6	3.9
Wholesale & Retail Trade	5.5	5.7	8.0	8.2	7.3	4.9
Banking, Insurance & Real Estate	1.0	1.5	1.1	1.6	1.3	1.5
Ownership of Dwellings	3.6	2.6	3.5	4.2	3.7	2.0
Public, Admin. & Defence	5.7	7.7	10.3	10.3	9.7	9.4
Other Services	5.2	6.2	6.9	7.2	7.5	4.3
GDP at factor cost	100.0	100.0	100.0	100.0	100.0	100.0

Source: Appendix B, Table 4

was 8.1% p.a., it was 8.6% in GNP; these rates rose significantly to 47.9% and 50.2% in the period 1973-75 respectively.

NNP (or NI), due to the slow growth in capital consumption, has grown at an average rate higher than that of GDP and GNP in the two periods above; 8.7% and 52.8%, respectively. NI, according to these rates of growth, rose to I.D. 1166.9 million in 1972, jumping to I.D. 3750.5 million in 1975.

In conclusion, the massive growth of both GDP and NNP was basically a result of the rapid increased contribution by the oil sector.

Expenditure on GDP

Table 1.4 shows consumption and investment (GDFC) by both government and private sectors, where the following observations can be made:

(1) Government consumption (Cg) in 1953-75 grew at an average rate of 15.3% p.a. which was higher than that of both private consumption (Cp) and investment. Through the period its importance both to GNP and to private consumption was increasing. Cg rose from I.D. 48.7 million, or 18.4% of GNP in 1953 to I.D. 917.8 million or 24% of GNP in 1975. This increase, however, may still look low due to the high growth of GNP after 1973; in 1972, for example, Cg contributed over 26% of GNP. Unfortunately, since there is no detailed data on Cg, it was not possible

to identify the sources. However, it is known that the major part of government consumption usually goes to public administration, defence and security, and these expenditures were seen to move rapidly with the increase in oil revenues.(9)

(2) Private consumption has grown at an average rate of 10.9% p.a. during the period which was higher than that of GNP. In Iraq private consumption is estimated as a residual. Its behaviour therefore is influenced by the behaviour of other components of GNP. The most significant increase in the value of Cp was again seen in the period 1974-75, it reached I.D. 1348.9 million in 1975 compared to that of I.D. 556.7 million in 1973 and I.D. 171.3 million in 1953.

(3) Total consumption (Cg + Cp) has always been high through the period 1953-75 with a contribution of over 65% of GNP. This situation has effected the country's ability to save which can be seen by the continuing decline in investment's contribution from 30.91% in 1953 to 19.7% of GNP in 1975. It should be argued that such consumption policy is irrational in a a developing country seeking economic development, even if the country happens to be an oil exporter like Iraq.

(4) Gross Domestic Fixed Capital Formation grew by only 5.4% p.a. during 1953-72, but by an average rate of 53.4% p.a. in 1973-75. This was due to the increase in government investment following the increase in oil revenues in 1974-75. It is clear that investment has shown both low

TABLE 1.4

EXPENDITURE ON GDP
(Million Iraqi Dinars)

Year	C^p 1	% of C	C^g 2	% of C	Total C 1+2	I^p 3	% of I	I^g 4	% of I	Total I 3+4
1953	171.3	77.9	48.7	22.1	220.0	41.9	51.0	40.3	49.0	82.2
1958	288.2	78.7	77.9	23.1	366.1	42.6	43.6	55.2	56.4	97.8
1965	455.1	71.8	178.6	28.2	637.7	58.6	45.1	71.2	54.9	129.8
1970	609.9	69.4	268.9	30.6	878.8	84.0	45.4	101.1	54.6	185.1
1973	556.7	57.6	410.4	42.4	967,1	69.7	24.2	218.9	75.8	288.6
1975	1348.9	59.5	917.8	40.5	2266.7	N.A	-	N.A	-	531.9

Source: Appendix B, Table 5

rates of growth and low contribution to GNP, as shown above. This was due to the very low investment by both the government and private sectors, particularly during the period 1953-72, compared to the increasing size of consumption. Total investment increased from I.D. 82.2 million in 1953 to I.D. 217.0 million in 1972, then to I.D. 761.2 million in 1975.

Table 1.5 shows the sectoral contribution of investment (GDFC) in the period. The manufacturing sector during the sixties and the seventies has taken the lead with a contribution reaching 28.4% of total in 1975. This reflects the increasing attention given by both the government and the private sector to this sector and clearly indicates the manufacturings priority mainly over agriculture which probably suffered more than any other sector of the economy in term of investment. Investment in agriculture as a proportion of total GDFC dropped from 12.4% in 1953 to 6.6% in 1975, reflecting the lower priority given to this sector in comparision to manufacturing. Total investment in agriculture rose from I.D. 10.2 in 1953 to I.D. 50.4 million in 1957; it reached I.D. 10.2 and 216.2 million in the manufacturing sector in the same years.

The mining and quarrying sector (including oil) contributed less than 10% of GDFC (on average) during the period. Investment in this sector, however, reached its highest share in 1973-75 amounting to an average of about

TABLE 1.5

Sectoral Contribution to Gross Fixed Capital Formation
(% at current prices)
1953-75

Sector	1953	1958	1965	1970	1973	1975
Agriculture, Forestry & Fishing	12.4	15.9	8.8	12.4	11.8	6.6
Mining & Quarrying	11.2	6.0	0.9	4.1	10.6	15.5
Manufacturing	12.4	13.8	19.5	22.9	23.9	28.4
Construction	1.7	2.1	1.5	2.1	2.7	4.2
Elec., Water & Gas	5.5	9.1	8.2	6.6	3.4	1.7
Transport, Communication & Storage	22.3	22.4	18.9	14.5	11.3	12.9
Wholesale & Retail Trade	2.3	2.1	3.3	4.3	7.8	5.6
Banking & Insurance	0.7	1.0	0.6	0.8	2.1	0.3
Ownership of Dwellings	19.2	17.4	21.3	17.7	15.6	8.9
Public, Admin.	3.1	2.5	2.8	2.8	4.3	7.6
Services	9.2	7.7	14.2	11.8	6.5	8.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Appendix B, Table 6

14% of the total. This increase was mainly due to the absence of investment by oil companies that had to be rapidly replaced by the government after the nationalisation of the oil companies in 1971-72, and also partly to the start of downstream projects which were included in the "National Development Plan" of 1975/76 - 1979/80[10].

The contribution of the services sector to total investment dropped during the period to be replaced by public administration the share of which rose from 3.1% in 1953 to 7.6% in 1975 reflecting a trend in non-productive investment. The services sectors contributed 64% of GDFC (I.D. 52.6 million) in 1953 and 49.5% (I.D. 376.8 million) in 1975.

1.6 Foreign Trade

The total value of exports and imports with and without oil is shown in Table 1.6. The following remarks can be made:

(1) Oil exports has dominated total exports during the period, contributing about 95%. They also grew rapidly and at a higher rate than that of other exports, particularly during the seventies [11]. Oil exports, grew by an average rate of 53.3% per annum in 1970/75 compared to the 14.7% per annum of other exports in the same period. This clearly indicates an insignificant improvement in the growth of non-oil exports of the country. The value of

non-oil exports ranged between I.D. 13.7 million (in 1956) and I.D. 42.8 million (in 1975) compared to that of oil which ranged between I.D. 114.4 million (in 1957) and I.D. 1943.0 million (in 1974).

The ratio of total exports to GDP stood at an average of 40% through the period, but did not drop to less than 30%.

(2) Total imports grew at a rate higher than that of total exports, indicating the country's increasing dependence on imports. Between 1953 and 1975, the value of imports rose from I.D. 69.3 million to I.D. 1369.2 million, an increase of 975%. This compares to that of 301.7% of exports.

The main imports items were food stuffs, mainly wheat, sugar, tobacco and tea, and consumer goods mainly clothing. This clearly indicates the failure of the country to produce a sufficient amount of these items domestically.

(3) Imports by the oil sector (basically includes capital goods imported by oil companies) contributed a low share of 9.8% of total imports, or I.D. 69.3 million, during 1953-59. This share declined rapidly to reach 2.4% of the total, or I.D. 36.1 during 1960-69, as a result of the conflict between the government and oil companies which led to the reduction of investment by the oil companies (see Chapter2). After the nationalisation of oil in 1971/72, imports by the oil sector started to increase

TABLE 1.6

FOREIGN TRADE, 1953-75
(IN I.D. MILLIONS)

Year	Exports (a)	Imports	Exports of Oil	Imports of Oil (b)	Total Exports	Total Imports	Balance of Trade
1953	23.0	56.9	120.1	12.4	143.1	69.3	(+) 73.8
1954	20.7	70.1	156.1	5.8	176.8	75.9	(+) 100.6
1955	16.2	90.9	169.2	6.3	185.4	97.2	(+) 88.2
1956	13.7	107.2	156.9	7.4	170.6	114.6	(+) 56.0
1957	14.0	112.0	114.4	10.4	128.4	122.4	(+) 6.0
1958	15.7	99.8	186.7	10.0	202.4	109.8	(+) 92.6
1959	14.3	99.4	202.1	17.0	216.4	116.4	(+) 100.0
1960	10.7	125.9	222.9	14.6	233.6	140.5	(+) 93.1
1961	11.8	138.2	224.5	12.1	236.3	150.3	(+) 86.0
1962	21.7	127.7	225.4	1.8	247.1	129.5	(+) 117.6
1963	18.9	111.0	259.9	1.6	278.8	112.6	(+) 166.2
1964	17.9	148.5	282.0	0.7	299.9	149.2	(+) 150.7
1965	21.2	161.8	293.7	0.9	314.9	162.7	(+) 152.2
1966	26.5	175.3	308.9	0.9	335.4	176.2	(+) 159.2
1967	23.8	150.6	272.0	0.8	295.8	151.4	(+) 144.4
1968	25.9	144.0	345.0	1.1	370.9	145.1	(+) 225.8
1969	25.9	156.3	347.4	1.3	373.3	157.6	(+) 215.7
1970	24.7	180.7	378.1	2.2	402.8	182.9	(+) 219.9
1971	23.2	246.6	526.2	2.6	549.4	249.2	(+) 300.2
1972	30.9	234.5	421.5	8.6	452.4	243.1	(+) 209.3
1973	32.8	258.6	625.5	22.3	658.3	280.9	(+) 377.4
1974	34.4	835.3	1943.0	70.4	1977.4	905.7	(+)1071.7
1975	42.8	1247.2	1820.0	122.0	1862.8	1369.2	(+) 493.6

TABLE 1.6 (Con.)

a) Including re-exports which only contributed less than 12% of total exports (excluding oil exports) during the period.

b) The majority of this item was imports by oil companies.

Source: Central Bank of Iraq Bulletins, 1970 and 1977.

again to reach 8.4% of the total or a value of I.D. 214.7 in the period 1973-75.

(4) According to the analysis above, it can be concluded that oil exports are the basis of Iraq's wealth; unless these continue to flow, the country's foreign trade situation could be in a grim shape. Oil exports led to the continuing surplus in the balance of trade during the whole period of 1953-75.

1.7 Balance of Payments

In view of the consistent balance of trade surplus that Iraq has enjoyed throughout the period, it is obvious that a favourable balance of payments position would result. This became increasingly more significantly in the figures for the seventies.

Appendix B, Table 7, shows the development of the country's balance of payments between 1973-75. The main observations which can be made from this are as follows:-

(1) Like the import of goods, imports of services (invisible imports) have increased rapidly through the period to reach I.D. 491.9 million in 1975; it was I.D. 67.9 million in 1953. This has affected the position of the current account, resulting in high deficits in four years (1956, 1957, 1960 and 1961). It should be noted, however, that deficits in some of these years (1956 and 1957) were also partly due to the decline in oil exports.

(2) Apart from five years, the capital account

continued to show deficits throughout the period. During the seventies these deficits rapidly increased to reach their highest value of I.D. 715.7 million in 1974. This has affected the overall result of the balance of payments in 1974 despite the fact that oil exports reached their highest value of the period under investigation in this particular year.

(3) From the analysis above, it can be concluded that it was only because of the high surplus on current account, as a result of oil exports, that Iraq's balance of payments showed a surplus of increasing value.

1.8 Conclusions

This chapter has given a general survey of the Iraqi economy between 1953-75. The following main observations can be made;

(1) The Iraqi economy has been dependent on a single sector, oil. This sector contributed more than 55% of GDP and more than 90% of total exports, but employed less than 1 % of the labour force. The rapid increase in this sector's production was not reflected in higher employment. However, it was oil alone which created the surplus in the balance of payments and tripled the national income of the country.

(2) More than 50% of an expanding labour force is engaged in agriculture while this sector's contribution to GDP has been less than 20% during 1953-75. (It was only

7.5% in 1974-75). This indicates that per capita income in this sector has been very low and declining continuously compared with other sectors.

(3) Despite the high increase in NI during the seventies, the average per capita income stood at only I.D. 163.4 which is still low compared with that in developed countries.

(4) The only non-oil sector that show a slight improvement in its percentage contribution to GDP, employment and investment has been manufacturing. Compared with other sectors, however, its growth was only slight.

(5) The value of imports has increased tremendously through the period studied. While non-oil exports increased from a value of I.D. 23.0 m. in 1953 to 42.8m in 1975, the value of imports rose from I.D. 69.3 m. to I.D. 1369.2 m. in the same years. This shows that the country has been depending more on imports than on domestic substitutes.

(6) It appears that the revenues generated from increasing oil production has been diverted primarily into government consumption as opposed to investment and this in turn has accentuated the level of imports.

CHAPTER 1

NOTES

(1) For more details, see J. M. Roberts, "The First Civilisations", Penguin 1980, pp. 6-21.

(2) See next chapter.

(3) Statistical Pocket Book (SPB) 1974, Central Statistical Organisation, Baghdad, Iraq, 1974 Table 13, P.32.

(4) A word on per capita income by social groups may be in order here. There is no data available before 1960 and some relevant statistics became unavailable after 1975, while other data relating to farmers and members of the armed forces are unpublished.

However, the following observations can be derived from Appendix B, Table 8:

(a) The highest income per capita was received by the employees of the oil companies, although their average income did decline between 1961-71. This group's per capita income stood at I.D. 967.6 in 1971.

(b) Between 1960-69 the average income of Civil Servants rose from I.D. 255.6 to I.D. 419.0, an increase of 63.9% and then accelerated during the seventies to reach I.D. 839.8 in 1974. In 1975 the figure dropped to I.D. 722.0, but this still showed an increase of 56.0% over their income in 1972.

(c) Workers in large industries were placed third. Their average income increased from I.D. 228.5 in 1960 to I.D. 316.5 in 1970, a rise of 38%. A significant increase came in 1975 and this pushed their average income up to I.D. 562.9.

(d) The lowest average income was obtained by workers in small industrial enterprises. Their average income rose from I.D. 68.7 in 1962 to its highest level of I.D. 98.6 in 1972, and dropped to I.D. 94.9 in 1974.

The unstable average income in the last two groups may be explained by the fluctuation in the number of "unpaid workers" which is included in the total of employed workers (see SPB 1968, pp. 92-911, and SPB 1974, p.52).

(5) M. S. Hasan, "The Economic Development of Iraq. Foreign Trade and Economic development 1864-1958". - Al Maktabah Al-Asriya Publishing Co., Beruit 1965, p.62.

(6) The rate of growth of employment in the manufacturing sector during the sixties was 1.4%; this is compared to 6.6% in agriculture, 3.4% in banking and insurance, 2.9% in transport and 2% in services. See Appendix B, Table 2.

(7) The following table shows clearly the rapid increase of expenditure of the Ministry of Defence and Security in the ordinary budgets between 1965-79.

Year	I.D. Million	% of Total
1965	56.9	40.2
1971/72	153.2	44.9
1974/75	491.2	53.3
1979	700.4	27.0

Source: - Central Bank of Iraq Bulletin, No. 111, 1977
- Economic Intelligence Unit, Iraq. A New Market in a Region of Turmoil, 1980.
- U.N. Statistical Yearbook 1967.

(8) The average rate of growth of net factor payment abroad (mainly dominated by profits of oil companies derived from their operations in Iraq) was 5.1% during 1953-75.

(9) See Note 5 above.

(10) See the National Development Plan 1975/76-1979/80. "The Economy of Iraq; Development and perspectives, 1958-1976-1980", Republic of Iraq, Ministry of Information, 1977, p.21.

(11) Iraq's non-oil exports during the period 1953-75 were mainly dates and hides and skins. These items, however, only contributed about 5% of the total exports of the country.

PART ONE

DEVELOPMENT OF THE IRAQI ECONOMY, 1953-75

CHAPTER 2

The Role of the Oil Sector

This chapter gives an introduction to the history of the oil companies in Iraq since 1912 with an emphasis on the period 1950-75. It will then examine the structure of the oil sector as well as the influence of the oil industry itself via an analysis of backward and forward linkages in the Iraqi economy. The role of oil revenues in financing the ordinary budget of the country will also be highlighted.

2.1 Oil Companies and the Iraqi Government

In 1912, the "Turkish Petroleum Company" (a combination of German, English and Dutch) was the first company to apply to the Ottoman government for an oil exploration concession in Iraq. This application, however, never reached a conclusion due to the outbreak of the First World War. When the war was over, the "San Remo Conference" in April 1920 drafted a peace treaty with Turkey in which the detached territories of the Ottoman Empire were declared as mandates of England and France.(1) This conference also allocated oil and minerals exploration rights in the country. In 1921, Iraq was occupied by the British army and a new royal government was established. From 1921 up to 1958, the country was called "The Kingdom of Iraq".

In 1923, the new royal government of Iraq refused the application of the Turkish Petroleum Company which had been

put to the Ottoman Government government in 1912. According to the San-Remo Conference, the British companies and their allies were guaranteed exclusive exploration rights for oil in Iraq.(2) Thereafter the British, in supporting their interest in the above company (which was 50% of total shares), threatened to break off the Zone of Mosul from Iraq if the latter insisted on denying the approval of the oil concession.(3) Accordingly, in 1925, the Iraqi government, for the first time, granted to the Turkish Petroleum Company a concession for oil extraction in Mosul and also for the construction of one refinery (Al-Wand) in Khanaguin. The Turkish government, as a reward for abandoning their claim to Mosul as a Turkish territory, was given 10% of oil revenues of the above company for a period of 25 years starting in 1926.(4)

The Americans also were there. Between 1925 and 1928, they engaged in strong negotiations (in terms of companies and government) with the British in order to obtain a concession for oil exploration in Iraq.(5) On July 13, 1928, they, according to the "Red Line Agreement", succeeded in obtaining 23.75% of the shares of the Turkish Petroleum Company.(6)

The Turkish Petroleum Company, which was renamed the "Iraq Petroleum Company" (IPC) in 1929, had the right of exploration in an area of only 497 square km. of Iraq.(7) In 1931, due to pressure from the company faced with increasing world demand for oil, the Iraqi government increased this area to 91.000 square km. to include the

Mosul and Baghdad provinces east of the Tigris river. But the IPC's demand for larger areas of exploration continued and by 1938 it managed to gain control of almost the whole of Iraqi (438.000 square km.).[8]

The IPC, with its two branches the Mosul Petroleum Company (MPC established in 1932) and the Basra Petroleum Company (BPC, established in 1938), was owned by the following shareholders:

1. British Petroleum Company (ex Anglo-Persian petroleum Company), 23.75%.
2. Compagnie Francaise des Petroles, 23.75%.
3. Shell (Royal Dutch) Company, 23.75%.
4. Near East Development Corporation (American) comprising;
   (a) Standard Oil of New Jersey, 11.87% of the shares.
   (b) Mobil Oil, 11.875% of the shares.
5. Calouste Salkis Gulbenkian Foundation, 5%.

In return for the oil produced in Iraq, these companies before 1952 were to pay to the Iraq government;

1. £200,000 in gold as a fixed royalty every year.
2. 4 shillings (gold) on each metric ton of crude oil produced.

In addition because these companies were exempted from all taxes (direct and indirect) they had to pay the following:

a) £1,000 in gold fixed per year.

b) £15,000 in gold on each 1 - 4 million tons of crude oil produced.

c). £20,000 in gold on each extra million metric ton over the above limit of 4 million ton.

The 50-50 Profit sharing Agreement of 1952

Following the end of the World War Two, factors arose which had an impact on the policies of both the companies and the Middle Eastern oil producing - exporting countries. The main one was the ever increasing demand for oil in Western Europe as a result of its economic re-construction.(9)

Another important factor was the social and political evolution that was taking place in Middle Eastern countries. This put more pressure on the governments to adopt better economic and social development strategies in order to improve the standard of living of the people in these countries. Such developments needed large capital investment in addition to that already undertaken by foreign companies.

In these circumstances, Iraq was no different from the rest. During the post war period, it was undergoing significant political and social evolution which demanded urgent economic and social improvement. In addition the government entered negotiations with the IPC partners accusing them of slowing down crude oil production in order to avoid paying more royalties. The government also complained of lack of training facilities for Iraqi workers, and lack of refining facilities in the

country.[10] But the main argument between the Iraqi government and the IPC, was the value of gold shillings paid as royalties. This matter was actually started in 1932 when the country's payment (revenues) fell because of the withdrawal of the Britain from the gold standard.[11] The Iraqi government argued that the gold shilling should be based on the free market value, while the company insisted on the official London rate of exchange of gold, which was considerably lower. These negotiations ended in 1950 with an increase in the Iraqi government's royalties from 4 to 6 shillings (gold) per metric ton of oil produced by the MPC and the BPC only.[12]

While the two sides were engaged in the above negotiations, three significant developments took place in the Middle East area which upset the Iraqi government even more, but at the same time, strengthened its bargaining with the companies. First, the 50-50 Profit Sharing Agreement between the Saudi government and Armco Company in 1950; second, the nationalization of oil in Iran on 30th April 1951; and third, the 50-50 Profit Sharing Agreement on 1st December 1951 between Kuwait and the Kuwait Oil Company.

In response to these events the IPC had no choice but to follow other oil companies in the area, and reach an acceptable solution with the Iraqi government. Therefore, on 3rd February 1952 the 50-50 Profit Sharing Agreement was

signed. The agreement included the following conditions:[13]

1. The Iraq government was to share the profit on a 50-50 basis resulting from the operation of the companies before deduction of taxes. In addition, each of the companies was to pay annually £20,000 for tax concessions.

2. The government's share in each calendar year should not be less than 25% of IPC's net production value at posted prices, and 33.33% of BPC's.

3. The IPC should guarantee a production minimum of 20.75 million tonne of crude oil annually, while MPC should guarantee an annual minimum of 1.25 million tonne and the BPC should guarantee an annual minimum of 8 million tonnes.

4. If, in future agreements between oil companies and neighbouring near Eastern countries, royalties were increased, Iraq was to have the right to request similar increases.

5. The companies should guarantee that the government's share be not less than £20 million annually for the years 1953 and 1954, and not less than £25 million for 1955 and each year thereafter.

6. The companies should supply the government refineries with all the crude oil necessary for local consumption at 5.5 shillings per ton.

7. Each of the three companies was to appoint two Iraqi directors.

8. The companies were to send at their own expense fifty Iraqi students annually to British universities for specialized studies in the oil industry, and IPC was to establish a school in Kirkuk to train Iraqi workers.

9. The government could take in kind up to 12.5 percent of the net production of each of the companies as part of the share of the profit and dispose of it in the open market or sell it back to the companies at current world prices.

Nationalization of oil companies

The agreement of 1952 faced three main difficulties:

(1) Cost determination: because the government share of oil revenues depend on net profits, it wanted to ensure that production costs claimed by the companies were proper and actually incurred. The government thought that the "Fixed Cost" claimed by the companies were too high. This was because the amortization of "dead rents", paid by the companies prior to the beginning of commercial production of oil, was not permissible, and that "grants" made by the companies were not deductible expenses, specially since the government was not consulted regarding these grants. The government also argued that the expenses of the IPC's London office should not be included within production costs.

(2) Prices: According to the agreement, payments to the Iraqi government should be based on posted price (see 2.4).

In February 1956, the companies announced a price cut of $0.5 per barrel of Iraq crude oil exported from Fao (Basra).[14] The government protested about this action, specially when no similar action was taken with other Gulf crudes. The IPC claimed that this cut was due to world demand and only effected low gravity oil. Another cut in oil prices took place in 1957. Yet the posted price for oil from the Gulf of Mexico in that time was over 50% higher than that of Iraq's similar gravity crude (36° API).[15]

(3) Natural Gas: According to the agreement of 1952, if the royalties of neighbouring countries were to increase, Iraq would have the right to request a similar increase. In 1957 the companies in Iran granted the government the right to use domestically the surplus gas produced by these companies. Iraq, therefore, demanded the utilization of the gas produced by the IPC. The companies refused this request and insisted on flaring it.

After the 1958 revolution, the new government invited the IPC group to enter into negotiations for the purpose of settling the problems that arose after the 1952 agreement. The government demanded agreement on the following issues;

(a) Determination of the areas covered by the concession but not actually exploited.

(b) Calculation of production costs.

(c) Method of fixing prices.

(d) Cancellation of price discount.

(e) Surrender by companies of surplus natural gas.

(f) Increase of Iraq's share of oil profits.

(g) Iraqi participation in the companies' share capital.

The negotiations ended on December 13, 1961, with law No. 80 defined the areas allocated to each of the companies as less than one percent of the concession areas they already had. The rest, which was 99.5 percent, was later awarded to the Iraqi National Oil Company (INOC) which was established in February 8, 1964.[16] The law also imposed certain cargo dues and port charges on oil shipments through Basra port. The companies never accepted law No. 80 and for the following ten years pursued a policy designed to abrogate it or at least "go around it". Their immediate response was to slow down production in order to penalize the country by denying it much needed oil revenues. This action caused the country a financial loss of I.D. 550 million in the period 1962-1970.[17] Moreover, the companies also minimized their investments and these dropped from I.D. 22.8 million in 1960 to I.D. 4.7 million in 1962 and to I.D. 1.3 million in 1963.[18]

In another round of negotiations in 1965, the companies demanded that they be allowed to increase their area of exploration to 1,937 sq. km.. This would included the very rich oilfields at "Rumaila" (at Basra). The companies also suggested the establishment of a Baghdad Petroleum Company as a joint venture between INOC and the IPC group with the former holding one third of the shares.

But these demands were refused by the government which was under public pressure not to change any condition in the law No. 80 of 1961. The companies in return continued their policy of slowing down oil production.

Between 1966-71, in addition to its long standing demands, the government stipulated that it should take control of the following:

> (a) "Production Programming. (b) Increasing the companies investment expenditures. (c) Bringing the price of southern oil to parity with other Gulf Crudes. (d) Moving IPC's headquarters to Baghdad, and (e) Allowing the government some degree of financial control over the operations of the oil companies. The government's grievances were no longer confined to questions of accounting procedures, but, rather, the government was demanding a measure of control over expenditures."(19)

In 1971 the companies asked the government to initiate talks for the purpose of settling all outstanding issues between the two sides. They offered (a) to pay retroactive royalties on Northern crude oil on the basis of border value rather than posted prices, (b) to increase production from Basra, and (c) to pay a lump sum of £10 million as compensation covering all the government's outstanding financial claims (estimated by the Ministry of Oil and minerals to exceed £650 million).(20) In exchange the companies made the following demands:

> 1. "A 20-year contract enabling them to purchase 8 billion barrels of Rumaila Crude produced by INOC at 1.62 dollars per barrel plus a yearly increment as provided by the Tehran Agreement.

2. The surrender by INOC to the companies free of charge of 12.5 percent of INOC's production, over and above the quantities to be purchased by them."(21)

The government rejected these demands for two reasons: firstly, it already informed them that it would not consider any suggestion affecting law No. 80 in any way; Secondly, accession to their demands would leave INOC without any marketing opportunities free of company influence. The 8 billion barrels represented all the recoverable reserves of North Rumaila. Furthermore, the price they offered for the crude "would, in fact, be lower than the companies would pay, were the companies themselves to undertake the development of the North Rumaila Fields."(22)

The government offered to sell the companies 150 million barrels of North Rumaila crude over a period of ten years at commercial prices and conditions. Coupled with this offer was a reminder to the companies that the government categorically rejected the principle of compensating the companies for law No. 80 as a matter of a principle because such an abrogation would be an infringement of the country's sovereignty, that it preferred to deal with each issue individually, and that it insisted on being involved in production programming and compensation for losses resulting from the policy of stagnant production adopted by the companies ever since the law No. 80 had been promulgated.

The government, again, invited the companies to submit a new and positive offer that could be used as a basis for negotiations. No such offer was made. Instead, the companies resorted to their old weapon of reduced production. The end of February 1972 witnessed a sudden and drastic reduction in production from the northern fields after such production had reached its maximum of 4.75 million tons per month during December, January and early February. In March production came down to 3.39 million tons and declined in April and May to 2.5 million tons per month.[23]

The new production policy brought financial disaster to the country. "Was production allowed to continue at this low rate, the total drop in government earnings for the year 1972 would have exceeded £110 million. This drop in revenues represented more than 50 percent of the total investment programmed for the fiscal year 1972/73. Hence, depriving the country of these funds would have resulted in paralysing the progress of Iraq's economic development" (which depended completely on oil revenues).[24]

Reduced production was justified by the companies on the grounds of reduced demand for oil in Western Europe and Japan. To accommodate the companies, the government offered three alternatives:

> 1. "The companies may produce at full capacity of 57 million tons annually (MTA), off-take 30 (the amount they claim there is a demand for), and leave the remaining 27 for the government without obligation, apart from cost of production

and transportation. The government would be free to market the oil.

2. If the companies believed they were unable within their commercial interests, to produce and export more than 30 MTA, then they may continue to do so provided that they agree to surrender the excess capacity of existing installations, especially the pipelines to the government to use as it seemed fit. All installations erected in Iraq are in fact financed jointly by both parties with Iraq paying its share in the form of amortized costs. It was not in Iraq's interest that a portion of this capacity was left idle.

3. "If, as the companies claimed, production from the Northern fields was less profitable than production from the southern fields, then they are invited to hand over the Northern fields to the government. They would be amply compensated by increasing production from the Southern fields under their control contained sufficient oil reserves to raise the production rate to a level that would make up from the production from the North." (25)

There was no response from the companies to these proposals. Therefore the government, on May 17, 1972, demanded the restoration of production rates to peak capacity and a positive response to its other demands. It gave the companies two weeks to reply. As no reply had been received the government had to take action. On June 1, 1972, therefore it passed law No. 69, which provided for the nationalization of the operations of IPC.

This law was not applied to IPC's two branches, the Mosul and Basra petroleum companies. This was done to prevent the oil companies retaliating against the govenment and because the government was not sure of its ability to handle all oil operations in the country. After all, the government basically wanted to have direct control over oil production and revenues.

The companies were invited immediately to enter into negotiations to enable this transfer to take place, and with the help of OPEC's Secretary General the two sides were able to conduct meaningful talks. As a result, on February 28, 1973, an agreement provided for the transfer of the assets and concessions of both IPC and MPC to Iraq but left the BPC concession intact. In addition, the companies agreed to pay Iraq £141 million in settlement of all outstanding claims by the government and to effect a substantial increase in production from the BPC's fields with a view to reaching an annual average of 80 million tones by 1976.[27] In return, the government agreed o compensate IPC for its nationalized assets through the delivery of 15 million tons of Kirkuk Crude, free on board (f.o.b.) Mediterranean ports at an average rate of one million tons per month.[29]

Soon after the October 1973 Arab-Israeli war, the government passed three laws providing for the nationalization of U.S., Dutch and Gulbenkian interests in BPC. Two years later, the remaining foreign interests in BPC (British and French) were also nationalized. The nationalization law made INOC fully responsible for operating the facilities of BPC. As in the case of IPC, the laws nationalizing BPC contained provisions for compensation.

2.2 Crude oil production

Table 2.1 shows Iraq's crude oil production between the years 1950-75. In 1952 the production increased to 18.5 m metric tonnes (M.T.) from that of 6.6 m in 1950. This increase was due to the agreement of 1952 which recommended an increase in oil production to a minimum of 20.75 m by 1954. Between 1952-72 oil production increased annually by 18.3%[28] The only years in which production dropped were 1957 and 1967; In 1957 the decline was due to the Suez war, while the decline in 1967 was due to (a) the IPC's policy of reducing production to discipline the Iraqi government through reducing its oil revenues; (b) the dispute of 1966 between Syria and Iraq over transit dues; (c) the 1967 Arab-Israeli war which led some Arab countries, including Iraq, to cut their oil supplies to the West, particularly to the USA.

In 1972 oil production dropped to 73.3 m M.T. after reaching 84.7 m M.T. on 1971. The reason for this decline was the conflict between the oil companies and the Iraqi government which resulted in an investment cut in the oil industry, and the problems of marketing Iraqi crude oil during the nationalization period of 1972-73. Despite the decline of 1972, however, the seventies saw the most significant increase so far in oil production in Iraq.

This was due to two main factors: (a) Iraq's control of its oil production, after the nationalization of the oil companies and (b) the increase in world oil prices after 1971, particularly in 1974.

TABLE 2.1

Crude Oil Production and Export, 1950-75,
(in millions of metric tons)

Year	(1) Production	(2) Export	% 2 : 1
1950	6.6	6.1	92.4
1951	8.6	8.0	93.0
1952	18.5	17.9	96.8
1953	28.2	27.4	97.2
1954	30.2	29.6	96.7
1955	33.2	32.2	97.0
1956	31.5	29.6	94.0
1957	22.0	20.2	91.8
1958	35.8	33.8	94.4
1959	41.9	39.8	95.0
1960	47.5	45.2	95.2
1961	49.0	46.6	95.1
1962	49.2	46.7	94.9
1963	56.7	54.1	95.4
1964	61.6	59.2	95.1
1965	64.5	61.6	95.5
1966	68.0	62.8	92.4
1967	61.4	58.6	95.4
1968	75.2	71.5	95.0
1969	76.0	72.3	95.1
1970	77.4	74.8	96.6
1971	84.7	80.9	95.5
1972	73.3	71.8	97.9
1973	100.9	96.3	95.4
1974	98.5	92.4	93.8
1975	113.1	102.9	90.9

Source: Al-Eyd, "Oil Revenues and Accelerated Growth", p.25.

OPEC, Annual Report 1979, pp.149, 157.

Iraq, to recover part of the losses made during the "companies' era" (1953-71), and in order to finance its expanding economic and defence development projects, had no other choice but to maximise oil revenues by increasing crude oil production especially when no alternative sources of revenue, such as taxes, appeared effective. Oil production, therefore, jumped to 113.1 m M.T. in 1975 showing an increase of 46.1% from that of 1972.

It can be suggested that the only reason for such expansion of crude oil production was the heavy dependence of Iraq on oil revenues which reached 83.6% of total government revenue in 1974 compared with the relative absence of other sources of revenue mainly taxes. Any decline in oil revenues therefore would cost the country a great deal, since the balance of payments, the balance of trade, and the country's economic and social development projects were heavily dependent on them.

2.3 Crude oil exports

Iraq exported an average of 95% of its crude oil production in the period under investigation.(29) Table 2.1 shows that this percentage which reached 97.9% in 1972 showed no sign of decline through the period. This clearly indicates that the country had no plan for changing such an export policy. The main reasons for this high export policy appear to have been:

(a) The non-existence of petrochemical and downstream industries which could use high amounts of crude oil and gas as raw material.

(b) The very low level of domestic consumption due to the absence of heavy industries that use oil as fuel (e.g. the steel and power industries), and transport (e.g. trains, ships and tankers). Moreover, the small population, compared with the amount of oil production, coupled with high average natural temperatures meant little demand for oil and gas for heating.

2.4 Iraq's crude oil prices

Up to the end of the Second World War, there was virtually no competitive market in the economic sense for crude oil.[30] The major oil companies which had been operating were able to share the markets in such a way as to balance the supply and demand for crude oil and maintain stable prices. The method in which these prices were set was derived directly from a historical pattern in which the price of oil of the United States - Gulf of Mexico - was the ruling price (posted price). In theory, posted prices represented the price at which any purchaser of crude oil could obtain supplies where the price was posted. But, obviously, it was an imaginary price which in no way corresponded to the true market situation.[31] It was, however, used as a base to calculate royalties and taxes on profits of the oil companies.

The importance of crude oil pricing in the Middle East area, however, started with the 50-50 profits-sharing agreements between governments and oil companies during the first half of the fifties. Since the size of the revenues of the oil producing countries depended on posted prices, any decline in these prices, therefore, reduced the per barrel revenues of these countries.

In Iraq, after the agreement of 1952 (the 50-50 profits-sharing agreement), the posted prices of Iraqi crude oil started to decline compared with that of the base point in the United States - Gulf of Mexico crude. This was actually planned by the oil companies so as to keep the prices of Middle East oil competitive with other crude prices in the United States after the freight cost and import duty were added.(32) In fact this was the case for all types of oil exported from the Middle East area through the Arab-Persian Gulf and the Mediterranean oil terminals. Moreover their prices (of Middle Eastern oil exports) were even considerably lower than those in the Western Hemisphere and European Markets.(33) Thus, this reduction in the inter-company buy-in price of Middle East crude oil resulted in excessive profits for the companies, while it deprived the Middle East producing countries of a considerable part of their rightful share of the profits which were estimated at $4.734 million in 1959.(34) In comparison with the prices of Texan oil (Gulf of Mexico) and Venezuelan oil (the Caribbean) the prices of the Middle

East's oil of similar API gravity were nearly 70% and 40%, respectively, lower.[35]

The price of Iraq's crude oil via Basrah (on the Arab-Persian Gulf) before the Suez crisis (1957) was $1.87 per barrel (p/b) (36° API). It rose to $2.00 p/b in 1957.[36] But as soon as the crisis ended the oil companies started to offer the crude oil at a discount. By the end of 1958, Middle East crude oils were estimated to be discounted against posted prices in the Gulf by 11-13 cents per barrel.[37] In 1959, BP took the lead in reducing the prices of all its Middle East oil by 18 cents p/b. Iraq's oil was priced at $1.82 and $2.31 p/b at Basrah, and Banias and Tripoli (the East Mediterranean) respectively. Another round of cuts were introduced in 1960 reducing Iraq's oil prices to $1.74 and $2.21 p/b at the above two locations.[38]

In 1960, the Organization of Petroleum Exporting Countries (OPEC) was established, with Iraq as one of its original members (Iran, Kuwait, Saudi Arabia, and Venezuela). The principal aim of this organization was to stabilize the posted prices in the Middle East, specifically the Gulf, and to restore the pre-1960 posted prices.

The struggle of OPEC with the oil companies in maintaining fair prices for crude oil, continued until 1971. Iraq's oil prices therefore were kept low during the sixties. But it was not until the Tehran conference of

1971 that the OPEC members, after ten years of work, were able to control their own prices for crude (the OPEC system). The Tehran agreement contained important agreements. It stated that there should be:

(1) A minimum rate of taxation of 55% of the companies' profits.

(2) Uniformity of posted prices: this led to an increase of 33 cents p/b for all Gulf countries.

(3) Harmonization of quality differentials: increase of 2 cents p/b of oil above 40° API, and an decrease of 1.5 cents of oil below 40° API.

(4) Price increases:

(a) An annual increase of 5 cents p/b to reflect the world price rise for oil products.

(b) An annual increase of 2.5% in posted prices over inflation on imported goods.

(c) An increase of 2 cents p/b to cover part of the difference in transport costs.

(5) Stability of taxation and basic posted price for a period of five years.

The rise in the posted price (by 35 cents p/b) as a result of the above agreement increased the return to the Iraqi government by 19 cents p/b.

A larger increase in Iraq's crude oil prices, however, came in 1973 after the new decision of OPEC to raise the posted price from $3.00 to $5.12 p/b.[39] This decision was taken by the OPEC members mainly as a protest against

the USA and the European countries who backed Israel in its war with the Arabs in 1973. Moreover, the 30% cut in production level of the Arab oil as a result of that war created a shortage of crude, which led to panic buying by the smaller oil companies and industrial countries. In turn a price of $17.34 p/b was offered for some of the Gulf oil, namely Iran.(40) This, therefore, encouraged Iraq and other members of OPEC to raise their prices.

By the end of 1975 and by its success in controlling crude production after the nationalization of 1972/73 was established, Iraq managed to attain a price of crude oil of $19.23 p/b.

2.5 Oil revenues and public finance

Before the 50-50 profits-sharing agreement of 1952, the size of oil revenues was too small to play a major role in government finance; they only reached I.D. 0.4m in 1931, I.D. 1.6 m in 1941 and I.D. 6.7 m in 1950 ranging between 10-17% of total government revenues in these years.(41) However, in 1952, the year of the agreement, oil revenues rose sharply to I.D. 40.1 m contributing 53.9% of total government revenues (Table 2.2). Three years later in 1955, oil revenues reached I.D. 73.7 m and continued to rise to reach its highest level of I.D. 1724.1 m in 1974. The latter amount of revenue contributed 83.6% of total government revenues in the same year, compared to 31.0% in 1951.

TABLE 2.2

Oil Revenues and
Total Government Revenues
(millions of Iraqi dinars)

	1	2	3
Year	Oil Revenues	Total Revenues	1 to 2 (percent)
1951	13.9	44.9	31.0
1952	40.1	74.4	53.9
1953	58.3	82.9	70.3
1054	64.3	97.8	65.7
1955	73.7	125.9	58.5
1956	68.8	113.8	60.4
1957	48.8	97.6	50.0
1958	79.8	137.2	58.2
1959	86.6	133.2	65.0
1960	95.1	151.2	62.9
1961	94.1	187.7	50.1
1962	95.1	184.7	51.5
1963	110.0	194.3	56.6
1964	126.0	221.0	57.0
1965	134.0	254.0	52.8
1966	122.4	229.4	53.4
1967	151.7	292.2	51.9
1968	174.7	308.9	56.6
1969	169.0	341.4	49.5
1970	211.7	403.7	52.4
1971	350.0	534.1	65.5
1972	218.6	406.4	53.8
1973	823.2	1,039.7	79.2
1974	1,724.1	2,062.0	83.6
1975	2,218.9	N.A.	N.A.

Sources: Ferhang Jalal, "The Role of Government in the Industrialization of Iraq" (London: Frank Cass, 1972), p.11; Iraq, CBI, Bulletin, no. 3 (July-September 1971); Iraq, CBI, Bulletin, No. 1 (January-March 1976); and Iraq, CSO, Annual Abstract of Statistics 1976. Petroleum Economist, September 1976, p.338.

As oil revenues continued to rise rapidly throughout the period 1953-75, government budgets also continuously increased. Officially 30% of total oil revenues were allocated to the ordinary budget before 1959, and 50% after. But in most years, particularly during the period 1965-75, this percentage was increased (it reached 70% in 1965) by transferring large sums from the other 50% which had been allocated to development programmes in order to compensate for the shortfall of the ordinary budget.(42) In the fiscal year 1970/71, the official share of the ordinary budget from oil revenues was I.D. 114.4 m. This share dropped down to I.D. 109.3 m (40.4% of total budget allocations) in 1972/73 and increased to I.D. 497.1 m (75.6% of total allocations) in the fiscal year 1974.75. It was only with these contributions from oil revenues, however, that the ordinary budget showed surpluses. Defence expenditure, it may be noted, was a major element in the rise in the ordinary budget. Its share of total expenditures of I.D. 246.3 m. in 1976 accounted for 41.7% of total revenues of that fiscal year.(43) This clearly answered the question why the official development programmes had never received their full dues (see Chapter 3).

2.6 Backward and Forward Linkages

The linkage, or the 'interdependence' of a sector is defined as, and also determined by, its demand and supply

links with other sectors. This relationship is usually analysed using the input-output model. This model shows both how much each sector produces, the source of its inputs and direction of its outputs. Each sector usually produces output which is used as intermediate products by other sectors in their production processes or as finished products for final sale to consumers.(44) Each sector also appears in the model as a user (buyer) of the products of other sectors. According to Hirschman, only the supply and demand of intermediate goods, which are used as inputs in further production are included in the determination of 'interdependance'.(45) The degree of the interdependance of a sector, therefor, can be measured by computing:

(a) the proportion of the sector's input that represents purchases from other sectors, and

(b) the proportion of its total output that does not go to final demand but to other sectors.

The first ratio indicates whether a sector is a primary sector in the sense that its "cost bill is dominated by the components of value added and complementary imports".(46) Similarly the second ratio indicates whether a sector is a final sector in the sense that its output mostly goes to final demand. The first ratio shows the backward linkages of that sector while the second ratio shows the forward linkages.

The importance of backward and forward linkages is usually linked with economic development. While these

linkages are most developed in advanced industrial economies, their absence seems to be one of the most charactaristics of developing countries.[47] This is mainly due to the fact that the economies of developing countries, unlike industrial countries are denomated by primer sectors, namely mining and agriculture. This suggest that a more developed industrial, or sub-industrial, sector/s, is required in these countries. One way of doing so is to establish new industries which add value to the output of the primer sectors. Hirschman indicated that new industries would increase supply and demand, thus strengthing linkages between various sectors.[48] It is therefore very important for developing countries to look at their economies and examine how linkage and their effects normally evolve. "Such an analysis is likely to yield hints about the possibility of influencing development in such a way as to strengthen these effects".[49]

As far as the interdependence of oil with the other sectors of the Iraqi economy is concerned, Table 2.3 shows the ratio of this sector's interdependence with other sectors. The Table also shows the interdependance ratios of non-oil sectors with each other.

The oil sector showed the lowest ratio of linkages of 0.03 (both backward and forward). This means that only a very minor amount of its inputs were produced by other sectors, and only a minute amount of its output was acquired by other sectors.

Other sectors, particularly 'Manufacturing', showed higher ratios of interdependence with each other. The only sector which showed no linkages at all was 'Public Administration and Defence', and this was because its output exclusively went to government consumption, ie, final use (This was calculated by using wages and salaries of employees in this sector).

Backward and forward linkages in the oil sector were mainly represented by the demand of oil industry for domestic labour and by its supply of low cost fuel to the national economy.

The isolation of the oil sector from the rest of the economy suggest the necessity of its integration with other sectors. This could be achieved by the development of this sector in a way that both its supply of and demand for intermediate goods is linked with domestic industry. One way may be to establish a sub-industry such as petrochemicals which with its high demand for labour and capital equipments and its supply of various intermediate products can increase the interdependance ratio of the oil sector, with other sectors.(50) At the same time, it is also important to encourage the development of other sectors of the economy in a way that it improves their backward and forward linkages with the oil sector.

In a mining and petroleum economy such as in Iraq, however, the fiscal linkages of the oil industry may have stronger connection than other linkages. This was clearly seen in the heavy dependence of the Iraqi government on oil

TABLE 2.3

Backward and Forward Linkages (1969)

Sector	Backward linkages	Forward Linkages
Agriculture	.10	.24
Oil	.03	.03
Manufacturing	.66	.59
Construction	.59	.14
Electricity, Gas & Water	.26	.26
Transport	.26	.24
Trade	.22	.30
Banking	-	.38
Dwelling	.27	-
Public Adm. & Defence	-	-
Services	.14	.06

Source: S.M.R.Al-Shabibi, "Optimal Industrialization With Uncertain Oil Revenues: Dynamic Multisector Models for Iraq, 1974-1984", A Thesis submitted to the University of Bristol for the degree of D.Ph., December 1974, p.56.

revenues for its ordinary budgets between 1953-75 (Table 2.2). Obviously the reason was due to the weakness of other fiscal sources, mainly taxes, which could not provide the government with the same amount of revenues. Moreover, these alternative sources of revenues were never as accessible as those of oil.

2.7 Employment

The demand of the oil sector for labour was the main backward linkage of this industry with the rest of the Iraqi economy. Table 2.4 shows the number of people employed in the oil sector (national and foreign) between 1957-67. No official data is available before and after this period. However, it was estimated that over 90% of people employed in 'Mining' (see Table 1.3 of Chapter 1) were actually employed in the oil industry.

According to Table 1.4, out of the total of 866 persons in permanent employment only 241 Iraqis were employed in the oil sector in 1957. This puts the percentage of foreign employees at 72.2% of the total. But this percentage showed a sharp decline in the following years to stand at only 11.2% in 1967 (only 79 persons out of 709). The reason for the decline in foreign labour was due to the increase of Iraqi skilled workers as a result of government training policies.

The number of people in temporary employment in the oil sector is also shown in the Table above. These workers were mostly unskilled and were hired only for short

TABLE 2.4

National and Foreign Permanent Employees of Oil Companies 1957-67.

Year	Permanent Employment Iraqis	Foreigners (1)	Total (2)	Temporary Employment	General Total	% 1 : 2
1957	241	625	866	10397	11263	72.2
1958	269	589	855	10419	11274	68.5
1959	294	593	877	11101	11988	66.9
1980	509	513	1022	12635	13558	50.2
1961	560	442	1002	12075	13077	44.1
1962	621	339	960	11724	12684	35.3
1963	623	220	843	11233	12976	26.1
1964	620	175	795	10695	11490	22.0
1965	625	149	774	10470	11244	19.3
1966	618	111	729	10332	11061	15.2
1967	626	79	705	10249	10954	11.2

Source: Ministry of Planning, SPB 1957-1967, Table 34, pp. 82-83.

periods. There number, therefore, varied through the years depending on the level of production operations; 11,263 in 1957, rising to 13,558 in 1960 and dropping to 10,954 in 1967.

Five types of workers were employed in the period studied. Table 2.5 show their type, number, and average income per year. 'Technicians' numbered 640 in 1961 with the highest average income per head of I.D. 2.898. This number dropped through the years to 415 persons in 1969, while their average income per head rose to I.D. 3.137. The average income attained by 'Administrators' was I.D. 3.724 in 1963 and I.D. 3.994 in 1969. However, the group 'Administrators' attained the highest level of income between 1963-69, reaching an average of I.D. 3.981 in 1969. The number of Administrators had also dropped to 156 persons in 1969; from 292 persons in 1961.

The average income of 'Skilled and Semi-Skilled Workers' make up the third position. Although their number of 7,935 in 1961 had dropped to 6,115 in 1969, they still represented more than half of the people employed in the oil industry. Between 1961-67 such a worker attained an average income of (I.D. 0.584). In 1969 this average increased to I.D. 0.980.

'Unskilled workers', in terms of income per year, took fourth place followed by 'Doormen and Guards'. In the last two years, the latter group managed to climb to fourth place with an average income of I.D. 0.472, leaving the

TABLE 2.3

Wages of Employees (National and Foreign) in Oil Companies
1961-69 (000' I.D.s)

	Category	1961 Wages	1961 No	1961 Average Income Per Person	1963 Wages	1963 No	1963 Average Income Per Person
(1)	Skilled & Semi-Skilled						
	Males	4374	7864	0.556	4256	7611	0.559
	Females	40	71	0.563	39	66	0.591
	Total	4414	7935	0.556	4295	7677	0.559
(2)	Unskilled						
	Males	1188	3609	0.329	958	2719	0.352
	Females	9	26	0.346	7	20	0.350
	Total	1197	3635	0.329	965	2739	0.352
(3)	Technicians						
	Males	1855	640	2.898	1322	447	2.957
	Females	-	-	-	9	4	2.250
	Total	1855	640	2.898	1331	451	2.951

TABLE 2.5 (cont.)

(4)	Administrators					
	Males	737	274	2.689	746	242	3.083
	Females	42	20	1.100	41	14	2.214
	Total	779	294	2.649	777	256	3.035
(5)	Doormen & Guards					
	Males	62	183	0.339	82	245	0.335
	Females	-	-	-	-	-	-
	Total	62	183	0.339	82	245	0.335
	Grand Total	8307	12687	0.655	7450	11368	0.655

Source: Statistical Pocket Book, 1960-1970 and 1972.

TABLE 2.5 (cont.)

1965			1967			1969		
Wages	No	Average Income Per Person	Wages	No	Average Income Per Person	Wages	No	Average Income Per Person
4525	7611	0.595	4760	7587	0.627	5938	6057	0.980
65	102	0.638	70	106	0.660	41	58	0.707
4590	7713	0.595	4830	7693	0.628	5979	6115	0.978
869	2350	0.369	869	2219	0.392	690	1492	0.462
12	30	0.400	8	19	0.421	4	10	0.400
881	2380	0.370	877	2238	0.392	694	1592	0.436
1325	409	3.239	1224	376	3.255	1274	407	3.130
16	8	2.000	14	5	2.800	28	8	3.500
1341	417	3.216	1238	381	3.249	1302	415	3.137

TABLE 2.5 (CONT.)

1965			1967			1969		
Wages	No	Average Income Per Person	Wages	No	Average Income Per Person	Wages	No	Average Income Per Person
1099	315	3.489	1132	304	3.724	619	155	3.994
56	22	2.545	50	20	2.500	2	1	3.994
1155	337	3.427	1182	324	3.648	621	156	3.981
104	281	0.370	109	274	0.398	84	178	0.472
-	-	-	-	-	-	-	-	-
104	281	0.370	109	274	0.398	84	178	0.472
8071	11128	0.725	8236	10910	0.755	8680	8456	1.026

'unskilled' in fifth place with an average income of only I.D. 0.436 per person.

In conclusion, the above information showed that:

(1) The oil sector provided less than 1% of total employment in Iraq in the period 1953-75.

(2) The number of people employed in this sector had dropped by 50% between 1961-69.

(3) From the total of 8,680 workers engaged in the oil sector in 1969 only 571 attained an average income ranging between I.D. 3.130 and I.D. 3.981, while the rest (7,885 persons) attained an average income ranging between I.D. 0.436 and I.D. 0.978.

(4) The highest average incomes were reached by the two groups 'Administrators' and 'Technicians'. Both groups were dominated by foreign workers in the period.

2.8 Conclusions

This chapter has looked at the role of the oil sector in the Iraqi economy in 1953-75. It has been seen that the fiscal impact of this industry in terms of revenues received by the government had a dominant effect on the Iraqi economy through ordinary budgets. The direct role of the oil sector via backward and forward linkages was very weak. The only direct linkages of the sector were seen in its supply of domestic fuel and its demand for labour. But only 4% of total oil production went to domestic

consumption, and less than 1% of total employment was generated by the oil sector.

Because of this, the direct contribution to income and aggregate demand in the oil sector was of minor importance. Nor had it ever been in a position to create the "abilities, skills, and attitudes" needed for further development of the economy.

Iraq, to recover part of the losses made during the "companies era" (1953-71) and to attain higher revenues to finance the government's expanding expenditures, concentrated continuously in this period on increasing crude oil production of which over 95% was exported. This policy led to a heavier dependence on oil revenues and to the neglect of all other sources such as taxes. Even though during the period 1973-75 when inflation in Western Europe led to higher prices of imported goods into Iraq, the government took no notice and continued to pursue the same policy of increasing crude oil production for export.(51)

Moreover, the policy of the oil companies which had prevented Iraq from having downstream operations (such as refining), coupled with an irrational government policy which concentrating on exporting crude oil rather than utilizing it domestically in, say, petrochemical industries, deprived the Iraqi economy of the beneficial effects of the backward, lateral, and forward linkages that normally accrue to an economy characterized by the

ascendancy of a leading sector. Furthermore, the absence of industrial growth also prevented the country from attaining additional revenue which could be generated through the high value added nature of new industries.

CHAPTER 2

NOTES

1) For more details of this agreement which awarded the detached territories of the Ottoman Empire as mandates to England and France (in April 1920) see Benjamin Shwadran, "The Middle East Oil and The Great Powers", John Wiley and Sons, New York, Toronto, 1973, p.201.

2) According to the above agreement, the British held 75% of the share of the Turkish Petroleum Co, while 25% of the share went to the French.

3) For more details of The Mosul Conflict, see "The Middle East Oil and the Great Powers", pp.222 - 25.

4) H A Al-Haris, "Taxation and The Development of Tax System in Iraq", Dar Wahran, Cairo, 1973, p.383.

5) For more details, see "The Middle East Oil and The Great Powers", pp.202-207.

6) This agreement was signed in 1928 by all the participants in the Turkish Petroleum Co. It limited the activity of each participant of the company and gave the Americans a share of 23.75% of total. This share was awarded to two oil companies; Standard Oil of New Jersey (11.875%) and Mobil Oil (11.875%).

7) "The Economy of Iraq: "Development and Perspecives", 1958-1976-1980, Ministry of Information, Baghdad, Iraq, 1977, p.90.

8) Ibid, p.91.

9) Ibid, p.92.

10) "The Middle East Oil and The Great Powers", p.245.

11) Ibid.

12) Ibid.

13) Law No. 4 of 1952, Baghdad, Iraq.

14) Kadhim A. Al-Eyd, "Oil Revenues and Accelerated Growth; Absorptive Capacity in Iraq", Praeger, 1979, p.17.

15) Fereidun Fesharaki, "Development of The Iranian Oil Industry: International and Domestic Aspects", Praeger, New York, 1976, p.97.

16) The Laws No. 80 of 1961 and No. 11 of 1964, Republic of Iraq, Baghdad.

17) Iraq, Ministry of Oil and Minerals, "The Nationalization of the Iraq Petroleum Company's Operations in Iraq: The Facts and the Causes", Baghdad, Iraq, 1973, p.8.

18) "Oil Revenues and Accelerated Growth", p.19.

19) Ibid, p.20.

20) Ibid, p.21.

21) Ibid.

22) Nationalization of IPC, p.15.

23) Ibid, pp. 16-17.

24) "Oil Revenues and Accelerated Growth", p.22.

25) Nationalization of IPC, pp.20 - 21.

26) Ibid, P.22.

27) Ibid.

28) Between the years 1950 and 1975, Iraq's share of oil as a percent of total Middle East production rose from 7.7% to 11.4%, and also rose from 1.3% to 4.2% of world oil production. In comparison with three selected countries - Iran, Kuwait and Saudi Arabia - Iraq had the highest rate of growth of 22.0% of production during the period 1950-60; this rate dropped to the lowest rate of 4.9% during 1960-70 and rose again to 7.8% to attain second place after Saudi Arabia, in 1970-75.

29) The principal market for Iraqi crude oil exports is Western Europe. Western European countries (mainly France and Italy which imported 55% of crude oil from Iraq) accounted for 75% of Iraq's total crude oil exports in 1967, 75.9% in 1971, and 54.1% in 1975. The relative decline in 1975 reflected the sharp rise in the country's exports to the socialist countries.

30) "Development of The Iranian Oil Industry", p.96.

31) Jean-Marie Chevalier, "The New Oil Stakes", Penguin, 1975, p.

32) Jean-Marie Chevalier, "The New Oil Stakes", Penguin, 1973, p.27.

33) For example the prices of Texan oil (Gulf of Mexico) and Venezuelan (The Caribbean) were nearly 70% and 40%, respectively higher than the Arab-Persian Gulf prices of similar API gravity. "Development of The Iranian Oil Industry", p.97.

34) Ibid.

35) Ibid.

36) A. Alnasrawi, "Financing Economic Development in Iraq", Praeger, pp 34-35.

37) Ibid.

38) Ibid.

39) "Development of The Iranian Oil Industry", p.116.

40) Ibid, 118.

41) K. Langley, "The Industrialization of Iraq", Harvard University Press, 1962, p.303.

42) Examples for transferring revenues from development projects to compensate for the shortfall of ordinary budget can be seen in the following table:-

Year	Sum of Transferred Revenue (in million of Iraqi Diar)
1965	28.00
1966	4.00
1967	20.79
1968	14.10
1969	14.47
1970	8.13
1971	1.75
1972	2.21
1973	5.35

Source: Dr H A Al-Haris, 1973, p.426.

43) Quarterly Economic Review of Iraq, Annual Supplement 1978, E.I.U., London, 1978, p.16.

44) John Lindaner, "Economics, A Modern View", W. B. Saunders, 1977, p. 628.

45) Albert O. Hirschman, "The Strategy of Economic Development", Yale University Press, 1958, pp. 98-104.

46) S.M.R. Al-Shabibi, "Optimal Industrialization with Uncertain Oil Revenues: Dynamic Multisector Models For Iraq, 1974-1984", a Thesis submitted to the University of Bristol for the Degree of Ph. D, December 1974, p.55.

47) Ibid, p. 109.

48) Ibid, pp. 100-101.

49) Ibid, P. 109.

50) The effect of new industries in term of linkages may be explained in the following example. As the establishment of W industry may lead, through linkages effects, to the establishment of n additional industries with net output equal to Xi ($i = 1, 2 \ldots n$) and if the probability that each one of these industries will actually be set up as a result of the establishment of industry W is Pi ($i = 1, 2 \ldots n$), then the total linkage effect of industry W is equal to

$$\sum_{i}^{n} Xi\ Pi$$

For more details, see Hirschman, 1958, pp. 100-102.

51) The increases of crude oil prices during 1973-75 consequently affected the prices of imported goods on which Iraq heavily depended for both consumption and development processing. Due to the 40% increase in inflation in Western Europe during 1974-75, the equivalent value of Iraq's imported goods per barrel of crude oil exported in 1975 went down to equal only two-thirds of that in 1973.

See Journal of Social Sciences, Vol. V, No.2 July 1977, Kuwait, p.76.

Also, see J A Allan, "Libya: The Experience of Oil", Croom Helm, London, 1981, p.187.

CHAPTER 3

Economic Development in Iraq: Strategies and Plans

The overall objective of economic development in Iraq has been, and still is, the stimulation of the non-oil sectors in order to reduce the country's heavy dependance on oil revenues. This chapter examines the strategies that were adopted in order to achieve this objective. It also attempts to indicate the problems of economic development through the analysis of the development plans which were put into action during the period 1950-75. Means of financing development plans will, in addition, be mentioned later in the chapter.

3.1 The Period 1953-59

The "Development Board"

The formality of economic development planning in Iraq started with the establishment of the Development Board in 1950. This Board was set up as a result of two main factors:

(1) The increase in oil revenues which had to be utilized productively and constructively within a formal management structure.

(2) The desire of both the government and the people to initiate economic and social development policies for the country.

The Board, with the Prime Minister as chairman, the Minister of Finance as an ex officio member and five non-political full-time executive members, was to be provided with all oil revenues in order to help it underwrite its development programmes. Its first task was to prepare a general plan to develop the Iraqi economy and to help in raising the standard of living of the people. Due to the increase of oil revenues as a result of the 50 - 50 profit sharing agreement with the oil companies, the law which established the Development Board (No. 23 of 1950) was abandoned in 1952 reducing the share of the Board of Oil Revenues to 75% of total (the other 25% was directed to the ordinary budget). In order to ensure the productive use of the large sums of funds which became available to the Board, the government in 1953 again re-established the above law and a new "Ministry of Development" was established. The Minister of Development became an additional ex officio member of the Board, responsible to Parliament for the conduct of his Ministry and of the Board. The execution of development plans was then placed under both the Board and the Ministry of Development.

The Board had no experience in economic planning, and since no available experience was acknowledged in the country, the assistance of foreign experts was needed.

During its existence (1950-58), the Board invited the following foreign experts in order to assist in planning the general economic development in Iraq:

(1) The International Bank for Reconstruction and Development (1951-52). This Bank was to undertake a general review of Iraq's potential economic development.

(2) Carl Iversen (1953-54). The leader of three Danish economists who was to present a study of Iraq's Monetary Policy.

(3) Lord Salter (1955). A British economist, who was to present a general plan for economic development in Iraq.

(4) Arthur D Little (1956), British. He was to present a general survey of Iraq's potential industrial development.

The strategy of economic development in Iraq: Balanced or unbalanced growth?

Basically, the goal of planning economic development is to provide that amount of "productive investment" which could be sufficient to generate a rate of increase in the national income higher than that of the increase in population, so that per capita national income increases.[1] Accordingly, an economic planner faces two main tasks:

1) The mobilization of fiscal resources for the purpose of productive investment.

2) The direction of these resources into proper channels.

The Board had no difficulties in evolving strategies which would provide fiscal resources since oil generated revenues were already available. The main task therefore was where to invest these revenues so as to help raise the standard of living of the Iraqi people. There is obviously no one certain road which leads to this end result. At a general conceptual level, an economist may follow one of two main lines of argument: he either supports the doctrine which argues that investment should be spread widely over the whole economy, to achieve a "balanced growth"; or he goes for an "unbalanced growth" strategy which consists in concentrating investment upon a certain sector of the economy, that is upon a certain growing point, and giving that priority.(2)

Supporters of "balanced growth" argue that the economy is made up of inter-related parts, and that economic growth will be held back unless the development of each part keeps more or less in step with that of the other parts.(3) "One cannot efficiently develop one sector without consideration of related sectors".(4) As one industry provides a market for another industry's output, the spreading of investment across a wide range of industries will therefore increase the overall size and effectiveness of the market of a country.(5) "The relation between agriculture and manufacturing industry offers the clearest and simplest

case of balance needed for economic growth."[5a] An increase in industrial output, from this perspective, requires the development of agriculture, because additional food output per agricultural employee will be required by the increased number of industrial workers. Agricultural development, in its turn, will provide a market for industrial goods and will supply raw materials for the industrial sector. Furthermore, industrial development will also require more investment in facilities such as transport, power supplies and so on as without the availability of these facilities a progressive industrial development will run into difficulties.

Supporters of "unbalanced growth", on the other hand, argue that a developing country cannot be expected to provide sufficient technical and managerial abilities and investment funds to set up simultaneously several industries that are going to be each other's customer.[6] In other words, "if a country were ready to apply the doctrine of balanced growth, then it would not be underdeveloped in the first place."[7] A developing country, therefore, needs to concentrate investment in one sector of the economy, leaving other sectors to catch up later. For example, accordingly to this argument, investment in the steel industry will put pressures on other sectors of the economy (due to food shortages, power shortages, transportation shortages etc.) which will then lead, either through the price mechanism or through

government action, to appropriate development in these sectors.[8] In order to meet the new demand, raw materials and labour can be imported and generated goods produced domestically can be exported.

However, critics of the unbalanced growth model argue that because of rigid structural characteristics, one cannot be sure that one sector will be able to pull through other sectors of the economy.[9]

Giving the high level of investment funds, it is arguable that unlike other non-oil developing countries, Iraq may have the ability to provide adequate funds to support the simultaneous development of more than one sector of its economy.

The "International Bank for Reconstruction and Development" recommended a "well balanced economic development" for Iraq. It argued that:

> Conditions... are generally favourable to further industrial development. The entrance of industry into new fields would help to balance the over-all development of the country and to utilize its resources more fully. At the same time it would increase employment and thereby aid in raising the general standard of living.... An expanding agriculture should provide material for processing... and when the standard of living among the rural population is raised there should be a growing domestic market for industrial products. In oil and natural gas the country possesses a cheap source of power and fuel as well as an important source of raw materials.[10]

In Iraq's case however the Bank suggested, as a first step, that the country should concentrate on the improvement of those industries already in existence, eg, textile, sugar, foodstuff, cigarettes, leather and alcohol. All these

industries depending basically on agriculture for their raw materials.

Professor Carl Iversen disagreed with the Bank's above policy and argued for "unbalanced growth" strategy. He stated:

> It seems to be in the best interest of Iraq not to force this development (industrialization) but to concentrate on raising the efficiency of agricultural production... Iraq has large comparative advantages in agricultural production, whereas the possibilities of creating new industries able to compete on equal terms with producers abroad are more limited and remote.(11)

Iversen's argument was supported by , Lord Salter who confirmed that the principal natural assets of Iraq were her alluvial soil and her water resources. "The greatest natural opportunity of development is through irrigation and draining.(12) Lord Salter argued that Iraq had no need to force the pace of industrialization.

> The expenditures of money and effort on developing industries for which Iraq has no natural advantages and could not compete with foreign manufactures except in a highly protected domestic market would be wasteful and damaging to Iraq's general progress and prosperity.(13)

It appears that the argument between the International Bank, on one side, and Iversen and Salter on the other, concentrated on whether Iraq should invest in industry as well as in agriculture or whether it should concentrate on agriculture only leaving other sectors, namely industry, to catch up later. The essence of Iversen and Salter's argument was that Iraq possessed natural advantages which favoured agricultural rather than industrial development. These arguments can be summarised in the following ways:

1) Since Iraq is a country with large areas of cultivable land and adequate water resources, it has many advantages when attempting to develop agriculture. The expanding world demand for food would put Iraq in a favourable position, and agricultural surplus could create a highly profitable source of export. Iraq, therefore, should concentrate investment in agriculture. A diversification of resources available in Iraq between agriculture and other sectors, mainly industry, would reduce the level of investment spent and would weaken the effort needed for high agricultural growth.

2) Iraq's domestic market is small in size and could not absorb the goods produced by an expanding industrial sector. Also due to factors such as cost and quality advantages, Iraq's industrial goods can not compete with those produced in the industrial countries. In other words, neither local demand nor export possibilities are available for Iraq's industrial goods.

It is true that in a developing country like Iraq where more than half of its population are peasants, a development strategy should give priority to the improvement of their standard of living. This, to a certain level, could be achieved through general agricultural development. In other words, it may be achieved through increasing agricultural production. However, unless farmers sell their products, there would be no increase in their incomes. A farmer would like to be

assured of a large market for his products and also an adequate annual income. Without an adequate return from his farm's output, his standard of living might get worse rather than better. In Iraq, during the fifties, neither a large market for large agriculture production nor legal protection of farmers' incomes (e.g. tariffs, direct and indirect credits and subsidies) existed. An export market, on the other hand, also presents difficulties.(14)

One could argue that, for agricultural development, the government should attempt to enlarge the scale of the domestic market itself. A larger size of market could reduce competition between farmers, thus helping, if not improving, farmers' standard of living. For example, one way of increasing demand for agricultural products is through developing industry. This sector may require raw materials for processing as well as food for its employees. A larger industrial sector would not just mean an extra market for agricultural products but could accelerate the development of agriculture through the supply of machinery given that only primary equipment was available during the fifties. The need for agricultural development processes for industrialization is clearly identified by Lewis

> An agricultural and industrial revolution always go together, the first releasing the labour which the second draws off the land. Governments of backward countries have therefore to put into their agricultural programmes projects for industrialization.(15)

Moreover, as mentioned earlier, unlike other developing countries, Iraq with the assistance of its potentially

increasing oil revenues may be capable of investing sufficiently in different sectors of the economy without limiting itself to agriculture. In other worlds, sufficient investments for the development of agriculture as well as for the development of industry may be mobilized "without suffering the typical foreign exchange crises and inflationary pressures of 'underdeveloped' countries which attempt to force the pace of economic growth".(16)

The second factor in the argument of Iversen and Salter suggested two points:

1) the Iraqi market for industrial goods is small in size, and
2) goods produced by industries in Iraq could not compete with foreign goods, domestically or abroad.

It is true that a small population can limit the demand for a certain industrial product, but it is not necessarily true that it will limit all other different industrial products. On the other hand, a large population may not always indicate a high demand for industrial products. For example, in a developing country with a large population, one cannot expect the same level of demand for a product as that in a developed country with the same size of population. This is because developing countries have lower per capita income (low purchasing power) than developed countries and the need for such an

industrial product may be limited in developing countries due to the nature of their non-industrialized economy.

Therefore, concentrating on the development of agriculture and neglecting industry in Iraq may prevent agriculture itself from having a large scale and expanding market which demands raw materials and food from agricultural products.

The second point of the argument may also be dismissed on the ground that goods produced domestically can be protected by tarrif barriers. These goods of course can always be improved in terms of quality and cost, thus reducing competition from similar goods produced abroad. However, the whole arguement may not be applicable in the case of Iraq which is seeking industrial development and depending on producing goods for a well-protected domestic market only.

The Board's Development Plans (1951-1958)

The Development Board presented four plans for economic development in Iraq between 1950-1958. These plans are summarized in Table 3.1.

It should be noted that the first development plan of 1951/52-1955/56 was presented by the Board before the 50-50 profit sharing agreement with the oil companies had taken place in September 1951. As a result of this agreement which almost doubled the Board's shares from oil revenues, the first development plan was abolished in the same year

TABLE 3.1

The Board's Development Plans 1951-58
(Million of Iraqi Dinars)

Category	First Plan 1951/52 - 1955/56 Allocation	% of total	Second Plan 1951/52 - 1956/57 Allocation	% of total	Third Plan 1955/56 - 1959/60 Allocation	% of total	Fourth Plan 1955/56 - 1960/60 Allocation	% of total
Administration	1.0	1.5	3.2	2.1	5.5	1.8	7.4	1.5
Irrigation	30.0	45.7	53.4	34.4	107.9	35.5	153.8	30.7
Roads, Bridges & Communication	15.9 (a)	24.2	26.8	17.2	53.7	17.6	124.4	27.9
Main Buildings	12.6	19.2	18.0	11.6	28.5	9.5	37.2	7.4
Industry	-	-	31.0	19.9	43.6	14.3	67.1	13.4
Land Reclamation & Other Projects	-	-	23.0	14.8	-	-	-	-
Railways & Airfields	-	-	-	-	20.5	6.7	-	-
Development of Animal Health	-	-	-	-	6.5	2.1	14.3	2.9
Building & Institutes	-	-	-	-	32.2	10.6	59.4	11.9
Summer Resorts	-	-	-	-	-	-	2.6	0.5
Housing	-	-	-	-	-	-	24.1	4.8
Other Projects	6.2	9.7	-	-	5.9	1.9	9.9	2.0
TOTAL	65.7	100.0	155.4	100.0	304.0	100.0	500.2	100.0

(a) Communication is not included inthis figure.

Source: The Laws regarding The Development Board, Iraq - No. 35 for 1951
No. 25 for 1952
No. 54 for 1956
No. 43 for 1955

(1951) and replaced by a new five year plan for the period covering 1951/52-1956/57. Total expenditure allocated for the second plan, therefore, increased to I.D. 155.4 million from 65.7 million in the first plan.

It is clear that priority in the first plan was given to agriculture. Out of the total expenditure, 45.7% (or I.D. 30 million) was allocated to irrigation. Allocations to roads and bridges, and buildings, took second and third places amounting to 24.2% and 19.2% respectively. No expenditure was allocated for industry.

The first plan concentrated on irrigation because irrigation and flood control projects had already been started (in Wadi Atharthar - north-west of Iraq - see Map, Chapter 4) by the government long before the establishment of the Board. The Board however tried to accelerate the completion processes.[17] In the light of the recommendations of the International Bank, this plan could not be considered an integrated approach to general economic development. Therefore, the second plan was presented to replace the first one.

Two comments can be made on the second plan:

1) About 20% (I.D. 31.0 m.) of total expenditure was allocated to industry;
2) Expenditure for irrigation still contributed the highest share of 34.4% (I.D. 53.4 m.) in the plan.

The second plan was strongly influenced bu the Bank's recommendations.[18] Investing in industry, therefore, was a part of a "balanced growth" strategy for Iraq. However, since irrigation and flood control projects were already in progress, the Bank did not hesitate to give them expenditure priority.

While the plan was in action, the Ministry of Development was established to take over the Board's work.[19] Oil revenues were increasing rapidly but no evidence of improvement in the standard of living of the Iraqi people was seen. During that period the Board was converted to the idea that no improvement in the standard of living could be attained without a serious attempt backed by heavy investment to improve agriculture. This was mainly because over 50% of the Iraqi population were rural-poor. Moreover, the International Bank also reached the conclusion that unless agriculture improved, the development of industries dependant on domestic agriculture for their raw materials could run into difficulties.

Accordingly, a third economic development plan was presented to cover the period 1955/56-1959/60. Total expenditure was I.D. 304.0 million (an increase of nearly 100% on the second plan). The plan included an extra three items (railways and airfields, animal health and buildings and institutions).

Once again, irrigation was given priority over other sectors with a total expenditure of I.D. 107.9 million

(35.5% of total). Road, bridges and communication took second place after irrigation with a total expenditure of I.D. 53.7 million (17.6% of total). Even though allocations for industrial development were increased in this plan to I.D. 43.6 million, their share slightly dropped to 14.3% of the total. The item "Buildings and institutions" took fourth place with 10.6% of total expenditure. As a general statement, it can be seen that even though it still laid emphasise on agriculture, this plan showed an even greater commitment to a general development strategy for Iraq than that found in the second plan.

While the third plan was being implemented, the British economist, Lord Salter, was preparing for the Board a report on various aspects of economic development policy in Iraq. As was seen earlier in this chapter, Lord Salter strongly criticized the International Bank's policy which recommended "well balanced investment", and argued for agricultural development as the main base for future economic development in Iraq. Industrialization, he indicated, should not be forced and should be postponed until agriculture was fully developed. He also argued that the Board in its plans had committed itself to long term rather than short term projects. A development of housing, roads, buildings and government institutions, therefore, was his second priority after agriculture.

Together with the continuously increasing oil revenues, Lord Salter's report had a significant influence on the Board's policy for economic development in Iraq. The third development plan was soon abolished and replaced by a new plan to cover the period 1955/56-1960/61. Total expenditure allocated to this plan was I.D. 500.2 million, an increase of over 60% on that of the third one. The new plan allocated 31% (I.D. 153.8 million) of its total expenditure to irrigation, 44.2% (I.D. 221.0 million) to buildings, roads, bridges and communications, and 15% (I.D. 67.1 million) to industry. Expenditure for housing totalled I.D. 24.1 million while all other items received I.D. 34.2 million. This plan, however, was abolished after the revolution of 1958.

In conclusion, the Development Board actually put three development plans in action. Due to technical and political factors, none of these plans ran its full time. However, these plans formed the basis of planning development in the country and up to 1960 some of the projects mentioned in these plans, particularly those related to irrigation and flood control, were partly completed and proved to be vital to agricultural development. In addition, the social services, general infractural and a limited industral investments have also showed positive results as will be seen in the next chapters.

Planned and actual expenditures, 1951-58

Table 3.2 shows the total of planned and actual expenditures on different development projects during the period 1951/52-1957/58.

The following features are apparent from this Table:

(1) While total planned expenditures reached I.D. 322 million, only I.D. 178.2 million (55% of that planned) was actually spent during this period.

(2) Agriculture with the highest planned expenditure (I.D. 117.7 million), in the Table, received an actual spending of I.D. 61.2 million (52% of planned).

(3) The highest rate of actual spending, 94% of that planned, was observed in the service sector, followed by construction (63% of planned) and administration (60% of planned).

(4) While industry took third place (after agriculture and transport and communications) with a total of planned expenditure of I.D. 51.2 million, only I.D. 19.1 million was spent, showing the lowest rate of actual to planned spending (37% of planned).

It can be seen that even though priority in planning expenditure was given to agriculture, in practice the focus of development policy was on construction, services, and transport Over 60% of the total planned expenditure allocated to these two sectors together was spent, compared to that of 52% for agriculture. Moreover, actual expenditure in the industrial sector, which showed the lowest level of spending in the Table

TABLE 3.2

Planned and Actual Development Expenditures, 1951/52 - 1957/58
(in million of Iraqi Dinars)

Sector	(1) Planned Expenditures	(2) Actual Expenditures	2 : 1 %
Administration	8.2	4.9	60
Agriculture[a]	117.7	61.2	52
Industry	51.2	19.1	37
Transport and Communication[b]	74.6	38.6	52
Construction[c]	38.2	24.1	63
Others (services)	32.1	30.3	94
TOTAL	322.0	178.2	55%

(a) Includes irrigation, land reclaimation and animal wealth.
(b) Includes roads, bridges and communications.
(c) Includes housing, buildings and institutions.

Source: A.AL. Nastrawi, "Financing Economic Development in Iraq; The Role of Oil in a Middle Eastern Econom", Praeger, 1968, (Tables 9 and 10), pp. 44-48.

(after administration), clearly reflects the influence of foreign economists. These advisors not only determined which planning models should be seen as appropriate, but also influenced the policies which resulted from these models. The application of these policies will be analysed in more detail in the next chapters.

3.2 Planning economic development in Iraq, 1958-75

Survey

Soon after the revolution of 1958, the Development Board was abolished and replaced by two establishments: The 'Economic Planning Board' and 'The Ministry of Planning'.(20) These new organizations started by presenting a 'Provisional Economic Plan' for the years 1959/60-1962/63. The main aim of this plan was to attempt to concentrate on the completion of the projects that were already under way (projects from previous plans). This was, however, a stop gap strategy aimed at giving those involved more time to draw up a more detailed overall strategy.(21)

Total expenditure allocated to the provisional plan was I.D. 392.1 million (Table 3.3). The highest share of expenditure of I.D. 100.8 million went to 'transport and communications', followed by 'housing and summer resorts' with I.D. 76.4, 'public buildings' with I.D. 50.5, leaving agriculture in fourth place with I.D. 47.9 million. For

the first time in Iraq both 'public culture' and 'public health' were included in a development plan with a total expenditures of I.D. 39.2 and I.D. 24.6 million respectively. Industry, in addition, was given a lower amount of expenditure (I.D. 38.7 million) than that it had received in the third and fourth plans of the Development Board. The main reason for this low investment was because only a few industrial projects were actually under way.

Two years later, the Provisional Plan was replaced by "The Detailed Economic Plan" which covered the period 1961/62-1964/65. Total expenditure allocated to this plan was I.D. 556.3 million (Table 3.3).

The Detailed Plan lasted only one year (January 1962-February 1963) before it was suspended by the new regime which assumed power on February 8th, 1963. However, this plan gave priority to industry with total expenditure of I.D. 166.8 million. Significantly, agriculture was given the lowest amount of expenditure of I.D. 112.9 million. One of the reasons behind this low allocation was that agriculture had been given far more attention in the past than any other sector. The other two sectors included in this plan were 'building and housing with total expenditure of I.D. 140.1, and 'transport and communications with I.D. 136.5 million.

Between 1963/64-1964/65, no plan for economic development existed. This was due to political disturbances in the country. During this period, however,

TABLE 3.3

Development Plans 1958-75
(Million of Iraqi Dinars)

Details	First Plan 1959/60 - 1962/63		Second Plan 1961/62 - 1965/66		Third Plan 1965/66 - 1969/70		Fourth Plan 1970/71 - 1974/75	
	Allo-cation	% of total	Allo-ation	% of total	Allo-cation	% of total	Allo-cation	% of total
Agriculture	47.9	12.3	112.9	20.3	56.3	12.4	347.6	18.9
Industry	38.7	10.0	166.8	30.0	112.9	24.8	364.3	19.8
Transport & Communication	100.8	26.0	136.5	24.5	61.2	13.4	204.2	11.1
Building, Housing & Social Services	126.9	32.7	140.1	25.2	66.3	14.6	264.2	14.4
Public Health	24.6	6.3	-	-	-	-	-	-
Public Culture	39.2	10.1	-	-	-	-	-	-
Others	10.0	2.6	-	-	158.1 (1)	34.8	659.1 (2)	35.8
TOTAL	388.1	100.0	556.3	100.0	454.8	100.0	1,839.4	100.0

TABLE 3.3 (Cont.)

(1) Includes the following:-

	I.D.
Planning Departments and Follow-up System	0.4 million
Ministry of Defence - Productive Systems	52.2 "
International obligation	17.1 "
Grant to the Ministry of Finance	25.0 "
Paid-up Capital of the Iraqi National Oil Co	10.0 "
Settlement of Dellquent Advances	53.4 "
Total	158.1

(2) Includes the following:-

	I.D.
Institutions of Planning, Follow-up, Statistics, SF (ADPE) Project and other Institutions	13.6 million
Loans Granted to Governmental Departments and organizations including interests borne by the plan	115.3 "
International obligations	51.7 "
Miscellaneous Investment Expenditures	478.5 "
Total	659.1

Source: Republic of Iraq, 'Provisional Economic Plan', Baghdad, 1959.
Law No. 70 of 1961
Statistical Pocket Book 1960-70, Baghdad-Iraq, P.192.
Statistical Pocket Book 1974, Baghdad-Iraq, P.88.

the principle of centralised planning was instituted. The Economic Planning Board was renamed the "Planning Board". It then limited its membership to the Prime Minister, the Ministers of Planning, Economics, and Finance, the Governor of the Central Bank of Iraq, and four full-time members.(22)

The result of these changes was the presentation of a new economic plan to cover the period 1965/66-1969/70. This plan allocated total expenditure of I.D. 454.8 million. Again, industry was given priority with total expenditure of I.D. 112.9 million (or 25% of total). The main reason given for this was that industry had suffered from a shortage of investment in the past and had thus shown little growth. While 'buildings and social services' (which appeared for the first time in the plan) and 'transport and communications' took second and third places with total expenditures of I.D. 66.3 and I.D. 61.2 million respectively, agriculture again showed the lowest share of expenditure, I.D. 56.3 million.

While this plan was in action a new law was passed (in 1966) authorising the Planning Board to co-ordinate economic, fiscal, monetary and commercial polices in order to ensure the full application of the plan.(23) The Board was also authorized to express its opinion regarding the ordinary budget and direct the activities of the private sector to ensure their harmonization with the objectives of the plan.

In 1970 a new plan called the "National Development Plan" was put into action to cover the five fiscal years 1970/71-1974/75. Providing the above powers to the Planning Board was probably one of the main factors that made this plan wider in its investment distribution. The total expenditure of I.D. 1,143.7 million which was allocated was higher than that of any previous plan. Out of this total, 75% (I.D. 858.7 million) was to be allocated to the public sector leaving 25% for the private sector.[24] It can be suggested that this plan has also adopted a better balanced investment strategy, especially in industry and agriculture; these two sectors received a total expenditures of I.D. 364.3 and I.D. 347.6 respectively. In addition, transport and communications were allocated I.D. 204.2, while other services received I.D. 264.2 million.

Planned and Actual expenditure, 1959-1975

During the period 1958/59-1974/75, a total expenditure of I.D. 3,451.9 million was allocated to the development of the Iraqi economy. Unfortunately, only 56.7% (or I.D. 1,957.7 million) of this total was actually spent on development projects (Table 3.4). In comparison with actual expenditure spent in the period 1951/52-1957/58, an increase of only 1.7% occured in the period 1958/59-1974/75. Spending on agriculture dropped to 45.7% of planned expenditure. Though total spending on industry

rose significantly to 65.7%, this was still only 37% of that planned in the period 1951/52-1957/58.

It seemed that the government's emphasis during this period was increasingly on industry followed by buildings and services, transport and communications, with agriculture consistently last. Out of a total actual expenditure of 1,957.7 million spent during this period, a sum of I.D. 481.5 million (25% of total) went on industry, compared to I.D. 314.6 million (15.7% of total) for agriculture.

Analysis

It is suggested that planning in developing countries imposes much bigger tasks on governments than does planning in developed countries.(25) This is because governments in developing countries have to be involved in a large number of activities which may be done by entrepreneurs in developed countries. For examples, such governments have to create industrial centres, induce an agricultural revolution, directly control foreign exchanges, provide a great number of public services and carrie out detailed economic legislation.(26) What makes the job even harder is that governments strive to meet these responsibilities despite a lower level of skills in the civil service, compared to those of developed countries.

Given such wide responsibilities, planning in developing countries has become a skilled task as well as a

TABLE 3.4

Planned and Actual Development Expenditures, 1958/59 - 1974/75
(in million of Iraqi Dinars)

	(1) Allocation	(2) Actual Expenditures	2 : 1 %
Agriculture	671.0	306.8	45.7
Industry	732.7	481.5	65.7
Transport & Communication	529.2	314.6	59.4
Buildings & Services	688.1	374.9	54.5
Others	830.9	479.9	57.8
Total	3,451.9	1,957.7	56.7%

Source: Statistical Pocket Book, 1975.
Al-Eyde, 1979, p.52.
Al-Nasrawi, 1967, pp.48 and 50-51.

vital tool for economic development. It should therefore involve more centralized decision-making and more direct government intervention.[27] In other words, the degree and the comprehensiveness of planning in a developing country will reflect that country's level of skills and control over all related variables.[28]

In a mixed economy like Iraq, planning should ideally contain two main elements, namely,[29]

(1) The government's direct utilization of savings to carry out investment and management of resources for production, especially in providing economic and social infrastructures.

(2) Government measures to facilitate, stimulate, guide and control private economic activity.

The government should, in addition, play a major role in creating suitable conditions for development, e.g. political and monetary stability, and making known available resources and development potentialities. By ensuring such conditions, backed by statistical data and supplying qualified planners, the government may then succeed in producing a more comprehensive development plan.

A comprehensive plan should be clear in its objectives and should be guided by certain criterias, e.g. targeted rates of economic growth. It should at least consist of the following parts:

(1) Objectives and aggregate targets, mainly of national income and employment.

(2) Sectoral programmes containing individual projects to be put in to action.

(3) An investment programme for the public sector with distribution of development expenditure among major sectors of the economy.

(4) A programme for investment by the private sector among various major sectors.

(5) A fiscal programme for the financing of public and private investment.

(6) Policy measures to influence and direct private investment.(30)

Between 1958-1965, in Iraq, two development plans were introduced (Table 3.3). Apart from the fact that they existed for a short period of time, their objectives were very limited. The main objective of the first plan was to concentrate on the completion of the projects that were already started by the Development Board and also to give the new government sufficient time to draw up a detailed plan; the second plan emphasized public sector development with priority given to industry. The following statement gives a clear picture of the main thrust of the second plan:

> The West have always led us to understand ours was an agricultural country and that for this reason we should concentrate only on agricultural affairs ... They created obstacles so as to keep industries backward and trivial .... It was a planned policy encouraged by that traitorous group which never bothered about the interests of this nation. Now that we have been freed from slavery and exploitation we open a new chapter in the history of our economy.(31)

Both plans intended to improve social services, mainly health, education and housing. This was one of the main measures of the new government of 1958 for obtaining a better standard of living for the Iraqi people. Out of a total expenditure of I.D. 944.4 million in both plans, the highest ratio of 35% (I.D. 33.8 million) was contributed by these sectors. However, both plans neglected the private sector and its role in the overall economic development of Iraq, and paid no attention to the problem of co-ordinating the various sectors.

The year of comprehensive planning in Iraq began with the introduction of the third plan of 1965/66-1969/70. This plan clearly stated the following objectives:

(1) To raise the standard of living of the Iraqi people by maintaining high rates of economic growth.

(2) To establish equilibrium in the Iraqi economy and reduce dependence on oil revenues by diversifying investment and production.

(3) To increase the level of output of the commodity sectors by ensuring higher rates of growth in both agriculture and industry.[32]

The following minimum targeted rates of growth per annum were then proposed by the planners as a measure of achieving these objectives: national income 8 percent; agriculture 7.5 percent; industry 12 percent; commodity sectors (as a group) 9.4 percent.[33] This plan contained sectoral and investment programmes with the aim of

distribution of expenditure over a variety of various sectors. Out of a total investment of I.D. 821 million allocated to this plan, the private sector was to provide I.D. 181 million (22% of total).[34]

Despite the fact that this plan managed to run its full course, there was no improvement in terms of take up over the previous two plans; the average rate of take up in this plan was 47.5% in comparison to that of 47.8% of the first two plans (1958/59-1964/65). Apart from the shortage of technical skills and adequate statistical information, the plan of 1964/65-1969/70 was affected by various political disturbances which rapidly slowed down its application.

The 'National Development Plan' which covered the period 1970/71-1974/75 was, in its terms of coverage, an improvement over all previous plans. For the first time it considered in detail such aspects as manpower and technical training, educational levels, research and development programmes, foreign trade prices, saving and consumption. As with the third plan, this plan also proposed certain rates of growth as targets to be achieved.[35] The private sector had a bigger share in this plan; it was to contribute 25% (I.D. 285 million) of the total allocation of I.D. 1,143,7 million.

It can be argued that by 1970-75 the planners had adopted a better "balanced investment" strategy than in the previous plans, not just over the sectors of the economy

but within the sectors themselves. For example, besides identifying clearly the individual projects to be tackled within the industrial sector, they also emphasized for the first time the impact of achieving a better geographical distribution of industries in Iraq. To achieve this, the planners thought of increasing investment in several industrial projects, mainly in Basra, Anbar and Kirkuk, (See Map, Chapter 5).(36)

In Iraq during the period which followed the adoption of the 4th National Plan, the availablity of financial resources as a result of the increase of oil revenues in 1971 and 1973/74 was used as a means of accelerating economic development by increasing expenditure, especially in the public sector. Here investment rose from I.D. 858.7 (75%) million to I.D. 1,274,3 million in 1971. The role of the private sector in economic development progress was however again ignored.

It can be argued that the application of any plan requires strong, competent and incorruptable administration.

> It must be strong enough to be able to enforce its measures ... and must have competent administrative services, with trained personnel able to understand the large issues that are at stake, and to act reasonably and rapidly. And it must be free of all charges of corruption, since, whereas men will bear many restrictions from a government which they believe to be acting fairly and solely in the public interest (however mistakenly) without respect of persons, they will sooner or later resist violently measures which are corruptly administered, however acceptable the measures themselves may be.(37)

The strong political influence on both the public and private sectors caused many changes in the economic aims of the plan as well as its administration and personnel. Apart from slowing down the application of this plan these political disturbances also limited the ability of the administration by centralizing final decision making in the hands of the Planning Board itself. Economic plans therefore became tools in the hands of the politicans who sought to impose their ideologies and parties' priorities.

The rate of uptake of the Plan, however, was 60.5%. This waw a major imporvement over previous plans. Again, industry was allocated the highest expenditure of 19.8 of total, and also showed the highest rate of take-up of 84.4%. Most of this expenditure went to help the Iraqi National Oil Company to carry on the oil companies' activities following nationalisation. Actual expenditure in agriculture also showed an impovement over the previous plan; about 57% of total expenditure allocated to this sector was spent. Again the main reason behind this improvement here was due to the 'Agrarian Reform' which was put into practice in 1970, (See Chapter 4).

The application and performance of planning for economic development in Iraq will be discussed in more detail in the next chapter.

3.3 Financing economic development in Iraq

Economic development planning in Iraq actually started with the increase of oil revenues in 1950/51. The main aim

behind the establishment of the Development Board during that time was to utilise the increase in oil revenues in a way that could help the social and economic development in Iraq.

During the period of the Development Board, oil revenues contributed 98.5% of the total revenues that were allocated for economic development programmes. Other sources of finance were taxes and loans which only contributed 1.5% of total expenditures. Between 1951-1958 oil revenues which were allocated to the Board rose from I.D. 91.1 to I.D. 385.1 million (an increase of over 400%).

Oil revenues continued to be the major financial source for economic development after 1958. Due to the long conflict between the governments and the oil companies during the sixties which resulted in a slow-down in oil production and therefore Iraq's share of oil revenues, total revenues allocated to development plans dropped slightly. The oil revenue share of the fourth development plan was I.D. 385.1 million; it was I.D. 315.8 and I.D. 362.7 million in the sixth and the seventh plans, respectively. Accordingly, the percentage contribution of oil revenues in these plans dropped to 74.3% and 75.3% of total revenues, respectively. The share of other sources of finance, such as foreign loans, government profits and others, in these plans, therefore, had to be increased rapidly in order to cover the absence of parts of oil revenues.

TABLE 3.5

Revenues allocated for Economic Development in Iraq 1951/52 - 1974/75
(in million of Iraqi Dinars)

Source of Revenue	1st Plan	2nd Plan	3rd Plan	4th Plan	5th Plan (3)	6th Plan	7th Plan	8th Plan
Oil Revenues	91.1	164.6	215.0	385.1	N.A.	315.8	362.7	1,389.7
Loans (1)	4.0	4.0	-	-	N.A.	77.2	30.7	51.2
Profit from Government Administration (2)	-	-	0.6	4.7	N.A.	30.8	13.6	44.9
Others	-	0.1	0.1	0.2	N.A.	1.0	74.4	53.8
Total	95.1	168.1	215.7	390.0		424.8	481.44	1,539.6
Percentage of Oil Revenues to Total Revenues	95.8%	97.9%	99.6%	98.7%		74.3	75.3%	90.3%

(1) Include foreign loans.
(2) Include interest and revenues of government agencies.
(3) There was no specific estimate of revenues except the financial resources were to be composed of 50% of oil revenues and the proceeds of two loans from the Soviet Union and Czechoslovakia amounting to I.D. 65 million and I.D. 12 million, respectively.
N.A. - Not Available.

Source: Laws No. 35 for 1951, 25 for 1952, 43 for 1955, 54 for 1956 and 190 for 1961. Central Bank or Iraq Bulletins; 1967 - Table 17, 1974 - Table 17, 1976 - Table 17 and 1978 - Table 17.

But, it was not long before oil revenues started to increase again. This was due to the Tehran agreement of 1971, the increase in oil prices in 1973/74, and oil nationalization which pushed oil production even higher. This put the share of oil revenues in the development plan of 1970/71-1974/75 up to 90.3% (I.D. 1,389.7 million) of the total (Table 3.5).

It can be concluded that during 1951-1975 oil revenues contributed over 88% of the total revenues which were allocated for economic development in Iraq. One of the main objectives of economic development in Iraq was to reduce the dependence of the country on oil revenues. What is seen in these economic plans during this period surely indicates that no improvement in the situation was apparent. Rather, it shows even heavier dependence on oil revenues.

3.4. Conclusion

The analysis in this chapter has shown that between 1951-1975, planning in Iraq went through two main periods: (1) the period of the Development Board (before 1958), and (2) the period after the revolution of 1958.

In the first period, planning was limited both in its targets and lack of co-ordination among the various sectors. The plans were no more than summations of public investment projects with no over-all analytical framework to determine their feasibility and what might be their

contribution to the national income. Due to a lack of qualified planners in Iraq, the Board had to depend on foreign economists, who suggested different strategies for economic planning and who paid little attention to Iraq's needs. Some of these teams managed to impose their ideologies on the Development Board which then initiated a series of poorly planned projects.

After the revolution of 1958 and up to 1965, planning was again no more than public investment in different sectors, especially industry and the social services. The plans in this period carried two main objectives: (1) to complete the projects already started by the Development Board before the revolution, and (2) to lay greater emphasis on industry which was almost completely neglected by the Board. Lack of technical and administrative skills as well as a shortage of statistics and perations needed in the formulation of the plans were some of the problems facing planning in this period. (These problems are explained in more detail in Appendix A).

Comprehensive planning in Iraq started in 1964. Up to 1975, two five year plans based on clearly determined planning principles were put in action. The main characteristics were: (1) more clearly defined objectives; (2) identification of certain targets in order to achieve the above objectives; and (3) the co-ordination of public and private investment among various sectors of the economy.

The political disturbances, especially during the sixties, together with lack of statistics, qualified planners, and competent administration, have directly affected the choice of planning strategy as well as the formulation and the performance of the development plans. Out of eight plans presented in 1951-1975, only the last two have managed to run their full courses, while all other six were either suspended or cancelled.

Finally, oil revenues were always the major source of economic development during 1951-75. Out of total revenues of I.D. 3,314.7 million allocated to development programmes in the period above, the share of oil revenues reached I.D. 2,924.0 million (or 88.2% of total). This is again another indication of Iraq's heavy dependence on oil revenues. In fact this may also indicate the failure of the planners to achieve their main economic objective of establishing a better equilibrium in the Iraqi economy by reducing the country's heavy dependance on oil through the development of other commodity sectors, namely agriculture and industry. The improvement of the latter sectors, it was also hoped, would generate (directly and indirectly) additional sources of finance needed for the development of other sectors of the economy.

Chapter 3 - Notes

1. Oskar Lange, Economic Development, Planning and International Co-operation. Central Bank of Egypt, Cairo, 1961, p. 10.

2. For more details, see for example: G. M. Meier, "Leading issues in development economics", New York/Oxford University Press 1964, pp. 250-263. Also, R. B. Sutcliffe, Industry and underdevelopment, Addison-Wesley 1971, pp. 92-98.

3. See Raghar Nurkse, The conflict between "'balanced growth' and international specialization", in G.M. Meiser, Leading issues in development economics, New York/Oxford University Press 1964, pp. 250-254.

4. Reginald H. Green and Ann Seidman, "Unity or Poverty? The Economics of Pan-Africanism",Penguin, 1968, p. 232.

5. Meier, 1964, pp.250-54.

5a. Ibid. p. 253.

6. See Paul Streten, "Balanced versus unbalanced growth", The Economic Weekly, April 20, 1963, pp. 669-71.

7. Albert O. Hirschman, "The strategy of economic development", New Haven: Yale University Press 1958, pp. 53-54.

8. Ibid. p. 204.

9. Paul Streeton, pp. 669-71.

10. The Economic Development of Iraq: Report of a mission organized by the International Bank for Reconstruction and Development at the request of the government of Iraq. The Johns Hopkins Press 1952, pp. 33 and 287.

11. Carl Iversen, "Monetary policy in Iraq", Baghdad, National Bank of Iraq, 1954, pp. 147 and 227.

12. Lord Salter, "The Development of Iraq: A plan of action". Baghdad, 1955, p. 15.

13. Ibid. p. 179.

14. It is suggested that export of agricultural products is not always promising for two main reasons:

    1) The demand for agricultural output from developing countries is growing slowly in developed countries.

    2) The agricultural output of developed countries is growing rapidly compared with their population. Their exports of agricultural products also dominated most of the international markets, particularly in developing countries.
    See Peter Dorner, "Land reform and economic development", Penguin 1972, p. 86.

15. W. Arthur Lewis, "The principles of economic planning",
    (Third Edition) Unwin University Books, London 1969, p. 127.

16. Dudley Seers, "The life cycle of a petroleum economy", Discussion Paper (DP 139), Institute of Development Studies at the University of Sussex, September 1978, p. 10.

17. Langley, p. 170.

18. Ibid. p. 170.

19. Ministry of Development was established in 1953.

20. Republic of Iraq, Law No. 74 of 1959.

21. Republic of Iraq, Law No. 181 of 1959.

22. Republic of Iraq, Law No. 221 of 1964.

23. Republic of Iraq, Law No. 18 of 1966.

24. K. Al-Eyd, "Oil revenues and accelerated growth: Absorptive capacity in Iraq", Praeger 1979, p. 49.

25. W. Arthur Lewis, Meier, P. 422.

26. Ibid. p. 423.

27. U.N. Economic Commission for Asia and the Far East, "A decade of development in the ECAFE region", Meier, p. 423.

28. Two groups of variables can be suggested here:

    1) Instrument variables: they are "relative to the policy measures that government intended to use to achieve its objectives". Examples of these variables are levels of savings, production and investment by sector and exports.

2) Other variables: they may not be directly affected by government action such as consumption of individual commodities, and price of commodities and productive factors.

For more details, see UN "Use of models in programming", Meier, pp. 465-76.

29. U.N. Economic Commission for Asia and the Far East. Ibid. Meier, p. 423.

30. Ibid. p. 425.

31. Langley, p. 19.

32. K. Al-eyd, p. 46.

33. Ibid.

34. Republic of Iraq, Law No. 87 of 1965.

35. These rates are: 6.9 percent in agriculture; 12 percent in industry; 5.8 percent in commodity sectors (as a group); 8.2 percent in distribution sectors (as a group); 6 percent in services sectors (as a group); 6.2 percent in GDP; 7.1 percent in national income; and 3.6 percent in per capital income.

From Republic of Iraq, Law No. 70 of 1970, pp. 146-47.

36. Examples were given by the government as follows:

1) Kirkuk sulphur extraction factor,
2) the Silk factory at Sadat,
3) Ramadi glass factory.

Republic of Iraq, Ministry of Information. "The economy of Iraq: Development and prespectives 1958-1976-1980", p. 73.

37. W. Arthur Lewis, 1969, p. 121.

CHAPTER 4

Development of the agricultural sector

This chapter will examine Iraq's agriculture between 1953 - 75 emphasising the efforts and attempts that took place to develop it. It will be divided into two main parts; Part One will give an introduction to the background and problems of agriculture. It will also deal with the development which took place in the period of the non-agrarian reform (1953-58).

Part Two will examine the need for agrarian reform in Iraq. It will also analyse plans for reform and their impact on the development of agriculture during the period of the agrarian reforms (1958 - 75).

4.1 INTRODUCTION

Any policy for economic development in a developing country should aim to reduce unemployment, poverty and to create a more equitable distribution of income and wealth. To achieve this, the agricultural sector must be the main target for policy makers. The main reasons are that the agricultural sector suffers from a high rate of chronic and seasonal unemployment which in turn leads to a high rate of poverty; the agricultural sector can always absorb more

employees; and in comparison with other sectors, the agricultural sector may provide the cheapest and quickest way to satisfy expanding needs for food.

In most developing countries, including Iraq, more than 50% of the popilation relies directly on agriculture for a livelihood. It is important, therefore, to increase and improve their productivity. Agriculture should be able to provide food supplies for the rural population. It should also have the capacity to sustain any increased demand resulting from higher per capita income in the urban population.[1]

In some non-industrial countries, agriculture could also produce a surplus for export to finance capital equipment and other important industrial development requirements. Without increased agricultural production in these countries, many industries will not develop, e.g. the sugar and tobacco industries in Iraq, the cotton textile industry in Egypt and the tea industries in Sri Lanka and India. A shortfall in production in the agricultural sector can distort the industrial sector and lead to higher food prices. This in turn increases imports of food. Higher prices in the industrial sector may result in decreasing purchasing power, in other words decreasing the demand for industrial goods. Theoretically, this can result in a decreased supply of these goods, which can lead to less income savings and investment in the industrial sector. Increasing imports of food can also affect the industrial sector by reducing the foreign exchange available for its development.

The agricultural sector could, also, contribute both capital and labour to the non-agricultural sectors as they develop. Capital can be provided in different ways: taxation as a direct proportion of farm production to the state, rural payments to landlords, farmer's savings channelled into industrial investment, etc., while labour can be provided through the young people who leave agricultural areas seeking further education.(2) This, of course, does not mean creating a shortage of labour in the agricultural sector, but it means the transfer of the surplus rural population from the agricultural sector to the non-agricultural sectors. This can also lead to a wider distribution of income, and can reduce under employment. However, without a simultaneous increase in the rate of investment between the agricultural and the industrial sectors, these goals may never be attained.(3)

Iraq, the 'Land of the two Rivers', was one of the first countries where agriculture was developed in the Middle East. In comparison with its neighbours, it had natural resources suitable for development (fertile land, adequate water and equitable weather conditions). Such conditions did not exist in the other Middle Eastern countries in which large oil revenues were discovered, such as Saudi Arabia and Kuwait. In contrast to its other neighbours, Syria, Lebanon and Jordan, which also have fertile land, Iraq had the financial resources needed to develop a potentially productive agricultural sector. In

comparison with other countries such as Egypt and Iran, Iraq also was in the fortunate position of not being over-populated. These important factors, therefore, created suitable grounds for achieving agricultural development, a development which could substantially increase agricultural production and raise the general standard of living of the Iraqi people. Sharing the same view, the UN stated:

> "It is important to note that for favourable over all economic development in Iraq, agriculture must develop substantially in order to attain minimum nutrition target and meet consumer demand and the growing requirements of industry. This task should not prove too difficult in a country endowed with fertile land, water resources and means of finance, provided an appropriate agriculture policy is drawn up and implemented."(4)

4.2 Population, Land and Water resources

Population

In Chapter 1 the growth of national population between 1953 - 75 was surveyed. Table 1.1 showed the percentage of urban population to national population. This section will deal with the rural population and their rates of growth through the period.

According to Table 4.1 the rural population totalled 3.525 million, or 62.1% of the total population in 1953. This percentage dropped to 60.8% in 1957 (3.855 million) and continued to drop every year until it reached 36.3% (4.038 million) in 1975. Between 1958 and 1975 the rural population increased by only 14.6% while total population grew by 95.9%. The most significant feature seen in the

TABLE 4.1

Total Rural Population
(1953-75)

Year	(1) Total population (million)	(2) Rural Population (million)	2:1 %
1953	5.676	3.525	62.1
1957	6.340	3.855	60.8
1965	8.097	4.453	55.0
1968	8.914	3.993	44.8
1970	9.440	3.984	42.2
1973	10.413	4.019	38.6
1975	11.124	4.038	36.3

Source: Table 1.1

Table is that not only did the rural percentage dropped throughout the period, but the rural population dropped too; from its highest ever recorded level, of 4.453 million in 1965 to 3.984 million in 1970. Even though this figure rose to 4.038 million in 1975, it still showed a decline of 10.3% on that of 1965. This decline was due to the high percentage of emigration from rural areas to urban areas. These phenomena, as the later analysis will show, had serious effects on both existing agricultural output and the future of agricultural development in the country.

Land

The total land area of Iraq is 438,446 square kilometres (including territorial waters of 924 sq. km.). Out of this total, some 167,000 sq. km. are desert lands along the western and southern extremities of the country, 92,000 sq. km. are mountainous areas to the north and east of the country, and some 175,000 sq. km. are hills and flat areas in between the two major rivers, the Tigris and the Euphrates. From the point of view of agriculture about one third of the total area is potentially agriculturally productive. This land is divided into three categories: Uncultivated area which contributes about 75% of the agricultural land; rain-fed areas lying in the north and north-east and stretching down to the centre of the country, and irrigated area between the two rivers. Some 25,000 sq. km. are under forest in the northern area, of which 17,000 sq. km. remain commercially important, the rest consisting of degraded scrubland. Only 4% of the land

is classified as pasture land, while much of the southern areas are marsh and swamp. The main crops of these lands are wheat, rice, barley and dates.

In relation both to the population and the land actually under cultivation, the amount of cultivable land available in the country is very large, in comparison with other under-developed countries. The per capita potentially cultivable land in Iraq is 3 to 3.5 acres; it is half an acre in Asia and less than a third of an acre in Egypt.(5)

Forms of land tenure prior to 1950

Until 1950 land was held under a complicated system of tenure which gave rise to much confusion and conflict. In accordance with traditional legal concepts the state retained the ultimate legal title to nearly all the available land. Absolute private ownership, known as "mamloukah" or "mulk", was confined to urban property and orchards. Rights to the permanent possession of a large proportion of state or "Miri"land were acquired by private individuals, however, under conditions which were virtually indistinguishable from full private ownership, since the holdings could be sold, mortgaged or transferred to successors. In the past, claims to land were established in most cases quite informally without the benefit of full legal sanction, e.g. by simply occupying the land. Tribal lands were generally regarded as being held in common. As the tribes were converted from nomadic pursuits to settled agriculture, the sheikhs and sub-sheikhs (chiefs) of the

tribe gradually established a claim to such lands which they then regarded as their own property and thus became landlords, with their tribesmen as sharecropping tenants.(6)

In the 19th century, the Turkish government (which ruled Iraq in that period) established the 'Tapu' system of land tenure. The law gave no systematic grants of tenure, and the grants generally made without any examination of conflicting claims were used as a means of rewarding the favoured few. With the introduction of Tapu tenure, and in order to benefit from it, many village areas were registered in whole or in part as the personal possession of local notables or 'Aghas' (sirs) who in the past had acted as tax collectors and served generally as intermediaries between the government and the cultivators.(7)

The earliest law for land tenure in the 20th century was established in 1932 under the name: 'The Land Settlement Law'. It initiated for the first time in Iraq, a survey of land both under and not under cultivation in order to settle the past confusion regarding land titles and systems of tenure. The law permitted the land settlement committees, appointed to administer the law and to grant title, so-called 'Lazmah' grants, to people who could demonstrate that they had made productive use of land within the previous fifteen years.

But in practice, it was possible to obtain a title on the presentation of proof that a crop was produced on the land in one year, and the land settlement committees

occasionally accepted even weaker proof of cultivation. In that way, many sheikhs (chiefs) and other influential persons easily managed to obtain titles to large tracts of land.

A further law was established in 1938. For the first time in Iraq, land was classified. The law recognised the following types of land tenure:-

1. Mamloukah or mulk: land held in absolute private ownership

2. Matruka: land reserved for public purposes

3. Wagf or Mawgufa: land administered in trust

   (i) for the benefit of private persons by mutawallis, appointed by religious courts, or

   (ii) for the benefit of religious institutions by the state Awgaf administration.

4. Miri Tapu: land held in permanent tenure from the state under conditions enabling the holder to sell or mortgage it and leave it to his successors. Proof of such tenure could be supplied by documentary evidence or by factual evidence that the land has been used productively by the holder or his predecessor for ten years during which no land rent was paid or that it has been planted with trees, meeting specified conditions.

5. Miri Lazmah: land held under generally the same conditions as Miri Tapu, but with the stipulation that the government could veto the transfer of such land if it tended to disturb the peace, a precaution designed to prevent, where necessary, the transfer of tribal lands to people outside the tribe. Lazmah grants were made upon proof that a person had made productive use of the land within the preceding fifteen years.

6. Miri Sirf: particularly vacant arable land, definitely acknowledged as belonging de facto or de jure to the state."(8)

Water resources

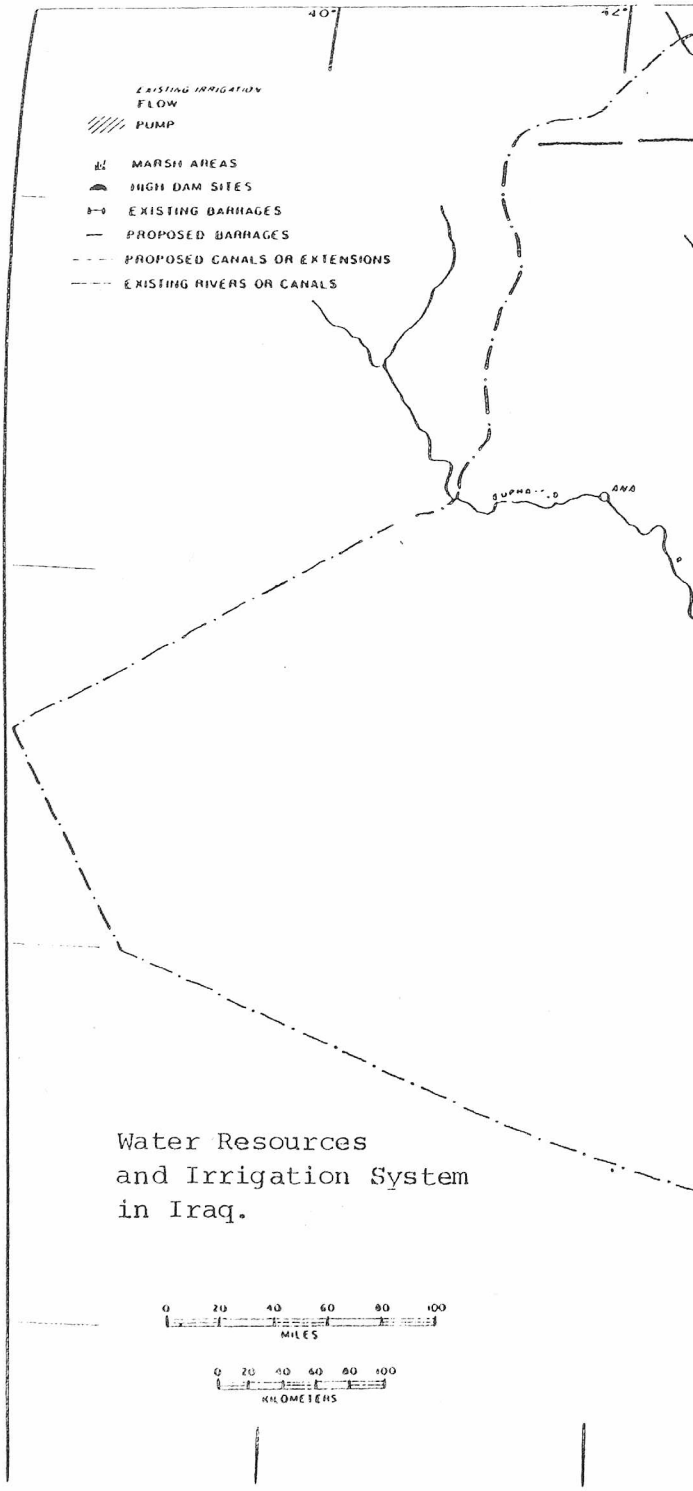
Even though large areas of cultivable land in Iraq are capable of being irrigated by the water resources of the Tigris and Euphrates rivers, there is still a noticeable

shortfall of irrigation water in particular areas and seasons of the year. The shortage of water in summer is one of the critical problems in the agricultural areas specially in the north-east and south-east parts of the country, because these areas are mainly dependent on the one-rainfall-season which begins in November and ends in mid-April. These areas also suffer from a lack of canals to divert the water from the main rivers.

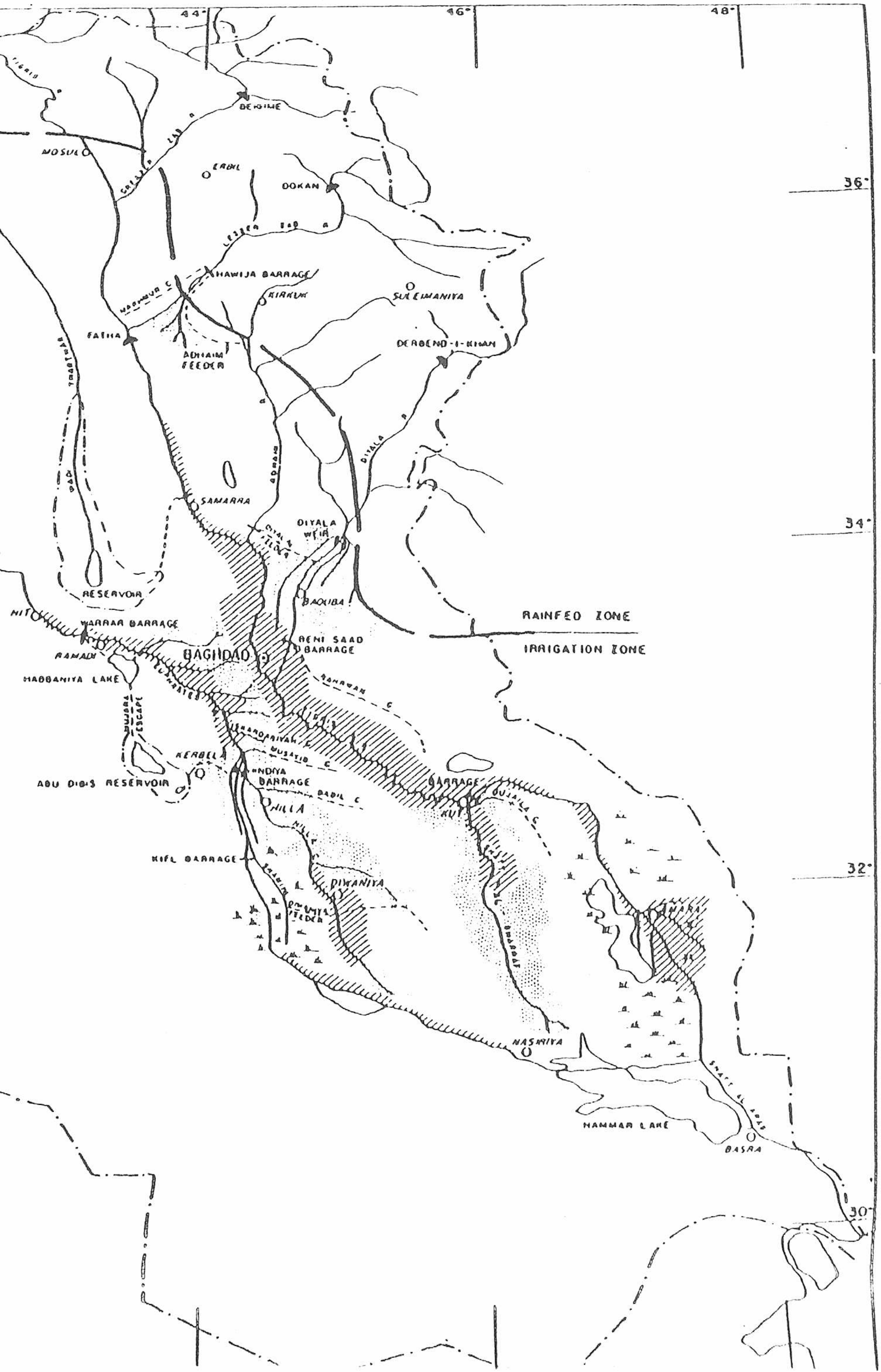
The amount of irrigation water available in the agricultural areas is approximately 37 milliard cubic metres taken from the total supply of the two rivers which amount to 82 milliard cubic metres; 10.1 m. cu. m. from the Euphrates, with the rest coming from other small rivers and the two large lakes, Tharthar and Habbaniya.(9) (See map).

4.3 The Problems

The main feature of agriculture in Iraq during the period under consideration, was the immense concentration of land ownership among small minorities. Table 4.2 shows the very great size of some of the private estates, and also the striking difference in the size of ownership units. It also indicates how land tenure had created a small minority of prosperous peasants with incomes several times higher than that of the average peasant household. This inequality in the distribution of income consequently affected any policy for development in the rural areas. In reality, the existing land tenure system increased poverty by restricting the power of investment to a small number of



Water Resources
and Irrigation System
in Iraq.



44°
46°
48°
36°
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32°
30°
BEKHME
MOSUL
ERBIL
DOKAN
HAWIJA BARRAGE
KIRKUK
SULEIMANIYA
FATHA
ADHAIM FEEDER
DERBEND-I-KHAN
SAMARRA
DIYALA WEIR
RESERVOIR
BAQUBA
RAINFED ZONE
IRRIGATION ZONE
WARRAR BARRAGE
RAMADI
BENI SAAD BARRAGE
BAGHDAD
HABBANIYA LAKE
ABU DIBIS RESERVOIR
KERBELA
BARRAGE
HILLA
KUT
KIFL BARRAGE
DIWANIYA
NASIRIYA
HAMMAR LAKE
BASRA

TABLE 4.2

Distribution of agricultural holdings according to size in Iraq in 1953

Donums[a]	Acres	Number
Under 4	Under 2.5	24270
4 and under 20	2.5 - 12	25849
20 " " 100	12 - 60	41905
100 " " 600	60 - 360	27555
600 " " 1000	360 - 600	1847
1000 " " 2000	600 - 1200	1702
2000 " " 5000	1200 - 3000	1221
5000 " " 10000	3000 - 6000	424
10000 " " 20000	6000 - 12000	168
20000 and over	12000 and over	104
	Total	124045

(a) The "Donum" is a unit of measurement which = 0.6 acre = 0.242 hectare.

Source: Lord Salter, "The Development of Iraq, A Plan for Action", Baghdad, 1955, p. 190.

landlords who invested much less than was needed in the agricultural sector. Moreover, this minority managed to maintain a dominant position controlling both economic resources, as well as of political power.

Since the majority of the population in Iraq was rural, with agriculture contributing less than one fourth of the national product, the distribution of national income was further distorted in favour of the urban population. This resulted in a pattern of income distribution in which the per capita income of the rural villager (during the fifties) became less than half that of the town or city dweller.[10] This led to a great number of rural families migrating to the large towns and cities.

Such migration usually creates two main problems. First, a shortage of manpower in the agricultural sector; and second, increasing unemployment in the towns and cities. The first problem can lead to a decrease in agricultural production in terms which can affect food supply in both town and village very badly. The second may increase poverty in the towns and cities, and create complex social problems.

Another major problem in the agricultural sector in Iraq was the inadequacy of the drainage system. Most of the irrigated and potentially irrigated land is comprised of very deep soil, the permeation of which is very slow. In addition, the majority of this land does not have adequate natural drainage. Since irrigation water carries some dissolved salts, it becomes necessary to use more water to wash the salt away. However, if the salt to be

washed away is below the root level it is necessary to prevent the water table from rising. The rising water table may carry the salt to the surface where it will be, with the evaporation of the water, left behind. To avoid this disastrous outcome, which will lead to the land becoming infertile, an effective drainage system becomes an urgent necessity.[11] In many areas there will have to be at least as many drainage ditches as there are irrigation ditches to ensure this. This indicates that heavy investment for agricultural development is required.

The third problem of agriculture in Iraq was the low level of productivity, both per hectare and per farmer. The main reason lay with the poor quality and inadequate inputs used in agriculture, specially in terms of chemical fertilizer and new seeds.

With these as the main problems, one would have expected the programme of agricultural development to start with solving the problem of land ownership, go on to introduce better systems of irrigation and drainage, and then seek to improve better methods of cultivation.

4.4 Agricultural Improvements (1953 - 1958)

The move toward agriculture development in Iraq started in 1950/51 with the establishment of a 'Development Board', which took responsibility for economic development in the country. Its first development programme (in 1951/52 - 1955/56) allocated 30.0 million Iraqi Dinar (or 45.6% of its total expenditure) for irrigation projects, and this was increased to I.D. 53.4 m. in the second

programme (1951/52 - 1959/1960). The irrigation programme included three main projects: flood control, water storage, and irrigation.

The Board started the agricultural development programme with these projects rather than land distribution due to the nature of Iraq's two rivers, the Tigris and the Euphrates. Their annual flood in March, April and May is too late for the winter and too early for the summer crops. Therefore, flood control and the prevention of flood devastation has always been a major concerns in Iraq, even before the establishment of the Development Board.

The other reason for giving priority to irrigation projects was that without the ready availability of water, especially in the summer season, the Board's idea of settling new farmers on new cultivated lands would be untenable.

The Board recommended the building of a series of dams and reservoirs in order to control the two rivers' floods and to enable them to store the water for the summer season. It also started work on two great lakes in the west of Iraq (Al-Gazerah desert) where the shortage of water is the most severe. To wash away the salt in the soil which rose during that period to reach 60% in some areas, the Board had also planned a system of drainage in these regions.(12)

These plans were always open to criticism as they were implemented before a full survey of the land of Iraq had been completed. The Board based its judgement on a engineering technical survey. A dam site may well be

decided purely upon the basis of an engineer's survey but much more is needed before a national policy for irrigation and drainage can be formulated. In other words, to build dams for flood control is one thing but to build these dams to provide stored water for irrigation is quite another. This is even more so because, while flood control may be essential to economic development, bringing new land under cultivation may not be economically justifiable if a different system for the utilization of the land already under cultivation can be devised.[13] An engineer may develop a plan for irrigation without making reference to population as a variable within this plan. The engineers plans as they were developed formed purely on the physical requirements of the terrain, but Iraq's task was to develop a national economy.

The actual irrigation and drainage schemes envisaged were not planned to meet actual economic needs nor timed to conform with the pace of actual agricultural development.[14]

Limitations on the amount of land which was going to benefit from the Board's water policy meant limiting the number of people who were actually going to benefit from the policy. Hence, the Board had to answer two questions when deciding its priorities. First, should the irrigation and drainage schemes be established to benefit only the new settlers on land owned by the government (Miri Sirf), or should they be fully available for land privately owned, and if so, on what conditions? And second, what would be the reaction of the large landlords to the changes that the

water policy might bring to their or their neighbours lands?

Once the large landlords realised the potential for enhancement that the above schemes represented, they attempted to influence the location of such schemes. In addition, unlike smaller farmers, they had the economic ability to derive maximum benefit from these schemes. This consequently led to the fact that the productivity and value of the privileged minorities' land were generally enhanced. On the other hand, due to lack of both fixed (mainly machinery) and working (mainly cash) capital which the board failed to provide, small farmers whose lands were within the location of these schemes had still not been able to derive the necessary requirements which could improve their land productivity. In other words the availability of water alone could not have significantly improved agricultural output unless quality and quantity of other necessary inputs, e.g. seeds, plants, fertilizers .. were improved. Small farmers could not meet such conditions as no support from the state was available. The board in conclusion failed to create that type of delivery system which could provide both support and protection for small farmers. This situation therefore increased the problem of income and wealth distribution rather than solved it. It also gave rise to social, economic and political consequences which had not been foreseen by either the engineers or the board(15).

To mitigate agricultural income inequality, one of two courses can be followed. One is to institute a programme of land redistribution and the second is to adopt fiscal measures which captures the new incremental income from the land proprietors. But in a country where the levers of political and legislative power were in the hands of the land proprietors, such courses were almost impossible.

"In these circumstances one tempting course is to outflank the problem instead of attacking it"[16] To achieve better income and wealth redistribution it was decided to adopt a scheme of new land settlement by bringing under cultivation those cultivatable tracts of land which the state owned. It was thought that the rise in the living standards of the new settlers would strengthen the bargaining power of those who remained as workers and share-croppers on the privately held land.

It was also thought that in such a way development could encompass the whole rural population. This, it was thought, would make it unnecessary to consider drastic measures such as land redistribution.

The difficulty with such a policy, however, is that the creation of a new settlement is a much more difficult and complex undertaking than building a dam or opening an irrigation canal. Lord Salter stated that a settlement:

"requires careful adjusted and intricate actions of many kinds. There must be a survey and classification of the land to be settled, much more detailed than the general survey already available, to determine the kind of cultivation which will be suitable and therefore the size of the plots to be distributed. The settlers must be carefully selected with suitable experience and equipment and credit facilities must be arranged. Special measures must be taken to reduce health hazards, schools, hospitals and essential public services".[17]

Since these requirements (data, surveys, maps etc.) were not available to the planners, the implementation of this approach to solve the problem can be criticized for the following reasons: 1. Most of the settlers appeared to have neither the ability nor the inclination to do the actual farming themselves. Some of them became absentee landlords bringing in others to do their work for them.[18]

2. The size of the plots (100 donums each) assigned to each settler appeared to be too big. Large parts of the plots were left unutilized and only a small part of some of the plots were actually utilized for self-sufficiency.[19]

3. Because of the desire to show quick results, the redistribution of land began before a suitable irrigation canal network was completed.

Because most of the settlers had neither sufficient ability nor financial support, they either sold their plots to other farmers (mainly to landlords in their areas) abandoned them and migrated to look for work in towns and cities. As for those who stayed on their new lands, the situation was also hard since no financial and social services were available. They therefore, managed to produce only subsistence crops.

The Board in other words, failed to achieve the schemes main aim of increasing agricultural production and or improving the standard of living of the rural population. In reality it increased the number of poor farmers who contributed almost nothing to the general agricultural output in the country.

As an illustration of the failure of the Board policy, Table, 4.3 shows the acreage and production of principal crops in Iraq. It shows that the cultivated area increased by 37% between 1950 and 1958, but the average annual increase of output was only 26%, reflecting an overall decline in productivity.

On the positive side there were gain in terms of its effect on the rural population. There is no doubt that a

TABLE 4.3

Average output of principal field crops, 1950-58 (million hectars and millon tons)

Year	Wheat			Barley			Rice		
	Area 1	Output 2	1:2 %	Area 1	Output 2	1:2 %	Area 1	Output 2	1:2 %
1950	0.95	0.55	0.58	1.00	0.85	0.80	0.22	0.24	1.1
1951	0.86	0.49	0.57	0.93	0.84	0.90	0.19	0.19	1.0
1952	0.88	0.49	0.56	0.70	0.80	1.10	0.21	0.25	1.2
1953	1.0	0.76	0.76	1.20	1.10	0.92	0.13	0.20	1.5
1954	1.40	1.20	0.86	1.10	1.20	1.10	0.12	0.18	1.5
1955	1.40	0.45	0.32	1.20	0.75	0.63	0.05	0.08	1.6
1956	1.30	0.78	0.60	1.20	1.00	0.83	0.07	0.11	1.6
1957	1.50	1.10	0.73	1.20	1.30	1.10	0.09	0.15	1.7
1958	1.50	0.75	0.50	1.20	0.95	0.79	0.09	0.14	1.6

Source: Derive from U.N., Economic Development in the Middle East, 1945-1954, 1954-1959 (New York) Government of Iraq, Statistical Abstact.

few of the settlers who formerly were poor sharecroppers became more prosperous and contented on their own lands. A part of the large uncultivated areas was cultivated, and more peasants were engaged in some kind of work mainly part-time or seasonal.

4.5 The Need for Agrarian Reform

As I have already shown, in Iraq before 1958 those who controlled the use of agricultural land also controlled the economic, social and political levers of power. The rural population remained, dispite the settlement scheme, overwhelmingly divided into two classes, with no intermediate group; the minority very rich and powerful landlords, and the majority very poor landless peasants. This inequitable ownership pattern affected the distribution of income not only in the rural but also in the urban population. Equally it affected land and productivity.

Soon after the revolution of 14th July 1958, the new government decided to centralise political and economic power in its hand, taking action against powerful rural groups who could seriously threaten the revolution. In this way, the government hoped to attain one of the main goals of its socialist policy. It was also confident that this policy would have the support of the majority of the Iraqi rural population. To achieve this, the first step which had to be taken was the redistribution of the vast areas of land owned by a number of families in order to benefit the large number of landless peasants.

The decision was taken quickly four months after the revolution and was based onan agrarian reform modelled on other countries' experience, in particular Egypt's, rather than from indigenous knowledge of Iraqi resources, people and institutions. The main driving force behind it was political. Economic and social benefits were thought to necessarily follow on from such reforms. But was it ever feasible to expect that such a hastily conceived action could adequately deal with the deep seated problems of Iraqi agriculture? Cynics might argue rather that this was a way in which central government, by shifting power away from the large landlords, could enhance the power of the state.

Agrarian reform may not always lead to agricultural development even though political and economic powers are in the hands of government. (20) In USSR, Mexico, India, Japan, Egypt, Bolivia, China, Cuba and several other countries where political developments led to a dramatic attempt to accelerate agricultural progress and economic development, major land reform programmes were usually among the first measures taken by the new regimes. (21) But although these countries all enacted sweeping land reform programmes, their success in raising agricultural production and improving the well being of the rural population had shown mixed results. This in other words means that the legal transfer of land ownership to tenants or the state, or the establishment of collective farms is often not enough in itself to achieve this goal, and in some cases may prove harmful. (22)

Sometimes the effects of agrarian reform may lead to land being transferred from originally powerful landlords to newly created, politically powerful individuals, such as members of farmers' unions. In this case the agricultural sector appears to move one step forward, but in reality it takes two steps backwards. The new powerful group may stick strictly to government policy rather than attend to the needs of the land, because they known that any change in their attitudes, which may be translated as less support for the new regime, can cost them both their land and power. In Iraq, for instance, government emphasis has always been on encouraging farmers to support its policy, by enrolling them in political groups and parties, rather than encouraging them to increas agricultural production. In the agricultural sector, this emphasis on political rather than agricultural education can be seen as a harmful input which led to a lower output which in turn can result in a levelling down of income. This in turn can also effect the distribution of income in this sector very badly.[23] A redistribution of income under land reform must therefore be accompanied by increased productivity and a dynamic rate of growth in output, or it will simply lead to negative results. Obviously any agrarian reform should, simultaneously, aim to develop both land and rural population. But how far should the agricultural development policy go in its re-distribution of income and land and how much should it aim to increase production?

Redistribution of income and land can generally decrease ownership inequality. This in itself may either

increase production or decrease it. Redistribution of land may be an incentive to the new settlers to increase their efforts, hours of work, enterprise and skills, which in turn can subsequently increase agricultural production. But on the other hand it may lead to the opposite result. Redistribution of large land holdings to smaller ones for the benefit of poor farmers may reduce capital investment and the use of technology on these lands.(24) In this case, of course, the government should help the farmers through the provision of short and long term loans from agricultural banks for the purpose of improving (and increasing) agricultural and livestock production.

4.6 Agriculture development under the agrarian reform laws after 1958

Without leading to a decline in agricultural output, the situation seemed to call for a new socio-economic system which would change the relationships between farmers and landlords, farmers and the state and between the farmers themselves. In Iraq in 1958 the government thought that changes in these relationships would be attained through the establishment of farmers' unions. But, can farmers' unions and the methods by which land tenure institutions are changed have a direct influence on the resulting socio-political and economic systems and can it be empirically verified that land reform actually leads to a more equitable distribution of income?

To answer these questions, one must examine the evidence. For an effective agrarian reform programme, it

was basically important in Iraq, as a first step, to break the political and economic power of landlords and this, it was thought, could be attained by land reform. Law No. 30 in 1958 embodied these beliefs. The law was based on four points:-

(1) Defining the ceiling of landownership and sequestrating the remaining land after payment of compensation either in money terms or kind.

(2) Distribution of land among the farmers against the payments of a sum of money.

(3) Preservation of the system of shareholding in landlords' areas with the introduction of some amendments in the division of produce.

(4) Defining the minimum wage of agricultural workers, and establishing agricultural co-operatives after land distribution.

The law limited any land holding for any individual up to a maximum of 1,000 donums (one donum = 0.6 acre = 0.242 hectare) of irrigated and 2,000 of dry land. Owners with more than the maximum were compelled to forfeit their "excess" land to the government which took responsibility for the redistribution of land to new peasant owners. Peasants were to receive some 30 donums of irrigated land or 60 donums of dry land. The law set five years for the completion of land redistribution. This plan was never fully enacted and was from the beginning distorted by powerful lobby groups.

What happened soon after the establishment of the law was that the landlords who were to be affected by the law

sub-divided their properties into smaller parts, which they registered under the name of their sons.(25) Therefore, the law was flouted in many areas, and large sectors of agricultural land remained in the hands of the feudal families. Moreover, this law gave to the landlord, whose property exceeded the maximum, the right to choose himself the land he was authorized to keep. This gave him the right to keep the best land, with the highest yield, with the most abundant water, closest to communication networks and cities, leaving the poor land lacking even the minimal necessities such as roads and water etc. to the poor farmers who, faced with overwhelming odds, therefore migrated to the cities in search of work.(26)

The law also adopted the principle of land distribution against the payment of land price, and obliged the purchaser to pay 20 per cent of the price as a down payment and 3 per cent as administration expenses, with the remaining amount to be paid in annual instalments over a period of twenty years. This method of payment kept the small farmer in debt throughout his life.

In these circumstances any improvement in income distribution within the rural population could not be expected. It also demonstrated how difficult it was to instigate any effective change in the socio-economic and political systems while the landlords were still enjoying political, economic and social authority in the rural areas. Table 4.4 shows the effect that vociferous lobbying had on the land reform law of 1958. Up to 1970, only 4.19 million donums were sequestrated out of the 12 million

TABLE 4.4

Distribution of land and number of beneficiaries in the period of Agrarian reforms.

Year	Distributed Area (Donum) [a]			Number of Beneficiaries
	Miri Lands	Sequestrated Lands	Total	
1959	36900	-	36900	615
1960	59504	223925	283429	7393
1961	198305	293726	492031	9460
1962	67876	569697	637523	11170
1963	203618	177161	380779	6779
1964	149532	267452	416984	9599
1965	27830	52852	80682	1984
1966	26771	55422	82193	2340
1967	60156	81281	141437	3290
1968	149402	73846	223248	3183
1969	54005	166673	220678	3585
1970	23079	131334	362127	15138
1971	429634	171409	601043	17235
1972	191593	211016	402609	12968
1973	315702	546164	861866	35040
1974	33112	282553	613565	23866
1975	146767	163727	310494	11308

(a) One Donum = 0.6 acre = 0.242 hectare.

Source: SPB, 1974 p.45, and SPB, 1975 p.26.

donums which were referred to in the agrarian reform law of 1958. Of these, 3.36 million donums were redistributed and 74.536 thousand farmers benefited. According to these figures, however up to 1970 more than 60 per cent of the land remained in the hands of the big landlords while a great number of peasants were still left landless.

The failure of the 1958 law to achieve even its minimal goals forced the government to introduce another agrarian reform law in 1970. This law differed little from the previous one. It retrieved the land reform programme from politics by introducing the principle of land distribution on the basis of fertility, irrigation method and type of products. It abrogated the right of choice envisaged under the old law in favour of the landlords. It also abrogated the survey law which was enacted in the thirties and maintained under the law of 1958. Finally, the law insisted on the setting up of agricultural collectives. This meant that work on a number of farms was to be directed by the government, and this was coupled with the creation of farmers' unions controlled by the state. These small number of producer associations were supposed to act as a means of introducing modern farming techniques into rural areas. But in reality, because of the substantial financial resources available to these associations, they appeared to be an attempt by government to dominate the agricultural industry.

Although this law did not introduce many changes in the agricultural sector, it maintained the momentum of distributing the agricultural lands. Between the years

1970 and 1975, and estimated of 2.9 million of donums were redistributed and abut 115,555 thousand persons benefited. This means that in five years the law of 1970 redistributed 85.3% of what the law of 1958 took 11 years to do (table 4.4).

Despite land redistribution, agricultural production showed no improvement in terms of both donum and farmer productivity. Rather there was a decline in this sector's production. The average output of principle crops in 1970-75 dropped to 1725,2 M.T.; it was 1997,9 M.T. in 1960-69 (Table 4.5). Average production per donum also dropped from 0.197 M.T. to 0.036 M.T. in the same period.

Multiplication of average agricultural output between 1970-75 by the number of people who benefited from the land distribution law of 1970 shows 0.084 M.T. per farmer in comparison ot 0.324 M.T. during the sixties. This clearly indicates that the productivity of the Iraqi farmer has also declined sharply during the years 1970-75, and that the increase of about 85% in the number of settlers (in this period) has not managed to improve general production.[27]. Overall, such results meant no improvement in the per capita income of the rural population and in the move to subsistence agriculture rather than cash crops.

Neither the law of 1958 nor the law of 1970 were able to be implemented in the northern area of Iraq before 1975. This was due to the Kurdish revolt, a recurrent phenomenon which has threatened all governments which have come to power since 1958. Internal instability was matched by

TABLE 4.5

Output by principle crops and cultivated area, 1959-75

(in 000's of tons and .000 of donums)

Year	Cultivated area (1)	O U T P U T Wheat	Barley	Rice	Cotton	(2) Total	2 : 1
1959	9618	657	733	92	8	1490	0.1
1960	9979	592	804	118	8	1522	0.1
1961	11524	857	911	68	9	1845	0.2
1962	12165	1085	1125	113	8	2331	0.2
1963	11427	488	790	143	5	1426	0.1
1964	11799	807	623	184	10	1624	0.1
1965	12223	1006	807	198	10	2021	0.2
1966	12284	826	832	182	7	1847	0.1
1967	9633	1029	855	315	9	2208	0.2
1968	10848	1537	992	354	13	2887	0.3
1969	10539	1183	963	318	14	2478	0.2
1970	10157	1236	682	180	15	2153	0.2
1971	11132	822	432	307	14	1575	0.1
1972	7008	2625	980	268	16	3889	0.5
1973	9254	957	462	157	15	1591	0.2
1974	8427	1335	533	69	14	1951	0.2
1975	8420	845	437	61	13	1356	0.2

Source: (2) U.N. Statistical Yearbook 1961, 1963, 1967, 1970, 1976 and 1977. (1) SPB 1957-1967 - 1968 p. 126, SPB 1960 1960-70 - 1972 p. 62, SPB 1974 - 1974 p. 35-37 and SPB 1975 p. 17-18.

NOTE

Data relating to the years 1967 and 1972 in this table are excluded from the analysis for purposes of consistency. Though these figures are official, in comparison with the rest of the table they do not appear to be accurate and thus including them in the analysis could effect the general conclusions to be drawn from this table. However, the figures are shown to demonstrate the problems of statistical usage in Iraq (also see Appendix A).

external problems with two Arab/Israeli wars between 1967 and 1975. This led to an increase in military expenditure from 50.37 I.D. in 1965 to 258.34 I.D. in 1975. Changes in allocation of investment was reflected in the agricultural sector (and others) by a decrease in development expenditures. In addition, the manpower demand of the Iraqi army was (and still is) one of the main agents responsible for creating a shortage in the agricultural labour force by absorbing a great number of peasants in to its services. Furthermore, in comparison with other sectors such as manufacturing, the agricultural sector was also starved of funds, Chapter 3 showed that the investment allocations in the industrial sector were more than those in the agricultural sector. It also shows that the funds actually spent in the industrial sector were 58.2% higher than those in the agricultural sector. This clearly indicates that priority after 1959 was given to the industrial rather than to the agricultural sector.

It could be concluded that land reform in Iraq failed to create a better distribution of income. It also failed to increase agricultural production. Indeed, the agricultural sector seems to have lost its dynamic impetus in the last ten years of the period 1953-75. Table 4.6 shows that the percentage contribution of agriculture to GDP dropped from 18.1% in 1865-69 to 13.5% in 1970-75. Its contribution to GDP excluding oil also dropped from 26.12% to 22.6% in the same period.

The drop in agricultural production was reflected in the country's imports of food; for example, between

TABLE 4.6

Agricultural contribution to GDP and GDP excluding the oil sector (in percent at current prices) (1959 - 75)

Year	% to GDP	% to GDP excl. oil
1959	16.1	25.7
1960	17.3	27.4
1961	19.0	28.8
1962	21.3	31.3
1963	16.3	25.5
1964	19.5	29.9
1965	17.7	26.1
1966	17.4	25.6
1967	19.9	27.8
1968	18.4	26.8
1969	17.2	24.7
1970	17.2	24.6
1971	15.5	24.5
1972	19.4	27.2
1973	14.2	22.1
1974	6.9	17.7
1975	7.5	17.6

Source: Appendix B, Table 4.

1971-75, Iraq imported 2,409,330 tonnes of wheat, compared to 719,800 tonnes between 1965-70. This increase in wheat imports cost the country over $364 million of foreign exchange.

Moreover, capital formation which the agricultural sector could provide through taxation also dropped rapidly throughout the period. Table 4.7 shows that the revenue from the agriculture tax in 1975 was lower than that in 1970 and even lower than that in 1954-60. Its contribution to direct taxation dropped sharply from 41.81% in 1954 to 2.89% in 1975. According to these percentages, the Iraqi revenue from its agricultural tax in the first five years of the seventies was one of the lowest agricultural tax revenues in the world.(27) It was not able to pay back more than 1.0% of the agricultural development expenditure during the sixties. The highest yield of tax was I.D. 3.15 in 1973 which paid back only 10.75% of that year's planned expenditure. It dropped two years later to pay back only 1.4%. Since agricultural tax depends on two factors, agricultural output and numbers of farmers liable to tax, this indicates that the agricultural sector in Iraq had not benefited from either.

4.7 Conclusions

Between 1953-75 the agricultural sector in Iraq has failed to develop. Whereas a large part of its agricultural production used to be exported during the ninteenth century, one of the main Iraqi imports in the seventies was food. Both agricultural production and

TABLE 4.7

Agriculture Tax Revenue and its contribution to total tax revenue and direct tax revenue (1954 - 75)

Year	Agricultural tax revenue (in million of I.Ds)	% of total taxes	% of direct taxes
1965	2.68	8.4	41.8
1958	2.78	7.5	37.2
1959	2.45	6.8	29.9
1960	1.94	5.5	27.8
1961	1.90	4.4	23.0
1962	0.78	1.7	9.8
1963	0.77	1.7	8.1
1964	0.68	1.5	5.9
1965	0.59	1.1	3.9
1967	0.67	0.9	3.7
1968	0.90	1.4	4.6
1969	1.27	1.8	3.8
1970	1.49	1.8	5.4
1971	1.29	1.4	4.1
1972	1.30	1.2	3.6
1973	3.15	3.0	7.7
1974	2.35	2.0	5.5
1975	1.26	0.7	2.9

Source: U.N. Statistical Yearbook 1963, 1973 and 1978, (Public Finance, Budget Account and Public Dept.)

farmers' productivity have been declining in the last twenty years.

The main problems which hampered the development of the agricultural sector in Iraq can be classified into three categories, (1) Land ownership, (2) irrigation and (3) investment.

Redistribution of land ownership fell considerably behind schedule. This was occasioned by the need to complete surveys, improve the sequestrated land, select suitable farmers and adequately establish co-operatives.

Farmers, having no security of tenure, either ignored good farming practices or left agriculture altogether and moved to the cities. Two land laws were established in 1958 and 1970, and the governments hoped to solve the agricultural problem through them. Both laws, however, depended on voluntarily compliance and the results were very poor. Up to this day thousands of farmers are landless, and many thousands more leave their lands every year for the cities searching for better work to improve their standard of living.

Irrigation in Iraq was, and still is, the central problem of agriculture in many parts of the country, especially in the summer season. Very little has been done to solve this problem in the last twenty years. Partially this was due to the Kurdish uprising in the northern area (the main area of dam and water reservoirs' schemes). In other parts of the country, especially the southern areas, the flooding from both the Tigris and Euphrates rivers increased the degree of salt in the soil, resulting in

minimised land utilization and reduced productivity per hectare to a level that was considered to be one of the lowest in the world. This consequently reduced farmers' incomes and a large number of them migrated to urban areas seeking employment.

Coupled with other problems such as lack of management skills, poor technical methods, transport, credit and marketing, and above all the unstable political conditions, Iraqi agricultural output presents one of the lowest levels of productivity in the world.[28] This situation significantly increased the country's imports of food, specially during the last ten years of the period under investigation, leading to a great loss of foreign exhange.

CHAPTER 4

NOTES

1. Peter Dorner, "Land Reform and Economic Development", Penguin, 1972, p. 16.

2. Ibid p. 17.

3. Ibid, P. 17 - 18.

4. United Nations, Studies on selected development problems in various countries in the Middle East. New York, 1970, P.47.

5. Abbas Alnasraqi, "Financing Economic Development in Iraq - The Role of Oil in a Middle Eastern Economy", Praeger 1967, p64.

6. The Economic Development of Iraq Report of a Mission organized by the International Bank for Reconstruction and Development at the request of the Government of Iraq, published for International Bank of Reconstruction and Development by The John Hopkins Press, 1952, p.13.

7. Ibid pp. 13 - 14.

8. Yurif A. Sayigh, "The Economics of The Arab World", Croon Helm, 1978, p.28.

9. Ministry of Information, The Economy of Iraq, Development and Perspectives, 1958 - 1976 - 1980, 1977, p. 46.

10. Alnasrawi, 1967, p. 66.

11. Ibid p.66.

12. "The Economic Development of Iraq", 1952, p.203.

13. Lord Salter, 1955, p.37.

14. Ibid p. 36.

15. Alnasrawi, 1967, p.68.

16. Lord Salter, 1955, p.55.

17. Ibid p.50.

18. The Economic Development of Iraq, 1952, p.16.

19. Ibid p. 16.

20. Peter Dorner, 1972, pp. 16-18.

21. Land Economic Research, Land Economic Research for World Agricultural Development, Rainer Schickele, John Hopkins Press 1962, p. 101.

22. Ibid p.101.

23. Ibid p. 82.

24. Peter Dorner, 1972, p. 83.

25. The Economy of Iraq, 1977, pp. 46 - 49.

26. Ibid pp. 46 - 49.

27. The problem of this calculation however is that the number of beneficiaries given in Table 4.4 does not necessarily mean that all were actually engaged in agricultural work. A great number of those who had benefited from the land reform laws were living in urban areas and they never moved to work on their new lands, (also see note on Page 8). In addition, some beneficiaries in the rural areas, due to lack of investment, were not able to utilise their new plots for commercial purposes. Therefore, a large number of those farmers were, as always, kept at a minimum level of self-sufficiency. This situation in turn could surely lead to no significant improvement in agricultural productivity.

28. Taking wheat as an example, for output, the average yield of one hectare during 1962-68 was 0.530 kilograms in Iraq; it was 1.380 kilograms in Australia, 1.760 kilograms in the United States, 2.090 kilograms in Yugoslavia, and 2.640 kilograms in Egypt. (Aziz Sibah: The Relationship between the size of agricultural land and increased production, Ath-Thawra Newspaper, Baghdad, Iraq, October 20, 1972, p.3)

CHAPTER 5

Development of the Industrial Sector

The main objective of Iraq's economic development policy, particularly in the post revolution period, has been, and still is, the stimulation of the non-oil producing sectors in order to reduce the country's heavy dependence on oil revenues. Apart from agriculture, the industrial sector has formed the main focus of this policy. This chapter examines the role of government in, and the influence of foreign-consultant recommendations on the industrial evolution of Iraq. The emphasis will be to show the progress of development of this sector in relation to these two factors.

5.1 Introductory Framework: The Role and Power of the State in Industrialization

It was indicated in Chapter 3 that a government should always play a major role in the overall planning of development in a country. It was also seen, in the same chapter, that this role of government is usually more important, yet practically more difficult in developing than that in developed countries. However, the level of government intervention still varies from one country to

another depending on political conditons and existing resources.

Most literature suggests that the political condition (or system) has a great effect on the level and type of industrialization in a country[1]. Historically, the importance of political conditions to industrialisation was seen clearly in both communist and capitalist countries. In the USSR, for example:

> industrialization ... in the years after the revolution was predominantly a political struggle between the left, which advocated industrialization financed by shifting the terms of trade against the peasantry, and the right which continued with the liberal New Economic Policy. The debate was very considerably about the extent of relations with the capitalist West, and about how much capitalism was to be permitted in the rural areas of Russia, but fundamentally about which class should bear the burden of socialist economic growth. In the end the debate as such had no outcome, since Stalin obtained power and implemented a policy which bore little relation to views of right or left in the debate, but which certainly showed up the ultimate political importance of the issue. Stalin's decision to go ahead with rapid industrialization and the building of socialism in one country demanded that a reliable food surplus should be obtained from the countryside. In the backward state of Russian agriculture this could be done either by massive financial incentives, which would simply have strengthened capitalism in the countryside and were in any case not certain to work, or else it required compulsion. In the form of collectivization and forced deliveries, Stalin adopted the latter policy. Capitalism in the countryside was eliminated and the political structure of the Soviet Union was determined for a generation.[2]

Also, in Britain, in the 19th century, industrialization was a result of a socio-political conflict between industrialists and landowners; industrial

capitalists were to benefit from the ending of the corn laws by having to pay lower wages while the price of corn was kept down.[3] The government in this case played an indirect role in encouraging industrialization:

> It (the government) certainly removed the obstacle of the corn laws; and its agency was important in promoting the land reforms (enclosures) which took place before and during early industrialization and which were important in solving food problems and in forceably creating a labour supply for industry[4].

It can be argued that the government in the USSR perhaps played a more effective role in industrialization than the government of Britain. In addition, it has been argued that the amount of state involvement has been much greater in the socialist countries of western Europe than in the capitalist countries of western Europe at the same stage of industrialization. This was seen in a faster rate of industrialization as a whole: "that is the industrial sector accounts for a given proportion of GDP at lower levels of income per head - and also in a concentration on capital goods as opposed to consumer goods at an earlier stage in industrialization under-developed countries more recently."(5)

But, however, this equation may not hold in all cases. In Japan, for example, where a capitalist system exists, the government has played directly a very active industrialization policy. In most Latin American countries, government, to encourage industrialization, has imposed high tariffs on imported industrial goods.[6] Moreover, the government of India owns and finances superstructural investments and invests directly in a

number of basic-large industries such as iron and steel[7], but the basis of the industrial sector remains in private hands.

In developing countries, with recent revolutions, government intervention in industrialisation may seem greater than that of other governments in other developing countries. The main reason for this action is probably to obtain public support which is viatal for the survival of new regimes. In developing countries, especially those with natural resources like oil and gas, the threat to new regimes may not just be internal, but external too. It would suggest that industrialisation in developing countries can also be a result of power conflicts between new governments which seek full control of social and political power and the old agricultural and merchants group who oppose them. Sutcliffe described this as follows

> in an underdeveloped country with a backward and entrenched rural society there is little choice but to give priority to the development of the industrial sector; the establishment of a new kind of (industrial) society is easier than a reformation of the old. More specifically, if, for social and political reasons, agriculture is backward and cannot be transformed it may be necessary to foster the building of new ideas and new urban social classes with sufficient power to set against those rural interests which are hampering development. In other countries, and there are several, where the migration from rural to urban areas has overtaken the expansion of urban employment and where this migration is not reversible a government may have no alternative in the interests of its survival

> but to expand urban (industrial) employment as rapidly as possible(8).

It is true that, for political reasons, such action has been taken by some governments in some developing countries, but this does not mean that all these countries have actually achieved significant levels of industrialisation. As the above quotation is only used here to describe the reasons behind the political action, I do not agree with Sutcliffe and would suggest that the backwardness of rural societies in some developing countries does not fully justify government concentration on industrial development to the neglect in the rural areas. Such policy would exacerbate the backward nature of rural societies and this in turn could affect the development of the industrial regions. Developing an industrial society should always be coupled by enhancing the agricultural area. As shown in Chapter 3 the process of industrialisation requires raw materials, labour, food for workers, investment and above all large scale markets for new industrial products. To provide these important conditions a more developed rural society would be necessary.

Also a government intervention does not necessarily always show positive results; it may equally show negative results. The example of Iraq, as will be seen later

in this chapter, clearly shows the negative result of differing unstable-political interventions in the Iraqi economy. Since "in the actual world the political position that a nation takes has an inevitable bearing on its economic system",(9) the government (or those who hold political power) should be flexible enough to allow undisturbed industrial economic development to take place. Green and Krishna indicated that

> a rigidly ideological position necessitates an inflexible economic system based on that ideology. Where the economic goals are clearly defined, and where first priority is given to achieving these goals, political decisions would have to be flexible enough to allow economic goal implementation. The alternative is a rigidity which seriously distracts from the fulfilment of the goals(10).

The other factor which may limit the level and type of industrialisation in a country is existing resources, mainly human resources, skilled workers and consumers (markets); natural resources, e.g. agriculture, minerals, energy, etc., and financial resources. The emphasis here is given to natural resources since they are more likely to make a country specialise in one industry rather than another. This is clear in the case of oil and gas

industries in oil-exporting countries, tea and coffee industries in some Asian and Latin American countries, and perhaps cotton industries in some African countries. In the United Nations' "A study of Industrial Growth", the following industries in different countries are noted:

> The most pronounced cases are found in the "basic metals" industries of Rhodesia and Nyasaland and Chile. The high positive deviations in "other heavy manufacturing" in countries like Indonesia, Iraq and Venezuela seem to be closely related to their "petroleum products". Similar associations may be applied, although to a somewhat lesser extent, in some of the crude rubber producing countries as regards their "rubber products" sector (e.g., Ceylon and Indonesia). High positive residuals in "textiles" are observed in Pakistan, India, UAR and Turkey, which are all net exporters of fabricated textiles.(11)

But this does not mean that a country with no natural resources cannot be industrialized. Industrialization usually starts in one of three ways:(12)

(1) the processing for export of primary products (agricultural or mineral) which are exported in a crude state; or

(2) manufacturing for an expanding domestic market; or

(3) manufacturing for export of light industrial goods, often based on imported raw materials.

Accordingly, industrialization, whether meant for home or export markets, could still take place in a country where no raw materials exist domestically. The petrochemical industries in Europe are perhaps a good example of this

model of industry dependant on imported raw materials. In fact the Japanese petrochemical industry was first developed depending not only on imported raw materials (still is) but also on imported skilled labour.(13)

The above statement does not suggest the concentration on the development of one industry only is the ideal. A developing country should try to diversify its available investment in different industrial sectors with emphasis on those depending on local raw materials. New industries reduce dependence on imports, provide training for substantial numbers of highly skilled workers, and increase support for the application of research and technology.(14) It is true, for example, in the case of some African countries, that,

> cocoa plantations, cotton production and iron ore deposits <u>are</u> national assets which can, by being more efficiently developed (including an expansion in the processing of output), contribute to the increased investible surpluses which are required for altering the existing economic structure; but ... the danger lies in depending upon them <u>alone</u>.(15)

In conclusion, it can be suggested that there is no one certain road to industrialization. It (industrialization) depends on various factors, such as a stable and flexible political system, the availability of resources especially those related to skilled workers and efficient planners, together with government determination. In developing countries the state must, according to informed commentators, involve itself in rapid direct intervention and not just encourage

industrialization by removing obstacles, but partake in industrial growth itself.

5.2 Government and industry before 1953: Historical background

During and after the First World War, the Iraqi economy was influenced by two main factors:

1) Increasing contacts with the West (particularly Europe), mainly through trade. This was due to the growth of international trade during that period as a result of increased European demand for raw materials and energy sources, namely oil.

This factor assisted in expanding trade operations in the country, by creating a class of merchants who specialized in international trading. Subsequently this led to the growth of various export processing industries such as dates, wool and grain. On the other hand, increasing imports of different industrial products led to competition for local indigenous industries, especially for the textile industry. (16)

2) The occupation of the country by the British army in 1921 led to the need for more and new industrial products in order to meet an increasing demand created by the military stationed in the country. Accordingly, consumer goods industries such as cigarette, alcoholic drink, printing and detergent (soap) industries were established, and other new goods and equipment including soft drinks,

hand power machinery and bathing machines were imported.(17)

The new Iraqi government which came to power after the First World War faced complicated political and economic changes; in the rural areas, economic and political power was strongly entrenched within a small group of landlords some of whom were members of Parliament, whilst in the urban areas (mainly Baghdad) power was in the hands of men who in their turn were strongly supported by the first group. This coalition reflected trade relationships, mainly agricultural, between the producers, landlords and urban merchants.

One of the new government's priorities was to limit increasing local demand for industrial goods, in an attempt to prevent massive trade deficits. Therefore, there was no choice but to encourage the development of local industries. In doing so, the government was also aiming to create an industrial society in the urban areas with sufficient power to set against those rural interests which were hampering development. These new social classes based on the industrial society would, the government argued, also help in reducing the unequal distribution of income between the rural and urban areas.

In 1929, the government, therefore, introduced the "Law for the Encouragement of Industry". This law exempted local industry from income tax, land tax and import duties, and provided that land up to 100,000 square feet might be

allocated to industries that contributed to the national economy rent free for ten years.[18] Less than two years later, an amendment to the law was introduced which aimed to encourage industry even more by exempting additional raw materials from import duties.[19]

However, despite these measures, after four years the government discovered that in spite of exemption from taxes, small industries were still unable to survive in the face of import competition. The main reason for the lack of success in promoting industrial development, it was thought, was that the people for psychological reasons, preferred foreign to local goods. As long as this continued, it was argued, there was no solution but to protect local industry from foreign competition.

In 1933, therefore, the government introduced a two pronged protective tariff law. In the first place, this law raised the rate of duties on imported goods by up to 100%. For example while rates of duties rose from 15% to 25% on metals, they rose to more than 100% on matches, sugar, cigarettes and alcohol. In the second place, the law, as part of a longer term strategy, expanded the list of machinery and raw materials that could be imported free of duty, and at the same time reduced the rate of duty on a large number of items, mainly spare parts, from 13% to 8%.[20] According to this law, government institutions were to give preference to local products in any contract they might sign with any company.

It was thought that by allowing more types of machines and raw materials to enter the country with a lower rate of tax, this would help local industries to produce goods of similar quality to foreign goods, and in turn that would swing the consumer's choice in favour of domestically manufactured goods. Both laws (of 1929 and 1933) were mainly introduced for political rather than for economic or social reasons and as such they were too narrow in the conception. Thus they concentrated on the acceleration of the individual industrial owner's profits and neglected wage payments and work conditions. The laws also neglected to extend financial support to industry, even though local industries were starved of risk capital. This shortage of capital investment in local industries proved a major reason for foreign companies, which were already attracted by the above laws, to enter the country and invest in different industries, particularly textiles.(21) These companies, in a short period of time, came to dominate almost all the large industries in Iraq with capital investment ranging between 60-90% of the total. Moreover, because of a shortage of local skilled labour, these investors imported labour from other countries.(22) This meant that domestic employment failed to rise and skills were not acquired.

These results were never anticipated by the government and all the laws of 1929 and 1933 aimed at encouraging local industry exacerbated the problem instead of lessening

it. The economic power of these companies and the political support they had from some members of parliament who themselves had shares in these companies were factors which prevented the government from taking any action to reduce the expansion of foreign employment and capital investment in the country. The only strategy open was to develop alternative support for small industries. This happened in 1936 with the establishment of "The Agricultural and Industrial Bank".

The bank was first given the title 'The Agricultural and Industrial Bank' for the reason that powerful rural interests had already noticed the shift in government policy towards the industrial sector. Hence the government had to demonstrate its support for agriculture in the Bank's name. Between 1936 - 1945, the annual loans granted to agriculture averaged I.D. 75.500 compared with only I.D. 6.300 for industry.[23] In 1946, however, the Bank was split into two separate Banks; one for financing industry and the other for financing agricultural projects.

The Industrial Bank was linked to the Ministry of Finance until 1957 when its responsibilites were transferred to the Ministry of Development. Since the Development Board was charged by the government with the task of establishing and implementing an economic development policy, the co-ordination between the Board and the Industrial Bank was seen as essential.

The main aim of the Industrial Bank was to encourage industrial development in Iraq. To achieve this the Bank was given responsibility for the following areas:-

(1) To make loans to industrial companies.

(2) To participate in the equity capital of industrial companies.

(3) To establish industrial enterprises directly on its own account.

(4) To provide technical assistance and advice on engineering, administrative and accounting affairs, as well as prepare industrial feasibility studies.

It can be seen from the remit that the Bank was more than a credit institution.

The Industrial Bank started its business with a government loan of I.D. 500.000. This loan was increased to one million Iraqi Dinar in 1950. These funds however were critized as insufficient to set up a strong industrial base in the country.

Between 1948 - 1950, the number of loans given by the Bank rose from 35, a sum of I.D. 50.298, to 93, a sum of I.D. 131,950 (Table 5.1). Although most of the Bank's money went to companies which borrowed I.D. 2,000 and over, these loans were in accounts less than I.D. 1,000. This indicates that the Bank's bias was in favour of medium and large scale companies and industries. Small scale industries, therefore, were again ignored. Up to 1950 the Bank only participated in six industrial enterprises with

TABLE 5.1.

LOANS MADE BY THE INDUSTRIAL BANK 1948-1955

Size of Loan (I.D.)	1948 No.	1948 ID	1949 No.	1949 ID	1950 No.	1950 ID	1951 No.	1951 ID	1952 No.	1952 ID	1953 No.	1953 ID	1954 No.	1954 ID	1955 No.	1955 ID
Below 100	..	..	..	..	..	..	..	..	..	..	2	200	3	300	2	20
101-500	18	6,828	52	22,520	64	24,010	58	22,950	75	25,730	76	27,740	80	30,963	150	64,80
501-1000	4	3,140	4	3,300	4	3,152	11	10,000	12	11,450	24	20,950	59	53,035	70	53,00
1001-2000	5	8,430	6	9,000	10	16,700	3	4,700	21	225,250	29	225,250	31	52,700	60	72,02
More than 2000	8	31,900	19	97,290	15	88,088	15	243,575	45	583,754	50	460,000	69	1,230,604	175	545,02
Total	35	50,298	81	132,110	93	131,950	87	281,225	153	656,950	181	734,140	242	1,367,602	457	735,04

Source: Industrial Bank Annual Reports, 1960 and 1965.

TABLE 5.2

The Industrial Bank's Equity Investment in I.D., 1949-56

Enterprise	1949	1950	1951	1952	1953	1954	1955	1956
Iraq Cement Co.	243.750	243.750	243.750	169.810	269.810	269.810	321.260	308.160
Vegetable Oil Co.	30.000	30.000	30.000	30.000	60.000	90.000	120.000	120.000
Iraq Trading & Grain Milling	25.000	25.000	25.000	60.000	60.000	60.000	66.000	66.000
Iraq Dredging & Land Reclamation	31.250	31.250	31.250	31.250	31.250	31.250	31.250	15.625
National Leather Industries	43.750	42.750	43.750	50.313	67.861	67.861	67.861	67.861
Iraq Spinning & Weaving	72.900	99.740	99.740	222.900	425.110	425.110	425.110	425.110
Iraq Jute Co. Ltd.	-	-	-	-	48.750	75.000	112.500	112.500
Date Industries	-	-	-	-	10.000	10.000	10.000	10.000
Baghdad Bakery	-	-	-	-	10.000	20.000	32.500	32.500
National Insurance Co.	-	-	-	-	12.500	15.000	15.000	15.000
Woolen Textile Co.	-	-	-	-	-	75.000	375.000	375.000
Estate Industries	-	-	-	-	-	-	25.000	25.000
Iraq Gypsum Co.	-	-	-	-	-	-	30.000	30.000
Total	446.650	473.490	473.490	629.273	995.281	1,139.031	1,631.481	1,674.756

Source: Industrial Bank Annual Reports, 1960 and 1965.

total investment of I.D. 473.490. All of these enterprises were large scale and were already in existance (Table 5.2).

The main reason behind the Bank's concentration on large scale industries can only be explained on the ground that the Bank was aiming for profit maximization.[24]

It followed the same policy of profit maximization which was applied by the only three commercial banks (British) in the country and tried to compete with them by investing only in the large industries. But such an aim was obviously not one of the objectives behind the establishment of this bank. By emphasis on this policy, the Bank also ignored its other responsibilities, specially those related to technical assistance and feasibility studies.

During the Second World War, three factors affected the Iraqi industry. More than 50% of the normal supplies of imported goods were cut off; the government's military expenditures on food-stuff, wages and salaries and military equipment increased and this in turn increased the purchasing power of the government; and thirdly by increasing the employment of local labour (on military constructions and engineering projects) the purchasing power of the people was also increased.[25]

The cut in the supplies of imported goods reduced the number of industries depending on foreign imports of raw materials, and increased the number of industries (and their output) which depended on local raw materials; for

example, textile, cigarette and date factories worked continuously at full capacity and made high rates of profits.(26)

Even though the second factor lessened government expenditures in the industrial sector, at the same time it increased the demand for industrial products. Together with the third factor, this, indirectly, increased the purchasing power of the country creating a wider local market for industrial products, supplies of which were very low compared with the high demand for them.

These factors showed even more acutely the need for industrial development in Iraq. Aware of this in 1950, the government added conditions to the law of 1929 by limiting foreign employment to 10% of total employment by, insisting that at least 55% of the total capital of any company should be held by Iraqis and by exempting new industries from income tax for the first five years of profitable operations.(27)

But the problems facing industrial development, during that period, were not just about finance, politics and protectionism; there was also an acute lack of local skilled labour and lack of indigenous technology, and this was aggravated by the small scale of the domestic market.

5.3 The Development Board's policy towards industrial development in Iraq, 1953-58

It was seen in Chapter 3 that the general policy of the Development Board was influenced by the recommendation

of a limited number of foreign economic teams who suggested that Iraq should not encourage industrialisation and should rather concentrate on agricultural development. As I have already shown, the effect of these recommendations was clearly evident in the Board's development plans; between 1951-58, only I.D. 74.6 million was allocated to industry, compared to I.D. 117.7 million to agriculture.

The Development Board started its first industrial planning programme in 1952 under the recommendations of the International Bank which suggested that several industries should be established in the country. The Bank recommended the improvement of local industries already in existence, e.g. textile, cement, vegetable oil, leather, cigarette and date and also the establishment of new industries, namely paper, sulphur, sugar, chemical fertilizer[28]. The Bank, however, emphasised that any new industries to be developed should basically depend on local raw materials.

All these new industries seemed to have direct of indirect linkages with agriculture; while sulphur was used for fertilizer production (see p. 217) which is needed for agricultural development, the rest depended basically on agriculture for their raw materials. This suggests that by recommending these new industries the Bank was probably bearing in mind the enhancement of backward and forward linkages between industry and agriculture. Generally such a strategy fits with the Bank's policy of balanced economic development which was recommended for Iraq during the fifties (Chapter 3).

The Board took its time considering these proposed projects and again sought assistance of industrial experts. In this way Little came to carry out an industrial survey for Iraq and presented a report to the Board in 1956. This report

consisted of suggestions for establishing new industries and for the improvement and expansion of existing ones. Little's industrial programme was estimated to require an investment of I.D. 43 million over a period of 6-7 years [29]. In fact his recommendation for new industries in Iraq were no different from those suggested by the International Bank. Little argued the need to the textile, date, building material, soda and chlorine industries, and also proposed that in the long term new ones such as fertilizer, ethylene and plastic industries may be developed [30].

Little's report was partly confusing. While it suggested the need to develop the above industries, at the same time it pointed out the dangers of forcing industrialisation in Iraq. It emphasised the importance of establishing "only those industries that could be expected to produce goods at a cost below the landed price of comparable imported commodities before import duties were levied" [31]. But, having stated this, the report on one hand strongly recommended the establishment of a new large scale rayon plant "even though the ultimate costs of production could not be determined". This indicates that the cost of rayon production might appear to be higher than imported rayon products On the other hand, the same report did not give much attention to the possibility of establishing the fertilizer plant which was estimated to be operating at a unit cost of at least I.D. 4.0 lower than that of similar imported fertilizer [32].

It is clear that Little emphasised the need to improve and establish those industries which depend basically on agricultural raw material rather than on other raw materials such as gas and petroleum products.

But, how could the Development Board establish large scale industries requiring large and improved varieties of agricultural products for the raw materials when general agricultural output and quality were both declining? To answer this question, the Board sought more foreign advice. The recommendations of Professor Iversen and Lord Salter (in 1955-56) pointed to a possible solution to the Board's confusion. Both experts argued strongly for the need for agricultural development leaving heavy new industries to be established in the "very long future". Again, they suggested the improvement of existing local, and the establishment of a few agricultural-based, industries, concentrating on textile, sugar, date and other food industries. They also emphasised the urgent need for cement and other building materials industries.

The Development Board accepted the above recommendations and thereafter adopted a policy that concentrated in the short term on improving and expanding existing industries leaving new ones to be considered in more detail for the future. Under this policy, the Board managed to establish four main projects: the Mosul textile plant, the cement plant, the Mosul sugar plant, and the Daura oil refinery. The development of some of these projects was not without criticism.

The only reason behind locating two large scale cement plants in the north of the country was to supply the construction of two dams which were to be built in Mosul

(Bekhme and Eski Mosul) and in Sulaimaniya (Dokan) with cement. The question which the Board did not realise was how beneficial could these plants be in the long term when the construction of these dams had been completed? These plants were situated far away from the largest domestic market in Baghdad and far from the southern markets. Cost of transport of cement in this case would be high. This cost would be even more prohibitive in the case of exports because the distance between any of these cement plants and Basra, the only port of Iraq, is over 800 km.

The textile plant, located in Mosul in the north of Iraq, was based on large scale capacity.(33) This, in other words, meant that unless the plant was run at full, or nearly full, capacity, production cost per unit would start to increase. Since this plant required a good quality of cotton which was, and still is, not available in Iraq, production costs were unlikely to be competitive. Furthermore, production of cotton requires a relative humidity ranging from 50% to 90%, depending on the season.(34) This range is much higher than that existing in the Mosul climate. Accordingly, more investment would be required to provide this necessary conditions. This investment would not be needed if the plant had been located at Basra.(35)

There were also problems with the sugar plant which was also located in Mosul. This plant was planned with a

capacity for processing 10,000 tons of beet and 25,000 tons of sugar cane per year.[36] Neither beet nor sugar cane was grown in Iraq at that time. The Board, therefore, hastily drew a plan for growing both crops in the north. But to put such a plan into action was not as simple as seen by the Board. The majority of farmers in the Mosul zone were already engaged in two processing operations: growing vegetables to meet increasing demand from workers who moved to the area for the construction of the dams and the textile industries; growing cotton to satisfy the great demand created by the textile industry. Moreover, the climate in the northern areas of Iraq (including Mosul) was suitable for growing beet, but not suitable for growing sugar cane. These areas are very cold in winter with snow throughout the season, and cool in summer. In such climatic conditions, sugar cane can not be successfully cultivated. It is, however, possible to produce this crop in the south of Iraq, an area where both water resources are available and the climate is favourable. In addition the methods used by the farmers in the south of Iraq are more suitable for the cultivation of sugar cane than those of the northern areas. Furthermore, agricultural unemployment was much higher in the south than in the north and this slack would have allowed expansion.

It can be concluded that the Development Board, because its policy was basically concerned with agricultural development, gave little attention to

TABLE 5.3

No. of industrial establishments, employees and average wages paid in Iraq, 1960 and 1969

City	Year	No. of Establishments	% of Total	No. of Employees	% of Total	Average Wager per Worker (I.D.)
Baghdad	1960	480	49.4	39510	58.8	256.4
	1969	795	58.1	62254	63.9	334.1
Basra	1960	171	17.6	11255	16.7	160.6
	1969	146	10.7	9414	9.7	247.8
Mosul	1960	81	8.3	6231	9.3	208.9
	1969	72	5.3	7322	7.5	315.5
Kerbela	1960	35	3.6	1096	1.6	169.7
	1969	76	5.6	3068	3.1	234.7
Hilla	1960	79	8.1	2094	3.1	171.9
	1969	49		3272	3.4	234.7
Others (1)	1960	125	12.9	7034	10.5	224.2
	1969	230	16.8	12131	12.4	290.2
Total	1960	971	100	67220 (2)	100	228.5) (3)
	1969	1368	100	97451 (2)	100	313.8)

Notes: (1) Nine cities.
(2) Covers all large establishments, water and electricity projects, and persons who are employed by slaughter contractors.
(3) Average of totals.

Source: Derived from the "Statistical Pocket Books; 1957-1967 of 1968 and 1960-1970 of 1972", Central Statistical Organization, Ministry of Planning, Baghdad - Iraq.

industrial improvement. Even when the Board decided to take action to promote industrial development, its policy resulted in inadequately researched projects which were then criticised either for their unsuitable location or inappropriate capacities. The few industrial plants which were established by the Board were limited to two areas, Baghdad and Mosul, while the rest of the country was ignored. Table 5.3 shows that out of Iraq's total industrial establishments numbering 971 in 1960, about 480 establishments were in Baghdad alone and 81 in Mosul. Adding the 171 establishments which already existed in Basra to that of the two areas above, the result shows that over 75% (732) of total establishments were centralized in these three cities only, leaving the other eleven cities with only 25% of the total. Moreover, wages paid for workers in these establishments varied significantly from one city to another. For example, while the average wage of workers in Baghdad was I.D. 256.4, it was I.S. 208.9 in Mosul and I.D. 160.6 in Basra. These results indicate an unequal distribution of income within the urban population.

The Board also neglected the establishment of new industries that could use uncultivated raw materials, such as petrochemicals. This industry, as Langley pointed out, "might have become as productive as the oil industry", and it would have created a good source of employment.(37)

Finally the Board gave no attention to the encouragement of the private industrial sector, a fact

that was obvious to private industries. For example, the housing programme, which provided a market for small contractors and building-material producers, was not instituted until the end of 1955.[38] Perhaps the Board assumed that its remit did not cover private industries, since the Industrial Bank and the laws of 1929 and 1933 for Encouragement of Industry were meant specifically for that purpose. But even this miscalculation can be critised:

> Its persistent misconception, however, was disheartening. Since 1950, the oil companies' 'integration' policy and the building-materials and construction industries' response to enlarged markets should have made it clear that private enterprise would not lag in the face of sure markets.[39]

The failure of the Development Board's industrial development policy in Iraq is clearly shown in Table 5.3. From this it is clear that between 1953-58 the industrial sector's contribution to GDP was only increased by 1.8%. The share of this sector in GDP excluding the oil sector also showed no significant improvement; it contributed 10.1% in 1953 and 11.9% in 1958.

5.4 Industrial development after 1958

The focus of the socio-economic development policy of the new government after the 1958 revolution was "to break with the past" changing those ideas inherited from the era of the Development Board which argued that Iraq should not force its industrialization and should lay emphasis on agriculture. Changes in policy were clearly shown in the

law of 1958 which abolished the Development Board and outlined the government's social and economic development aims as follows:

> "(1) To implement the social revolution, aimed at creating an economic and social regime which would result in an increase in production, and a fair distribution of income.
>
> (2) To define the field of economic activities pertaining to the public sector to ensure the implementation of socialist principles in planning." (40)

Soon after, therefore, all the banks and insurance companies were nationalized. This measure was meant to centralize financial resources in the government's hands. Emphasis was also laid on the completion of those projects which were already under construction. From 1958 industrial development was supposed to have priority in government investment.

But, despite the stated aims, the share of the public sector in industry continued to be low while the private sector, benefiting from the new government's laws towards industrialization, continued to dominate. The main reason for this was probably because for the new government, in the first years of the revolution, industrial development was not seen as an ideological priority.

In 1963, a new regime came to power with an ideology commitment to overall socio-economic and political changes. This regime pointed out strongly that "the public sector is the vanguard and leader of the industrialization process as it is state owned and being the main base of the

transformations towards socialism"[41] In line with this, in July 1964, a law was passed for the nationalisation of over 20 large industrial establishments. The government's justification for this change was to put an end to the domination of capitalist companies and groups in the country. They, the government pointed out, were relics which had controlled industry for a long time for their own benefit rather than that of the Iraqi economy.

However, an examination of the political and social conditions of the sixties, especially the first half, may indicate another reason for this move.

From the early years of the revolution, emigration from the rural to the urban areas reached its highest level in the county's history. Between the years 1960-70 the percentage of the urban population in Iraq rose from 46.8% to 57.8% and it continued to rise rapidly to reach 63.7% in 1975. The three large cities Baghdad, Mosul and Basra, were most affected by this change. The main reason for emigration was the availability of work in the cities. Baghdad's population, for instance, increased from 1.3m. in 1957 to 2.3 m. in 1967. The rate of urban population growth was much faster than that of industry and other public facilities. In turn the rate of unemployment, in towns and cities, increased rapidly, raising the pressure on the government which was already facing a high rate of unemployment. Surmising that the urban population are politically more organized and articulate than the

rural population, the government then had no alternative but to provide jobs for them or it judged that it would simply lose their support. The government therefore, took an urgent decision to expand the public sector within the cities, so as to absorb as many as possible of the unemployed. The nationalization of large companies seemed to be the most obvious way of doing this.

Apart from this the government did not seriously take any action to slow down the rate of emigration; instead it indirectly helped to increasing this rate by employing a great number of migrant farmers as workers in its establishments. As a result of this policy the number of government employees increased from 207,966 in 1960 to 245,253 in 1963 and then jumped to 313,087 in 1965. Taken over by government, some establishments had to employ double the amount of workers that they actually need. During this period industrial workers were given priority by the government in its development plans over farmers and the distribution of political power and income also changed in their favour. This meant that the existing distribution of income, which was already heavily skewed towards the urban population, increased further to widen the gap between urban and rural populations even more. This led to more peasants emigrating to the urban areas.

Nationalization was a set-back for the Industrial Bank, since it meant the exit from its portfolio of the shares of most of the companies in the creation of which it

had participated, or of the capital which had been subscribed. It was left with only a few small private companies, and it had in the following years to turn to mercantile and real-estate lending.(42) The private sector, it can be said, has suffered under this policy. However, in spite of ambiguity in the delineation of its frontiers, this sector expanded very slowly mainly as a result of the expansion of small businesses in fields already in existence.

The new regime which took power in 1968 attempted an even more vigorous strategy to enlarge the public sector. Its first development plan of 1970/71-1974/75 allocated the highest share I.D. 858.7 to the development of the public sector; out of this, I.D. 364.4 was to go to industrial development. The principle guiding to the industrial expenditures was as follows:-

> Ensuring the party's supervision and direction of this sector, in addition to ensuring and promoting the participation of the working class in production fields and in solving labour problems.(43)

The government in its industrial policy between 1970-75 emphasised two conditions:

1) Completing those industrial projects which had already been started, and also begining work on those which were previously recommended but no serious steps had been taken to bring this about. Examples of these projects were the silk factory in Baghdad, the Kirkuk sulphur extraction factory and the Ramadi glass factory.(44)

2) Establishing new industries that mainly utilize local raw materials for their operations. What was meant by new industries here was cement and petrochemical projects.(45)

In reality however, the government, gave priority to the completion of those industries already under construction and indicated that future new industries would have to wait until "economical conditions (lack of funds) improved".(46) During this period, therefore, the first phase of the Mishraq project was completed. This was to provide an annual capacity of 250,000 tons of sulphur for domestic demand.(47) In additon the other major projects which were completed during this period were the Basra Paper Mill, the Sadat Silk Factory, and the Ramadi Glass Factory. All these projects had been recommended by Little in 1956.(48)

Up to 1975 the main industries in Iraq were still those which had existed in the forties, e.g. textile and clothing, date and foodstuffs, vegetable oil, leather, cement and construction materials, and petroleum refining. Almost all these industries' output was consumed domestically.

By 1974, after 17 years of industrial development the industrial sector (excluding petroleum, electricity and water) produced goods valued at I.D. 417.7 m. A total of 1241 large establishments and 26332 small establishments were in operation, with a labour force of 178,000 employees (or 5% of the total employment of the country). The

industrial sector contributed an average of 8.5% of GDP in 1964-69, and an average of 8.2% in 1970-75. It also contributed an average of 12.4% of GDP excluding the oil sector in 1964-69, and 14.0% in 1970-75 (Table 5.4). In addition, it showed a high average annual growth rate of 9.3% in 1960-70 and of 15.4% in 1970-75. The industrial sector, however, was no different form other sectors in that it suffered from a high level of unskilled labour, mismanagement, and an overall inconsistency of approach due to conflicting advice given to it which was then incorporated into the policy. In addition, the unstable political conditions in the country ment that the development progress was frequently interrupted, resulting in a high rate of losses due to decreased factory and worker productivity. This situation, in turn, led to "under utilization of capacity". Only some branches of the food industry, leather tanning and petroleum refining industries were operating at rates of about 80% maximum capacity during this period.(49) Other industries were operating at lower rates ranging between 50% and 80%, and in a few cases this rate went as low as 10% or less, e.g., manufacturing of tyres (10%), artifical sponge (8%), sodium hydrochloride (4%) and bicycles (assembly) (3%).(50)

5.5 Conclusions

Before 1953, the Iraqi industry was encouraged by two factors: Law No. 14 of 1929 which exempted industrial

TABLE 5.4

Contribution of the industrial sector to GDP and to GDP excluding oil, in Iraq 1953-75

Year	% of GDP	% of GDP excluding oil
1953	6.1	10.1
1954	5.8	9.7
1955	6.9	11.9
1956	7.4	11.6
1957	8.1	11.1
1958	7.5	11.9
1959	8.7	14.2
1960	9.6	15.2
1961	9.6	14.6
1962	9.8	14.5
1963	9.5	14.9
1964	8.3	12.8
1965	7.9	11.8
1966	7.9	11.6
1967	8.8	12.3
1968	8.8	12.9
1969	9.2	13.3
1970	9.6	13.8
1971	8.6	13.6
1972	10.0	14.1
1973	9.9	15.3
1974	5.2	13.3
1975	6.0	14.0

Source: Appendix B, Table 4

profits from income tax for ten years, their property from real estate and property tax for fifteen years, and their exports from export tax for an unlimited period. This law was followed in 1933 by a tariff amendment which expanded the list of machinery and raw materials that could be imported free of duties, second, by the establishment of the Industrial Bank in 1936 which gave industry the financial support it desperately needed.

The main reason behind government intervention in industrial development during the post 1950 was political. Such expansion was seen as a way of breaking the political and economic power of the landowners who always threatened the new government. The latter thought that the creation of a new industrial based society might be the solution. Unfortunately, the above laws appeared not to be the answer neither for the government nor for industry itself.

The first sign of industrial development was seen in 1952 when the Development Board allocated, for the first time in Iraq, an amount of I.D. 31.0 m. in its economic development for industrial projects. The reason for this delay was mainly due to the confusion created in the Board by the recommendation of the International Bank for Reconstruction and Development and other foreign economic consultants who suggested that Iraq should not force its industrial development but concentrate on developing its agricultural sector.

The Board, thereafter gave little priority to industrial development, and concentrated on the establishment of those industries which depended on agriculture for their raw materials, in this way neglecting the establishment of new industries particularly chemicals and petrochemicals.

After the revolution of 1958 the industrial sector figured more prominently in government thinking. The main event in the post revolution period was nationalization which changed the picture of industry in Iraq in favour of the public sector after a long time of being seen as a private sector activity. The public sector henceforth took priority in government development expenditure leaving the private sector again in desperate need of funds. There were the positive effects on the industrial sector. Nationalisation increased industrial investment, established new industries, increased employment and increased this sector's output.

In contrast, nationalisation had negative effects by concentrating on the public sector and neglecting the private sector. Compared with total expenditure invested in the public sector in the period after nationalization with the earlier period, this sector showed lower returns and a decline in productivity per industry. Because of the disappearance of the incentive factor (which is usually higher in private business than in public business), the productivity of workers also declined. The political

nature of the policy, which concentrated on absorbing as much labour as possible, created disguised unemployment as a major feature in many state owned industries. Large and important industries were centralized in the main cities (Baghdad, Mosul and Basra) leaving others in desperate need of industrial development. This in turn improved the standard of living of the people in main cities while the rest of the country was left with a high level of unemployment and lower standard of living.

Having reviewed these facts, it is still true to say that many of the problems of industry in Iraq were due to a lack of technically trained manpower, a lack of technology, the small scale of the market and a lack of management and planning experience which again reflected the instability of political conditions, particularly during the sixties.

These factors slowed down the development of this sector by hampering the establishment of modern industries such as petrochemicals, and seriously affected productivity of both worker and plant.

CHAPTER 5

NOTES

1) Apart from these mentioned in this section, the following can also be seen;

   A Greschenkron, "The Typology of Industrial Development as a Tool of Analysis", in continuity in History, Cambridge, 1968; E J Hobsbawn, "Industry and Empire: An Economic History of Britain since 1750", London, 1968; E Preobrazhensky, "The New Economics", Oxford, 1966; and E H Carr "The Bolshevik Revolution 1917-23, Vols 1-3, London, 1966.

2) R B Sutcliffe, "Industy and Underdevelopment", Development Economic Series, Addison - Wesley Publishing Company Inc, 1971, p.65.

3) Ibid, p.65.

4) E J Hobsbawm, 1968, p.194.

5) Sutcliffe, 1971, p.282.

6) Ibid, p.284.

7) Ibid.

8) Ibid, p.64.

9) R H Green and K G V Krishna, "Economic Co-operation in Africa: Retrospect and Prospect", published for University College Nairobi, by Oxford University Press, Nairobi - London, 1967, p.18.

10) Ibid.

11) UN, Department of Economic and Social Affairs, "A Studty of Industrial Growth", New York, 1963, p.18.

12) W A Lewis, "Industrialization in The Gold Cost (Ghana)", in Meier, 1964, p.322.

13) Louis Turner and James M Bedore, "Middle East Industrialization; A Study of Saudi and Iranian Downstream Investments", Saxon House, 1979, pp. 154-55.

14) Reginald H Green and Ann Seidman, "Unity or Poverty? The Economics of Pan-Africanism", Penguin, 1968, pp. 232-33.

15) Ibid, p.232.

16) Langley, 1961, p.29.

17) The Economy of Iraq ..., 1977, p.68.

18) Kurt Grunwald and Joachim O Ronall, "Industrialization in the Middle East", C.F.M.E.A.P., 1960, pp. 241-42.

19) Ibid, p.242.

20) Ibid.

The Tariff Law of 1933 subsequently increased the rate of duties on imported goods up to 100% of their values. For example while rates of duties rose from 15% to 25% on metals, they rose by more than 100% on tea, watches, sugar, cigarettes and alchol.

For more information on tariff laws in Iraq, see Dr Ferhang Jalal, "The Role of Government in the Industrialization of Iraq 1950-1965", Frank Cass: London, 1972, pp. 102-119.

21) Al-Haris, 1973, pp. 364-69.

22) This was mostly seen in the case of oil industry.

23) Jalal, 1972, pp. 102-119.

24) Langley, 1961, p.142.

25) Ibid, pp.80-94.

26) Ibid.

27) Grunwald and Ronall, 1960, p. 242. Also see Jalal, 1972, pp. 119-122.

28) "The Economic Development of Iraq", The International Bank for Reconstruction and Development, 1952, pp.279-94.

29) See, Arthur D Little, "A Plan for Industrial Development in Iraq, Cambridge, 1956, p.11.

30) See The Report of Arthur D Little, above.

31) Langley, 1961, p.219.

32) Ibid, Table 35, p.218.

33) The Plant contained with 25,000 spindles and 630 looms. It was to manufacture 20-25 million yards of cotton piece goods, annually.

34) Langley, 1961, p.210.

35) This is because the climate in the Basra zone is characterized apart from the very hot weather (50° in summer), by very high rate of humidity.

36) Langley, 1961, p.212.

37) Ibid, p.236.

38) Ibid, p.235.

39) Ibid, p.236.

40) UN, "Industrial Development In the Arab Countries", United Nations, New York, 1967, p.72.

41) "The Economy of Iraq; Development and Perspectives 1958-1976-1980", Baghdad Iraq, 1977, p.121.

42) Yusif A Sayigh, "The Economics of The Arab World Development since 1945", Croom Helm, London, 1878, p.42.

43) "The Economy of Iraq; Development and Perspectives 1958-1976-1980", p.72.

44) Ibid, p.73.

45) Ibid, p.75.

46) Ibid, p.73.

47) Ibid, p.75.

48) Little, 1956.

49) Elias T Ghantus, "Regional Industrial Integration: The Case of The Arab Middle East", A thesis submitted for the Degree of Doctor of Philosophy in the University of Durham, October 1980, pp.261-262.

50) See Industrial Development Conference for Arab States, "Industrial Survey of Iraq 1969", IDCAS, 1970.

PART TWO

PETROCHEMICAL INDUSTRY:

A STRATEGY FOR ECONOMIC DEVELOPMENT

INTRODUCTION

In the previous part of this thesis, it was shown that oil in Iraq has been seen solely as an export commodity from which government revenues have been directly derived. Part of these revenues were invested through centrally planned development programmes which ran between 1953 and 1975. However, it is arguable whether or not the Iraqi economy has achieved any significant change in its structure as a result of these efforts.

Iraq's economic dependency on this single sector has been compounded by neglecting the importance of integrating this sector within the rest of the economy. This in turn meant that the economy has failed to benefit from the wide and various spin-off effects that can be generated from such intergration. These range from high value-added downstream operations and/or other oil-based industries as well as the considerable opportunities these may offer for diversifying the structure of the economy in general and improving labour skill and technology in particular.

The main aim of Part Two is to examine the possibility of using petroleum (oil and gas) as a raw material, as well as a revenue source, in Iraq. In doing so, it will be suggested that the oil sector may be integrated more thoroughly within the domestic economy, thus helping to vitalize the structure of the Iraqi economy.

There are many ways (or strategies) in which petroleum could be integrated within the economy. The following chapters will examine the specific case in the petrochemical industry. The reason for choosing this industry is its strategic position linking the oil sector with the rest of the economy. The petrochemical industry is the most widely known industry which uses oil and gas as raw materials (feedstocks) extensively in its operation.

The petrochemical industry has been the subject of frequent analysis in the literature. Such analyses, however, have generally considered the role of such an industry within a developing oil-economy.

In planning economic development in a developing country, three main elements should be borne in mind:

(a) Utilizing domestic non-human resources.

(b) Utilizing human resources.

(c) Improvement and increase of food supplies.

How do these elements fit in with the above strategy? The petrochemical industry in developing countries is basically bound up with food supplies and agricultural production. This is so because one of the main products derived from this industry is fertilizers. It was shown in the early analysis that Iraq is basically an agricultural country with over one-third of its land suitable for agriculture, and more than a third of its population

dependent on agriculture for their livelihood. Therefore the importance of increasing and improving both the quantity and the quality of agricultural production is vital. More efficient agricultural methods can only act as a source for further growth, leading to higher living standards and greater export opportunities. This in turn could generate higher domestic savings and an increased supply of foreign exchange, the lack of which is recognised as major impediments to sustained growth in the developing countries.

Different climatic conditions make the land suitable for different kinds of agricultural production whilst water resources are present in the two rivers, the Tigris and Euphrates. These factors have created favourable conditions for improved agricultural production and higher rates of productivity in Iraq. Yet the country in the last two decades has become one of the main countries in the Middle East which is increasingly dependant on imported food. This is mainly due to low rates of farm productivity coupled with a low percentage of land utilization; until 1975 no more than one quarter of the total agricultural land was actually cultivated for agriculture. This situation has increased the country's dependence on food imports and has led to a neglect of the agricultural sector. This was shown in Part One of this thesis.

In any attempt to increase agricultural production and land productivity, and to cultivate new land, fertilizers must play an important role. A study by the UNCTAD has shown

the great importance of fertilizers in increasing agricultural production. It states that:

> "Increases in agricultural yield per hectare can be achieved in a number of ways, i.e. through improved irrigation, the introduction of high - yielding varieties of crops, better crope management, and sometimes, though not necessarily always, by the introduction of mechanization. But the increased use of chemical fertilizers, ... has been identified as the major single factor by which a rapid increase in yield can be obtained. For example, it is estimated that its increased use contributed at least 50 per cent to the increase in food production in the last 30 years. Further increases in fertilizer use can be expected to contribute at least 50 per cent to the expansion of food production during the next 25 years, in both developed and developing countries."(1)

It follows that chemical fertilizers can provide a major stimulus to production in the agricultural sector. It is this aspect of the petrochemical industry which I now intend to examine in detail, concentrating on two main questions:

(1) How feasible for Iraq is this industry.

(2) What role would this strategic industry play in economic development in general and in agricultural development in particular?

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(1) UNCTAD/TT/45, United Nations Conference on Trade and Development, "Fertilizer Supplies for developing Countries: Issues in the transfer and development of technology". Study prepared by the UNCTAD Secretariat in co-operation with Dr S. K. Mukherjee, United Nations, 28 October 1981, pp. 4-5.

CHAPTER 6

NATURE AND CHARACTERISTICS OF PETROCHEMICAL INDUSTRY

The main purpose of this chapter is to give a brief introduction to the nature and characteristics of the petrochemical industry. The emphasis will be on the following areas:

6.1 Petroleum and raw materials.

6.2 Evolution and growth of petrochemicals.

6.3 Feedstock requirements.

6.4 Market conditions.

6.5 Nitrogenous fertilizer as a petrochemical operation.

6.1 Petroleum and raw materials

Although petroleum has been used as a basic raw material for many chemical industries for about sixty years (1920-1980),[1] the significance of its contribution in this field has only been recognized in the last two decades. In fact, oil and gas have become so indispensable for use as raw materials in the petrochemical industries that economists are wondering whether it is at all wise to continue using oil, predominately as a source of energy. The present concern of some developed countries, especially in the USA and Western Europe, is to encourage the development of other sources of energy in order to save oil

for non-energy uses. Similarly in the oil exporting countries, particularly the Middle East where petroleum is the only source of both finance and raw materials in many countries, the concern is how to use such a "noble" raw material as a base for industrial and economic development. These countries successfully exploited their economic power during the first half of the seventies by pushing their prices of crude oil high enough to double their incomes. This in turn encouraged high cost investment in petrochemical industries and as a result the consumption of petroleum for both energy and non-energy uses expanded considerably.(2)

Petrochemicals have become the main non-energy use of gas and oil in the world. The increase in oil prices after 1973/74 affected the growth of this industry but did not seriously interrupt its development.(3) In fact, current research shows that the future of this industry seems assured and this will accentuate the consumption of petroleum products; if research on petrochemical-based paper, for example, succeeds, this sector alone may more than double the non-energy consumption of oil.(4)

Table 6.1 shows the consumption of petroleum products for energy and non-energy uses between 1967-1975. About 19% of the world oil consumption in 1975 was for non-energy uses, compared with 9% in 1967. It is expected to reach 55% in the year 2000.(5) The annual rate of growth of non-energy uses of petroleum products was 15.5% (1967-75)

TABLE 6.1

World Pattern of Oil Consumption;
Energy and Non-Energy Uses
(in 1000's b/day)

Year	Total Demand	(1) Energy	(2) Non-Energy	2 : 1 (%)
1967	30,547.4	27,811.68	2,730.7	8.93
1968	33,085.2	29,983.49	3,101.8	9.38
1069	36,626.7	33,103.3	3,523.4	9.62
1970	39,197.5	35,195.5	4,002.0	10.21
1971	41,295.5	36,488.7	4,806.8	11.64
1972	44,436.0	38,656.6	5,779.5	13.00
1973	47,196.9	40,262.4	6,934.5	14.69
1974	49,958.7	41,629.7	8,329.1	16.67
1975	52,720.6	42,715.7	10,004.9	18.97

Source: Studies on Key Petroleum Issues, No 1 - 1974.
"Towards an optimal production and investment strategy of the Arab Petroleum Exporting Countries in the light of alternative energy sources through the year 1985".
Pan Arab Consultants for Petroleum, Economic and Industrial Development, P.O. Box 5631 - Beirut-Lebanon, p. 95.

while energy uses increased at an annual rate of growth of 4.48% in the same period.

The use of natural gas as a petrochemical raw material has also grown at a high rate. Its growth has not, however, been as dramatic as the use of oil. Non-energy uses of natural gas in the EEC countries account for about 10% of the total consumption of gas, compared with 3% in the USA.[6] The reason for this may be due to the fact that in the USA the petrochemical industry was developed at a later stage than the gas fields.[7] In addition, the more convenient transportation of oil products to various plant sites has made petroleum products more useful as petrochemical feedstock than natural gas. However, natural gas does compete favourably with petroleum products as a petrochemical feedstock in areas where it is available at very low cost, e.g. associated gas in production areas, and has been used in the fertilizer and methanol industries.

6.2 Evolution and growth of petrochemical industry

Petrochemical products may be defined as those which are made from petroleum feedstocks. Petroleum itself is a mixture of hydrocarbons and it is therefore to be expected that the production of petroleum chemicals will fall largely within the realms of organic chemistry. There are, of course, some exceptions; for example, in the production of ammonia, petroleum acts as the source of hydrogen and the end product is inorganic.[8] While the number of

inorganic chemicals commonly made from petroleum is not large, the tonnage is considerable. For example world-wide production of ammonia and sulphur alone from petroleum sources reached about 20 million tonnes in 1979.[9]

Before the Second World War, basic organic chemicals were made in small amounts from coal by-products, for example acetylene from calcium carbide and molasses. During the war, the chemical industry became more important because many chemicals were used for military purposes. This in turn encouraged the chemical industry and accelerated its development. New products, therefore, were produced and research in to using alternative, cheaper and more practical raw materials (mainly petroleum) took place. Among the countries with an important chemical industry, only the USA was at that time a petroleum producer. By the late 1940s, the results of this research, coupled with the availability of oil from new Middle East sources and the simultaneous expansion of oil refineries, led to petroleum based products becoming the main feedstock for chemicals in this country (USA).[10] Other factors which encouraged the use of oil in the chemical industry were the characteristics of petroleum: its hydrocarbons are easier to separate into different organic chemicals than are other natural raw materials; petroleum also contains a greater number of hydrocarbons which can be used for different drilling industries and products.

Up to 1950, however, there was relatively little production of petroleum chemicals outside North America. In the early 1950s the U.K. took the lead in Europe, and in 1954 it was responsible for over half of Europe's total petrochemical production. In the later 1950s other European countries developed at a spectacular pace, with the result that the scope and size of the petroleum chemical industries in West Germany, France and Italy at the end of the 1950s were at least comparable with that of the U.K. But the most notable feature of the last twenty years (especially the seventies) was the rise of Japanese petroleum chemical production to the point where it was second only to that of the USA.

The world chemical industry grew faster than industry as a whole during 1960-73.(11) In the OECD area, while total industrial production rose during the period by 5.6% per annum and chemical production by 9%, petrochemical production showed a rate of growth ranging between 10% and 17%.(12) Production of the four basic petrochemical products (ethylene, propylene, butadine and benzene) went up from 7.7. million tonnes to 51.1 million (between 1960-73).(13) Similarly, in the USA and Japan, production of petrochemicals grew by 8.4% and 13.1% per annum respectively between 1963-73.(14)

Table 6.2 shows the world production of the main basic petrochemicals between 1965-1976; the USA was the leading country, followed by Western Europe and Japan. The USA

TABLE 6.2

World production of the main basic petrochemicals
(thousands of tons)

	1965	1970	1976
Ethylene			
United States	4 600	7 700	9 900
Western Europe	2 000	5 950	9 600
Japan	900	3 050	3 800
Others	500	1 800	2 700
Total	8 000	18 500	26 000
Propylene			
United States	2 400	3 900	4 400
Western Europe	1 100	3 280	5 100
Japan	700	1 850	2 600
Others	200	500	1 600
Total	4 400	9 530	13 700
Butadiene			
United States	1 100	1 400	1 500
Western Europe	400	880	1 400
Japan	100	450	590
Others	300	400	1 400
Total	1 900	3 130	4 890
Benzene			
United States	2 700	3 900	4 500
Western Europe	1 450	2 750	4 100
Japan	380	1 570	1 900
Others	250	600	2 800
Total	4 780	8 820	13 300
P. Xylene			
United States			1 500
Western Europe			750
Japan			550
Others			300
Total			3 100

Source: UNIDO, 12 December 1978, "First World - wide study on the petrochemical industry 1975-2000", p. 21.

contributed over 50% of total world production in 1965, but dropped to 30% in 1976. This was due to the increase of petrochemical production in the rest of the world, especially in Western European countries and Japan. In 1976 Western Europe passed the USA in propylene production, and contributed 37.2% of total world production, compared with 32.1% from the USA.

There were four main factors behind the super growth of the petrochemical industry in the above developed countries in this period:

(1) Explosive market expansion due to the fast substitution of petrochemicals in the markets for natural products. The new materials had properties often superior to those of natural products.[15]

(2) Naptha,[16] the basic feedstock of petrochemicals, was a commodity whose price was falling both in monetary terms, and in real value.[17] (3) The development of economies of scale in petrochemical plants led to large-scale modern petrochemical complexes. This was assisted by the adaptation of a large-scale oil refinery technology, that decreased investment cost per ton of product by the spreading of overheads and semivariable costs. "This trend led to the provisions of capacity ahead of demand in order to reap the benefits from large-scale operations, with the result that either due to a down-turn in demand or in anticipation of full plant capacity utilization benefits, prices were lowered to unrewarding levels".[18]

(4) The fast development of technology in processes and engineering which gave petrochemicals a cost edge over natural products. Among the more important technical developments were the following:

> "Advances in chemical analysis methods; new separation methods for products of higher and consistent purity; metallurgical developments of new materials able to withstand extreme temperatures, high pressures and corrosive environments; development of large and reliable centrifugal compressors; and more advances in instrumentation and control mechanisms".(19)

The oil price crisis in 1973/74 and the recession that followed in 1975 affected the petrochemical industry which experienced a sharp decline in its rate of growth. In 1974 for example ethylene production advanced by 6.1% compared with 11.0% in 1970-73, and propylene production advanced by only 3.8% compared with 13.7% in the same period.(20) This was also the case with benzene which showed a decline of 5%, and butadiene which declined by 7% in the same period.(21) The average annual growth rate of naphtha consumption by the petrochemical industry, in the EEC countries, was 17.2% in the period 1968-1973; this dropped to 9% after 1973-74.(22)

In fact, in Western Europe, the slow down in petrochemical production started in 1970, 4 years before the oil crisis of 1974-75.(23) Since then, the production of petrochemicals has grown at only 2.5-3% per annum on average, compared with 5-6% in the previous twenty years. This was the result of internal and external factors: Increased levels of inflation, the growing demand by unions

for more power and influence in the running of both privately and publicly owned industry, and growth in the relative size of public sector expenditure which played a major role in increasing costs of both the construction and entire operation time of this industry.(24) Externaly, increased competition from Japan and other communist countries added to the slow down.(25)

The petrochemical industy in developing countries, during the fifties and sixties, was almost non-existent. By the seventies, some of these countries started to establish small and medium sized plants. Among these countries were Algeria, Iran, Saudi Arabia, Brazil, Venezuela and India.

The main reasons which encouraged these countries to enter this field of capital intensive industry were:

(1) The availability of local raw materials, mainly gas (natural and associated) which is usually flared in these countries. In order to utilize this valuable source, petrochemicals seemed an attractive proportion.

(2) The increase of most of these countries' revenues from oil after the price increases of 1973/74 and after helped them to invest heavily in large scale-heavy industries such as the petrochemical without incurring the problem of foreign exchange shortages.

(3) The rapid increase in petrochemical products which most of developing countries import from developed countries. Top of the list of imported petrochemicals is

TABLE 6.3

Capacity of basic products in the developing world, in 1977 (in 000. Tonnes/Year)

Area	Ethylene	Propylene	Butadiene	Benzene	P. Xylene	O. Xylene	Methanol	Total
North Africa	120	-	-	-	-	-	110	230
E & W Africa	-	-	-	-	-	-	-	-
South Africa	200	-	20	-	-	-	17	237
Middle East	190	40	33	-	-	-	54	317
South Asia	192	100	36	69	17	-	33	447
East Asia*	480	215	77	134	42	-	585	1533
Pacific Area	290	80	34	-	-	-	33	437
Latin America	1455	418	205	349	100	75	264	1411
Total (1)	2927	853	405	552	159	75	1096	6067
Developed World	36080	19473	5635	18212	4091	2051	12221	97763
World Total (2)	39007	20326	6040	18764	4250	2126	13317	103830
1 : 2	7.5	4.2	6.7	2.9	3.7	3.5	8.2	5.8

*: Excluding Japan

Source: Derived from Annex 1(a), First World - Wide Study on the Petrochemical Industry 1957-2000, UNIDO, 12 December 1978, p. 221.

nitrogenous fertilizers which are vitally needed for the agricultural development of the developing countries.

The evaluation of petrochemical industy in developing countries, however, differed from one country to another depending on the main following factors:

(1) The availability of local skilled labour
(2) The availability of adequate general infrastructure.
(3) The stability of political conditions
(4) The availability of local oil and gas.

Generally, however, developing countries still lack wide domestic markets for petrochemicals. This is due mainly to the underdevelopment of their economies and the low per capita income of their population. Table 6.3 shows the existing capacities of basic petrochemical products in the developing world, and their share in world total capacity in mid-1977. Methanol products shared 8.2% of world total, followed by ethylene with 7.5% and butadiene with 6.7% Benzene capacity showed the lowest, with only 2.9% Total capacity of the developing world for all these products, however, was only 5.8% of world total.

6.3 Feedstock

The two basic raw materials of the petrochemical industry, petroleum products and natural gas, lead to three groups of output: basic, intermediate and end-products. Figure 6.1 shows the classification of the first two

outputs, while Figure 6.2 shows production relationships and the possible integration of various production process mixes. The second figure also shows different groups of petrochemical end-products.

The main petrochemical base products are the olefins (ethylene, propylene and butadiene), aromatics (benzene, tuluene and xylene) and methanol. The two primary processes used for their production are steamcracking of naphtha for the olefins, and catalytic reforming for the aromatics. In addition, a third major process, which is steam reforming, is used to synthesize ammonia which are mainly used in fertilizer production and methanol. The hydrocarbon building blocks derived from these processes are the key products of the industry. The processing chains leading from them to the end products are many and complex, but the main ones are ethylene and propylene, which serve as input for the most important plastics; aromatics for the basic synthesis of man-made fibres; butadiene and benzene for the production of non-natural rubbers, and methanol for formaldehyde used in making adhesives. Their relative importance in world production can been seen in Table 6.2.

The supply of basic feedstock, however, is determined by the availability of oil and gas in the world. At the same time, this is influenced by the prices of oil and gas, and petroleum fractions. Since quantities of naphtha, the main basic feedstock for petrochemical industry, are

Figure 1

Feedstock and Basic Intermediate Products of Petrochemicals

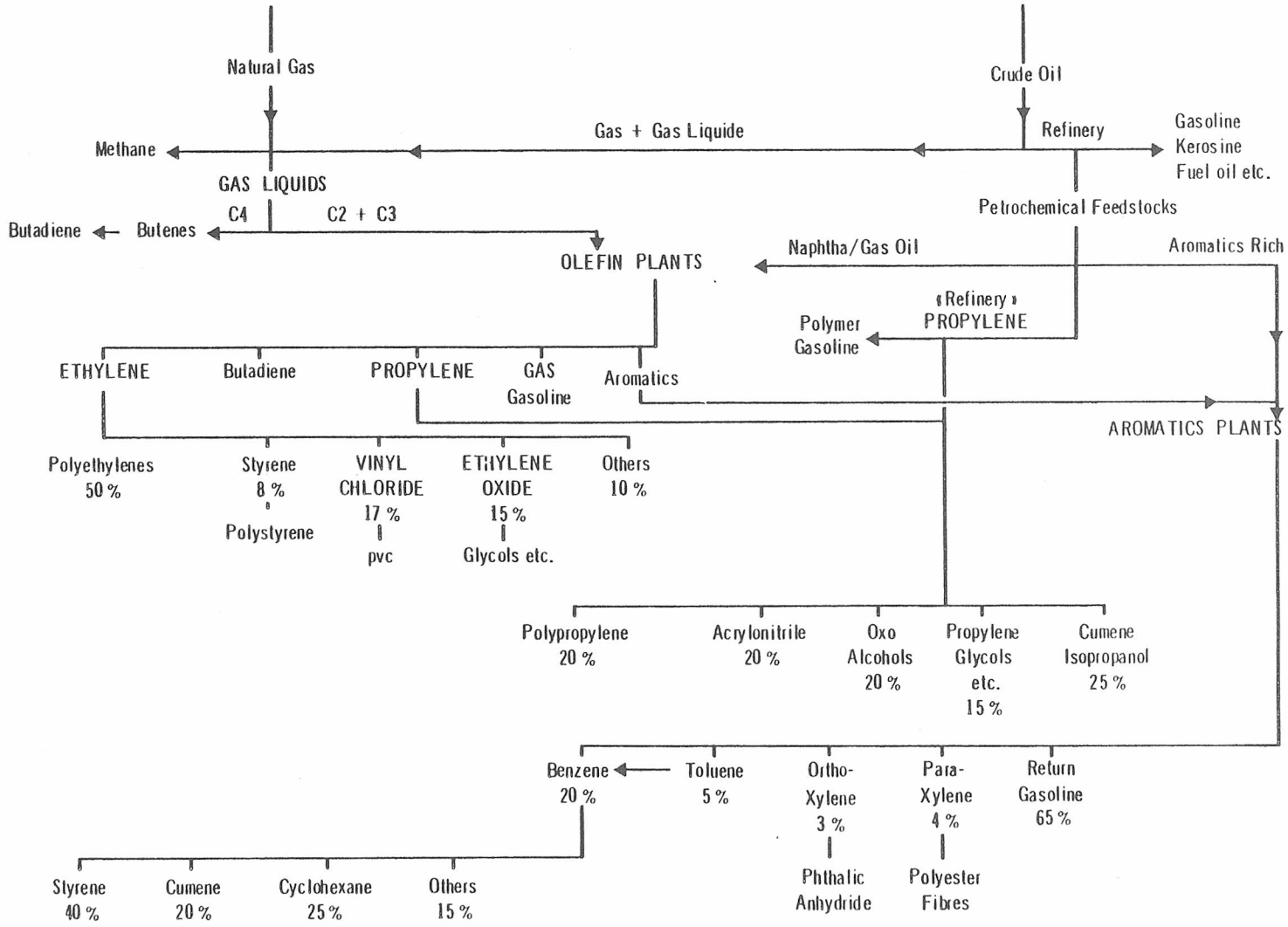
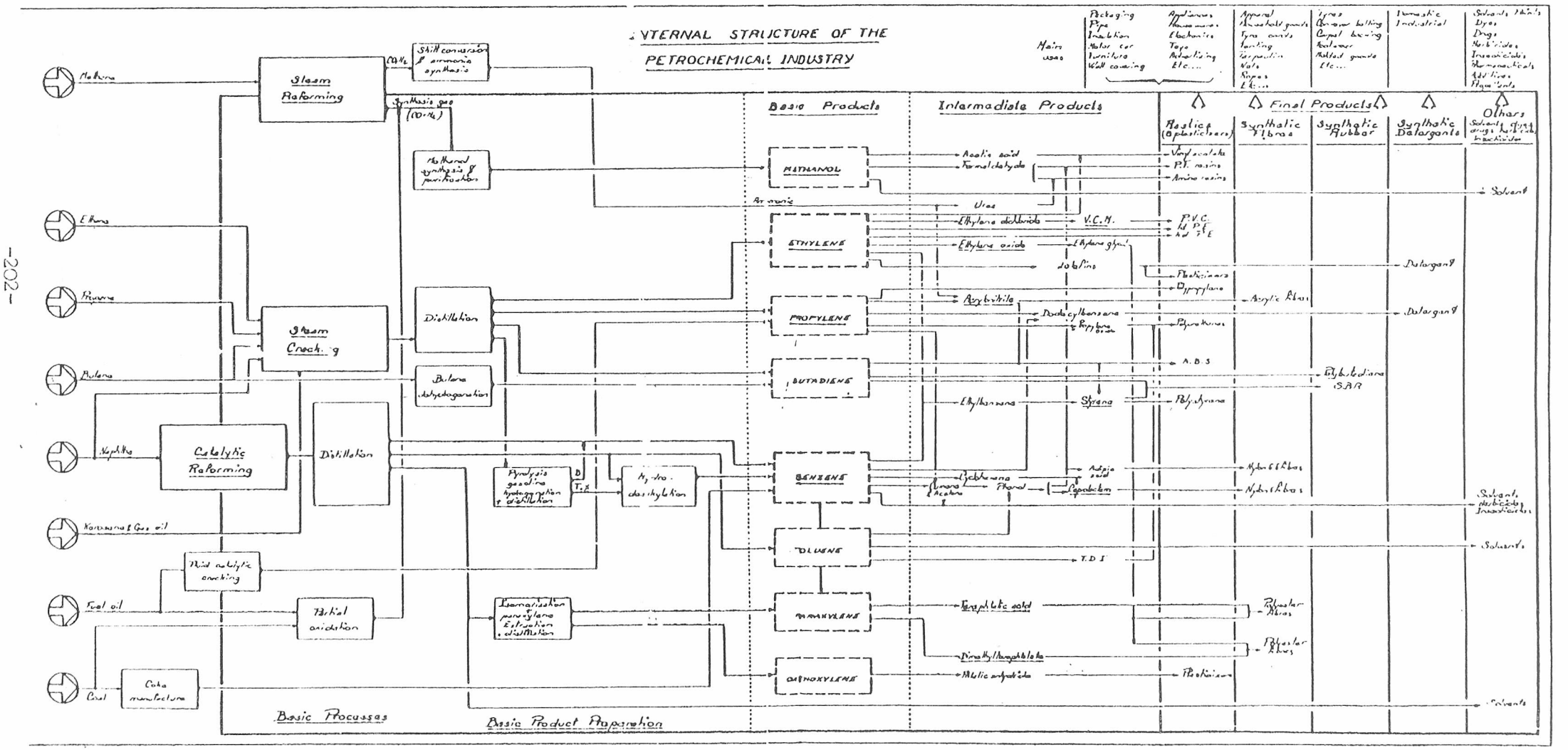


Figure 2

INTERNAL STRUCTURE OF THE PETROCHEMICAL INDUSTRY



Source, First World-Wide Study on the Petrochemical Industry, 1975 - 2000, UNIDO/ICIS. 83, 12 December 1978.

limited in the world, this will surely continue to be in intensive demand and its price will continue to rise. On the other hand, in the long-term existing quantities may not be enough to satisfy the expanding petrochemical industry.

This had led to the investigation of the possibilities of providing feedstock from other resources. In some developed countries such as West Germany the possibility of using coal as a source of feedstock for petrochemicals is already being investigated. But it appears that, due to the very small quantities of petrochemicals that could be obtained from large amounts of coal, the development process of these new sources can be very costly. Moreover, with the rapid increase in demand for oil and gas for energy purposes, the demand for coal will also increase, hence raising its prices. In these circumstances, oil and gas are likely to continue to be the main sources of feedstock for the petrochemical industry.

6.4 Market conditions

Basically, need creates demand and the demand for a product creates its own supply. The successful marketing of some chemical industries (speciality chemicals) relies on a basic fact which is common to all types of marketing; it is to produce goods that people need rather than make products purely for sale.[26] This can be clearly seen in the case of medical production. Similarly, the need for

fertilizers in the agricultural regions of the world would create a high demand for chemical fertilizers.

On the other hand, supplying a new product may still create its own demand. In fact the success of the petrochemical industry in the last two decades has been mostly due to the supply of new products, e.g. synthetic rubber, plastic, and detergents. The most significant feature of petrochemicals is that it managed to replace other products which were produced traditionally from non-petroleum resources (agriculture and other minerals such as steel and iron), hence creating a need for these products. This, in turn, shifted demand from traditional raw materials to new petroleum raw materials. Costs of production in this industry, therefore, were reduced and the prices of the end products subsequently fell. Two main reasons were behind this decline:

(1) The low cost of the new raw materials, especially naphtha which cost well under $20 per tonne during the fifties and sixties;[27] and

(2) Development of technology which provided a cornacophia of both new products and processes. This helped in reducing production costs through the establishment of large-scale plants.

The scale factor by which the cost of a plant may be related to its capacity can be expressed approximately as follows:

$$S = c^{0.6}$$

where S is the factor of increase in costs and C is the factor of increase in capacity. In practice this would mean that a doubling of the capacity of a proposed plant would only increase its cost by a factor slightly over 1.5.[28]

Because of these characteristics, especially the continual emergence of new products, the demand for petrochemicals in the future is estimated to be much higher. The construction industries, for example, may consume immeasurably greater quantities of plastics as a replacement for the metals, wood and glass, in the future. The world production of plastics in 1970 was about 27 million tonnes. It is estimated, for the above reason, that this figure may rise to around 120 million tonnes in 1985. This is also the case for the other main petrochemical products, as shown in Appendix C.

The demand for petrochemical products, however, may still be determined by the following main factors:

(1) Prices:

Two kinds of prices would be relative here; namely, petrochemical prices, and the price of substitutes and complements.

In theory, the price of a product, in any type of market, determines the size of demand for this product. On the other hand, prices of other goods would also affect the demand for a particular product. The demand for plastic

products would fall if their prices were to rise. A similar picture may appear if the prices of other goods went up. This is because consumers have limited incomes and have to balance their spending on different products, starting with necessities, e.g. good, clothes, housing, and so on. If the cost of food goes up they still have to buy, but at the expense of other goods.

The price of a product may rise due to increase in production cost, and to changes in the quality of that product. Petrochemical products are a good example in this case. Table 6.4 shows the significant jump in prices of these products after the crisis of 1973/74. Ammonia, for example, rose from a stable price of about $50 in 1970 to $150 in 1974 and then to $230 per ton in 1975. This was, of course, due to the increase in the cost of raw materials namely naphtha and natural gas which rose from $16 to £110 per ton and from $11 to $31 per 1000 cubic metres respectively in the same period. All other prices in the table also changed forward in different ranges.

(2) Industrial requirements:

The demand for petrochemical products in the developed world (industrial countries) is always higher than that in the developing world (non-industrial countries). This may be due to the characteristics of petrochemicals which are used widely in different industries as raw materials as well as in some industrial processes. In fact these characteristics have always been

TABLE 6.4

Trends of export prices for specific chemical products, oil, naphtha and gas, 1970-80
(US dollars per ton)

Product	1970	1972	1974	1975	1976	1977	1978	1979	1980
Ethylene	70-90	80-90	260-285	260-330	240-330	295-315	286-370	310-590	410-740
Propylene	45-90	50-90	185-220	185-200	185-220	185-200	200-230	370-410	400-420
Ammonia	35-90	38-45	135-150	150-230	105-123	100-120	95-110	120-160	140-200
Methanol	60-90	50-70	100-250	100-150	100-130	90-135	120-130	150-175	200-240
Acrylonitrile	250-270	250-270	590-660	490-550	480-550	450-560	540-590	590-860	680-750
Glycols	100-190	100-170	340-450	430-470	340-440	330-395q	330-340	550-700	600-800
Benzenc	58-65	60-65	315-350	250-300	230-280	200-240	245-255	490-560	490-560
High-density polyethylene	290-370	270-340	700-790	615-660	620-680	200-240	245-255	490-560	490-560
Low-density	230-300	250-300	680-740	550-600	550-600	500-560	515-560	840-950	980-1150
Polyvinyl chloride	290-330	220-380	650-760	510-570	520-610	510-580	580-700	840-950	870-1100
Oil [a]	13.31	18.19	85.41	85.01	91.25	100.72	100.72	102.80	
Naphtha [b]	16.08	20.02	123.25	109.73	130.69	125.12	146.14		
Natural gas [c] (for 000 m³)	11.05	12.33	20.12	31.02	36.05	47.02	57.20	66,57	102 [d]
	9.37	10.81	18.31	39.20	60.39	64.80	76.79	87,16	156

[a] Persian Gulf, Arabian light (Ras Tannura) 34.0-34-09° APN. 1970-1978 Platt's Oil Price, Handbook and Oil Manual from 1979, Platt's Oilgram Price Report.

[b] European Bulk, Italy.

[c] Export prices of the Netherlands and Canada.

[d] Preliminary figures.

Source: UNICO, "Second world-wide study on the Petrochemical Industry: Process of Restructuring", Istanbul, Turkey, 22-25 June 1981, UN, 1981, P.84.

TABLE 6.5

World Consumption of Major Petrochemical End Products

REGIONS OF THE WORLD	1974
WESTERN EUROPE	31.61
EASTERN EUROPE	11.91
NORTH AMERICA	31.68
LATIN AMERICA	4.71
AFRICA	1.81
NORTH AFRICA	0.54
WEST AFRICA	0.29
EAST AFRICA	0.28
CENTRAL AFRICA	0.14
SOUTH AFRICA	0.55
ASIA excl. CHINA	16.89
MIDDLE EAST	1.01
EAST ASIA excl. JAPAN	1.40
JAPAN	11.81
SOUTH ASIA	2.27
PACIFIC	1.39
TOTAL WORLD	100.0

Source: UNIDO, 12 December 1978, "First World -wide study on the petrochemical industry 1979-2000", p. 64.

main factors which have accelerated this industry's growth in the past thirty years. Table 6.5 shows that 87.01% of world total petrochemical products in 1974 were consumed by the industrial world (Western Europe, Eastern Europe, North America and Japan). Asia (excluding China and Japan) was in second place with 5.08%, followed by Latin America with 4.71% and Africa by only 1.81%.

More petrochemical end-products are consumed in the developed world than in the developing world. Despite this industrial demand factor, there are, of course, some other causes that limited demand for these products in the developing countries; mainly the low standard of living and the concomitant limitation of markets. The latter, again, depends on other factors, e.g. size of population, consumer preference (particularly for new products), etc. But the demand for petrochemical products surely will continue to increase while the developing world seeks to industrialize.

(3) Use of product:

In the first United Nations' International Conference on the Development of petrochemical Industries in Developing Countries, the following was stated:

> It is (the petrochemical industry) a dynamic industry which supplies intermediate products to a number of other industries and also provides substitutes for traditional materials, such as steel, rubber, paper, natural fibres, soaps,... etc.... This industry is regarded as strategic to the inducement of future industrial development because most of its output goes to other producing sectors.(29)

Such an industry with multiuse products, therefore, is assured of a high level of demand for both its basic and end-products. But, as mentioned earlier, the level of demand will differ from one country to another depending on the type of market and use of these products in that country. An industrial market, for example, may demand higher quantities of basic petrochemicals than that of a construction market which would mainly demand end-products. Again, the level of demand for a particular product in both markets may still depend on the use of that product. Plastics, for instance, could be used in both markets. In fact use of plastics appears to be practically unlimited, considering its many possible applications in three end-use sections; packaging, transport and construction. These uses can be coupled with many other daily uses in housing, schools, factories, offices, etc.

On the other hand, use of product may be determined by the geographical area of demand; fertilizers in agricultural areas are in much higher demand than in non-agricultural countries. The reason is obvious; this product is used only for agriculture, and any potential demand would depend on the future of agriculture in a country. But plastics would surely be in demand in any country. Agricultural countries can use plastic products in a variety of ways (e.g. water schemes, draining, plastic

houses, etc.) and need them as much as industrial countries.

6.5 Nitrogenous fertilizer as a petrochemical operation

In developing countries, the need for security of food supply is a priority. Anything which can enhance this supply will therefore be given primarly consideration. It has shown that maximizing fertilizer use is, the most vital factor by which a rapid increase in agriculture production can be achieved. This insures an adequate supply of food. Yet in those countries, which contribute more than two thirds of the world population, the production of this type of fertilizer amounted to an average of only 10.6% of the total world production of nitrogenous fertilizer during the seventies, while their share of world consumption of the same product was 17.8% in that period.

In brief, the principle feedstock of nitrogenous fertilizers is ammonia which is produced from a hydrogen source and the nitrogen in the air. Hydrogen source can be found naturally as gas or could be produced from fuels like naphtha and other petroleum products. Principle nitrogenous fertilizers, their chemical formulas and their main characteristics are shown in Appendix C.

The production process of ammonia, like any other petrochemical process, is characterized by high capital intensity. Unless it is based on large scale capacity, production cost per unit will rapidly increase. In fact, it was not until 1964 that large capacities (2000 - 4000

tonnes per day) were actually introduced.[30] In turn both world production was increased and prices of fertilizers were reduced.

6.6 Conclusions

Historically speaking, the petrochemical industry was first developed in the USA during the period 1920-45. The Second World War was a vital factor in the expansion and spread of this industry through many European countries. By 1960, the U.K., W. Germany, Italy and France had become more prominent in this industry, achieving second place after the USA. Japan's increase in petrochemical production has been the main feature of the last two decades. The developing world played no effective role in this industry and, by 1977, its share of world total production of petrochemicals was only 5.8%.

The expansion of the petrochemical industry world wide has been higher than that of world industry as a whole. This is due partly to the wide range of products derived from this industry, covering among others vehicles, household appliances, and packaging. The increasing manufacture of these items is a sensitive measure of improving standards of living. A second factor in the growth of this industry is its use in the replacement of traditional products. This is now evident in synthetic rubbers, synthetic detergents and synthetic fibres.

The rapid growth of the petrochemical industry, however, was interrupted by economic recessions, mainly in Europe. The oil crisis in 1973/74, and again in 1975, are among the main causes which slowed this industry's growth. Increases in raw material prices (petroleum raw materials), coupled with international competition from new countries mainly Japan, and internal economic problems, e.g. increasing rates of inflation, increasing government expenditure, union wage demands and other social problems, have affected this industry's growth. In fact these internal problems started to affect European production long before the oil crisis. Since then there have been signs that the growth curve was continuing but at a lower rate.

The future of petrochemicals may largely be bound up with the problem of feeding the mounting world population. A significant proportion of the present world population suffers from malnutrition and there will probably be twice as many mouths to feed by the year 2000 as there are today. As the total availability of arable land cannot be increased without heavy expenditure, either on irrigation schemes for desert reclamation or on reclamation of land from the sea, this will call for more intensive cultivation of existing land. All future agricultural scenario call for a marked increase in the use of fertilizers. Prominent amongst these will be the nitrogen fertilizers largely based on the synthesis of ammonia from petroleum raw materials.

CHAPTER 6

NOTES

1) The petroleum chemical industry started in the United States in 1919-20; it was created from research work carried out during the First World War. In the 1920's and 1930's the industry was concerned mainly with the methods of making and of using the simple olefins - ethylene, propylene, and the butenes. The first olefin, ethylene, was made by direct cracking of liquid petroleum fractions or of propane. Propylene and the butenes were obtained either simultaneously with ethylene in these direct cracking processes or as by-products of refinery operations, particularly as these became more and more akin to chemical processes with the adoption of thermal reforming and later of catalytic cracking and catalytic reforming.

   For more detials, see Richard Frank Goldstin and A Lawrence Waddens, "The Petroleum Chemicals Industry", Third edition, E and F.N. Spon Ltd, 1967, pp. 9-15.

2) Robert S Pidlck, "The Structure of World Energy Demand", The MIT Press, 1979, p. 248.

3) While it slowed down in developed countries, the development of petrochemicals rapidly increased in other countries, mainly these of OPEC (see "Evelution and Growth of Petrochemical Industry" in this chapter, and "Oil and Gas as raw materials" in chapter 9 of this thesis).

4) Studies on Key Petroleum Issues, No. 1 1974. "Towards an optimal production and investment strategy of the Arab Petroleum Exporting Countries in the light of alternative energy sources thorugh the year 1985" Pan Arab Consultants For Petroleum, Economic and Industrial Development , P.O. Box 5631, Bierut, Lebanan, P.95.

5) European Chemical News - June 7, 1974, p.29.

6) Studies on Key Petroleum Issues No.1, 1974, p.96.

7) Ibid, p.96.

8) Petroleum Chemicals, BP Handbook for Teachers, BP Educational Services, 1975, p.1.

9) Ibid, p.1.

10) Richard Frank Goldstin and A Lawrence Waddams, "The Petroleum Chemicals Industry", pp. 10-12.

11) In fact, in "Prospects for Petrochemical in Western Europe", it was stated that growth rates of petrochemicals as high as three times the increase in industrial production were recorded until 1973.

See, Shell Briefing Services, March 1980, p.2.

12) "The Petrochemical Industry - Trends in Production and Investment to 1985", Organization for Economic Co-operation and Development, OECD 1979, p.7.

13) Ibid, p.7 (total).

14) Petroleum Economist, Feb, 1976, p.62.

15) UNIDO/ICIS, 83, 12 December 1978, "First World Wide Study on the Petrochemical Industy; 1975 - 200, p.17.

16) "Naphtha" is that fraction of crude oil which boils within the range 30° - 170° C and contains a wide range of aromatics, naphthas and paraffins".

17) UNIDO/ICIS 83, 12 December 1978, p.17.

18) Ibid.

19) Ibid, pp. 17-18.

20) "The Petrochemical Industry .....," OECD 1979, p.11.

21) Ibid, p.11.

22) Petroleum Economist, Feb. 1975, p.48.

23) Petroleum Economist, November, 1972, p.416.

24) Chemistry and Industry No. 22, 20 November 1976, pp. 968 - 969.

25) See, Hermann H Stenger, "The Problems and Pressures on the European Chemical Industry", in the Chemisty and Industry, 6 December 1980, pp. 903 - 906.

26) Chemistry and Industry, No. 11, 1 June 1974, p.432.

27) Chemistry and Industry, 20 November 1976, p.967.

28) The 'Point 6 rule' suggests
"that capital costs rise at a rate equal to the rate of increase of output raised to the power 0.6, that is, more slowly than the rate of increase in output. The "rule" applies largely to those industrial processes where a major item of the capital equipment consists of something which is spherical or cylindrical, for example, a kiln, blast furnance, a storage tank, a vat, and so on. The "rule" derives from the simple mathematical relationship between the volume of a sphere or cylinder and its surface area; the cost of equipment of this kind is said to rise roughly in proportion to the surfact area, that is to the amount of materials used. This of course applies only up to a certain size when the strength of the cylinder of sphere would be reduced with increasing size unless a thicker wall was used. There is evidence that the point 6 rule applies at least to major processes, if not to all equipment, in a number of industries: these include aluminium ingot manufacture, alumina production and aluminium rolling and drawing, cement manufacture, the production of oxygen, the production of synthetic ammonia and other branches of the chemical industry and oil refining, the production of petrochemicals and large ocean-going oil tankers".

See R B Sutcliffe, "Industry and Underdevelopment", 1971, p.201.

29) Report of The First United Nations Interregional Conference on The Development of Petrochemical Industries in Developing Countries, Teheran - Iran, 16 - 30 November 1964, United Nations, New York, 1966, pp.1 and 9.

30) Claude Mercier, with the assistance of Bernard Bartoli and Michel Barraque, "Petrochemical Industry and the Possibilites of its Establishment in the Developing Countries", Publications De L'Institut Francais Du Petrole, Collection "Science et Technique du Petrole" No 7 bis, 1966, Editions Technip, 7 Rue Nalaton, Paris 15. (English) pp. 94 - 98.

CHAPTER 7

PROSPECTS FOR THE DEVELOPMENT OF FERTILIZER INDUSTRY IN IRAQ

7.1 Recommendations

The idea of developing a fertilizer industry in Iraq goes back to 1952. During the early period of the Development Board, different suggestions concerning this industry were made. The most influential came from the International Bank and the economist, Little. All other suggestions followed the same path of the above experts.

The International Bank stated that

> The largest and perhaps most promising possibility for new industrial development lies in the utilization of the natural gas produced in conjunction with oil. This gas (at Kirkuk fields) contains 10.5 percent by volume of hydrogen sulphide with the remaining products being different types of hydrocarbons, chiefly methane. In the same area there are also large deposits of gypsum or hydrous calcium sulphate. These gases and gypsum could be utilized for the economic manufacture of ammonium sulphate, a valuable fertilizer for agriculture; and, in the process, sulphur, carbon black and cement could become available as by-products. A plant of economic size and capable of satisfying approximately one half of Iraq's eventual needs should have an annual capacity of approximately 500.000 tons. Any fertilizer not consumed domestically would find a ready market abroad.(1)

A.D. Little recommended the immediate recovery of sulphur, from natural gas, because it commands an extensive world market and could be locally consumed in the production of fertilizers. He also agreed with the International Bank

that "the most suitable fertilizer Iraq could produce would be ammonium sulphate - a nitrogenous fertilizer".(2) However, he denied the possibility of creating both a domestic and external market; saying:

> Unfortunately, although Iraq is capable of producing low-cost fertilizer, the domestic market is negligible, and future export markets are uncertain.(3)

Accordingly, Little recommended the establishment of a fertilizer plant, but only under two conditions: (1) when drainage facilities were completed, and (2) export markets existed.

The argument here centres on the existance of markets. While the International Bank anticipated an extensive domestic market and a good possibility of an export market, Little indicated the opposite: a narrow domestic market, and an uncertain export market. Both, however, agreed on one point: the economic feasibility of developing such industry.

When discussing the domestic market for any product, a number of important factors become relevant: size of population; level of per capita income, together with distribution of income; price of the product compared with prices of other goods; the transportation system and degree of tariff protection. Little failed to take the above factors into account and concentrated only on soil conditions, related to fertilizer application. It is indeed true that the amount of fertilizer needed for a certain kind of soil is determined mainly by the level of salinity in the soil; for example soil scientists do not

recommend the use of nitrogenous fertilizer on saline soils because it increases the level of salinity.

In Iraq, saline soils are mainly found in the southern areas, namely between Basra-Amara and Hilla-Kut, due to the lowlands being flooded yearly by the Tigris and Euphrates rivers. Other areas, however, particularly the north and centre which comprise over half of Iraq's agricultural land, are almost without any type of saline soil.(4) In addition the northern areas are characterized by high levels of rainfall which cause the leaching of nitrogen away from soils, leaving crops nitrogen deficient. Thus, a high level of nitrogenous fertilizer is needed after every rainy season.(5) Moreover, northern areas of Iraq are the main areas where cereals are grown, particularly wheat and barley (contributing almost two-thirds of the country's production of the two crops), yet no attention has as yet been given to increasing the fertility of this land and/or to improving productivity of crops.

Little's argument as to the unavailability of a domestic market appears unfounded because it depended on one single factor which was only valid when applied to a small part of the agricultural lands in Iraq. In other words, Little's knowledge of Iraq's soils conditions was limited; the lands that were expected to have a high rate of salinity contribute less than one quarter of the country's total agricultural area. Accordingly, one can not expect that Little's estimation of the size of Iraq's

domestic market for nitrogenous fertilizer was accurate for he failed to realise the importance of the agricultural land in the north of Iraq, which would contribute a significant proportion of total demand for nitrogenous fertlizer.

As far as the possibility of export markets for Iraq is concerned, Little also gave a gloomy picture. He, however, did not state any reason for such "uncertain" possibility. This may leave us with the following questions; did he mean that the general level of world demand was low or that fertilizer production in other countries was already high compared to world consumption?

Generally speaking, the main factor which may influence a fertilizer export market is the price.(6) A country which is able to sell at a lower price may have a reasonable chance of sustaining exports despite high competition in the export market.(7) There are may examples of this in developing countries, e.g. Brazil in 1975 and Saudi Arabia in 1978.(8)

The fertilizer plant he recommended in 1956 was of a capacity of 258.000 t/y with an operating cost of only I.D. 9.4 per metric ton. The expected return was 13.5% if sold at I.D. 16.0 per ton; the London price was estimated at I.D. 20.0 per ton at the same time.(9) In fact the International Bank put its planned net earnings at 18.5% of total investment and stated that it "may break even when approximately 40 percent of its capacity (total capacity is

500.000 t/y) is utilized".[10] With an absolute advantage of I.D. 4 in the price Iraq must surely have a reasonable chance of attaining an export market. Little, it appears, has again based his investigation of export possibilities on a limited number of factors, which were important, but he neglected the price factor that plays a significant role in international competition.

It seems that the main reason for recommending a fertilizer plant in Iraq was the availability of cheap raw material, mainly gas. None of the economists and experts (see Chapter 3), who were invited by the Development Board to advise on development programmes, however mentioned anything about using oil (naphtha) as a raw material as well as gas. Their reason was that using oil as raw material would increase operating costs, thus reducing the advantage of lower cost opportunity through the use of gas. However, one should not forget that most fertilizer industries in developed countries depend on napththa as well as gas for their raw materials. This can even be seen in some developing countries such as India, which uses mainly naphtha for the production of fertilizers.[11] It may appear that there were other reasons such as lack of refineries and the political and economic power of the oil companies which were seen as a major block to any development that might affect their profit maximization through the export of oil. Accordingly it can be suggested that there was no natural obstacle to prevent Iraq

utilising oil as well as gas in the development of a fertilizer industry.

7.2 Influence of oil companies

There are two main long term goals of oil multinational companies: profit maximisation and survival[12]. It is not within the scope of this thesis to discuss their goals, but it is important to raise this here since in order to attain these goals the companies used a variety of strategies which in turn prevented any petrochemical development in Iraq when they were in control.

It was shown in Chapter 2 that before 1952 the oil companies, represented by the IPC, had fully controlled both oil production and export in Iraq. The Iraqi government during that period had no power over these companies which in turn paid a fixed but small rate of royalty annually. This situation, however changed after the 50-50 profit sharing agreement of 1952 which gave the government some sort of bargaining power with the oil companies.

To avoid any kind of petrochemical development the oil companies adopted two roles.

Firstly, they prevented any large refining and downstream development taking place[13]. This was done by monopolising refining, by liniting it to only one small refinery which did not even cover the oil product needs of the country. This in turn enabled them to dominate the country as a market for their oil products which were imported heavily by the same companies until the end of the first half of the sixties[14].

Secondly, they encouraged these recommendations which suggested that Iraq should concentrate on agricultural projects and not get involved in any petrochemical industry development[15]. Using their economic and political influence, this was demonstrated through their publication of unreliable data and information related to the Iraqi economy which meant to show the inability of the country to develop heavy industry specially those of petrochemical nature.

It was not until 1961 that the oil companies allowed Iraq to utilise even limited quantities of gas for simple domestic uses mainly in heating and as energy source in power stations and some large industries[16]. The main reason given was that if Iraq started to use its gas as a raw material, this might influence the use of oil as a raw

material also. Economists had already established that using gas as raw material in the production of nitrogenous fertilizer in Iraq would give very promising results. Therefore the oil companies could not gain say.

In addition it should not be forgotten that larger profits were to be made in refining petrochemicals and distributing oil than in selling it as a crude commodity.[17] This was another reason why the oil companies in Iraq insisted on producing oil products mainly to satisfy Europe's demand.[18]

During the sixties the annual rate of growth in Iraqi crude oil production dropped from that of 22% during 1950-60 to 4.9%. This low level of production not only deprived the country of additional revenue but pushed up the production cost per barrel, thus reducing government revenue. It was estimated that during 1962-70 Iraqi financial losses due to this policy ran at about I.D. 550 million. Moreover, this policy of low production generally damaged the Iraqi economy by paralysing its development programmes which were mainly dependent on oil revenues. Yet if such a policy was applied, what about the profit maximisation aim of the companies? The answer simply lies with the other main goal of the multinational companies, which is survival. During the period above oil companies made lower profits in Iraq then in Saudi Arabia and Iran. For example, the Iraqi Petroleum Company, for tax reasons, so arranged its accounting that the company itself made no

profit.[19] The main reason for this policy was due to the monopolistic characteristics of these companies which were able to maintain their overall profits by increasing them in other areas where taxes and royalties were low.[20]

The general policy of the oil companies in Iraq, during the fifties and the sixties, was no different (or perhaps the same) from that of other oil companies in other oil exporting countries (Nigeria, Venezuela, Iran...). Green clearly identifies these companies' policy as follows:

> There can be no doubt, however, that the policies of the big oil companies....will be determined, not by the needs of the producing country, but by their own world-wide resources and corporate bargaining power. The bulk of their oil is to be shipped crude to power the industries of Europe, with the value added in manufacture going to European .... economies."[21]

Because of the above difficulties, Iraq had not been able to utilize oil as raw material. But after the nationalisation of its oil in 1973, and strengthed by the rise in oil prices after 1974, Iraq had the opportunity to maximize both its production of crude oil and in turn its revenues (see Chapters 2 and 3). Oil revenues played a decisive role in enabling the country to invest heavily in its development programmes. As part of these, the petrochemical complex plans which had been recommended in 1952 were begun.

7.3 Government attitudes

It was seen in Chapter 3 that during 1952-58 the government, as represented by the Development Board, concentrated its economic development programmes on those projects which were related to agriculture, e.g. dams, draining systems, irrigation schemes, etc. Even in its industrial policy, the government still laid emphasis on projects that had strong links with agriculture, such as sugar and textiles. However, the most significant feature of government policy was that, even though it was influenced by those recommendations which suggested concentration on agricultural improvement as a priority, it did not take any action to develop a fertilizer industry clearly needed to satisfy the requirements of "the potential agricultural country".(22) As estimated by the International Bank, the country needed about 500.000 tons of nitrogenous fertilizers annually in order to satisfy only half of its "eventual needs". Yet in 1953 only one metric ton of nitrogenous fertilizer was utilized in the country. This rose to about 1.5 ton in 1957.(23)

Between 1958 and 1972/73 successive governments faced three major problems. The authorities were in conflict with the oil companies over the production and price of crude oil. Political instability was a recurring phenomenon (at least six military revolutions and uprisings), the two Arab-Israeli wars (1963 and 1967), together with the Kurdish uprising (1961-75). These problems cost the country a great deal of money and

manpower, which in turn seriously hampered all development programmes, particularly the long-term. Heavy industries, mainly petrochemicals, were the first to be dramatically effected. This was clearly stated by the government when commenting on the new "National Development Plan" in 1970:

> This industry (petrochemicals) needs huge capital; besides, there are the multi-national companies and other problems which hamper the process of constructing such important industries. Studies were prepared, and implementation will be effected once the required money is made available.(24)

Accordingly, even though the first step towards the development of a fertilizer industry took place in 1970/71 when a contract for building a gas based urea-Ammonia complex at Basra was discussed, it was not until 1975/76 that the work on this project was actually begun.(25) This complex at an estimated cost of I.D. 200 million (about $600m) was to start production in 1979/80. The general line of the National Plan 1970-74 indicated the need to establish heavy industries that depend on mainly local raw materials and with export potential. The complex was designed originally to meet export markets.(26) Its full capacity was planned at 2 million tons of area-ammonia annually, and it was located at Basra, the only port of Iraq (to the Gulf).(27) Construction on another two large scale gas-based petrochemical complexes (at an estimated cost of I.D. 325, or $975 m) was also started at Basra during the second half of the seventies to produce for export. In order to meet the requirements for such large export levels, a massive

adequate infrastruture (pipelines, harbour facilities, terminals, pumping stations, piers, etc.) was needed. To achieve this extra investment of over I.D. 100 mn. was required.[28]

It appears that while development plans before the 1960s neglected the possibility of developing a fertilizer industry, the development plans of the late sixties and onwards especially those after 1974, seriously attempted to establish the industry. This change in government attitudes was due to a number of factors:

(1) Petrochemical development was seen as a way of fighting multi-national oil companies.

(2) It was also seen as a way of applying a new socialist policy which fits with the theory of "the Leading Public Sector" on the other hand.[29]

(3) The government felt that it had to catch up with countries such as Iran, Kuwait and Saudi Arabia, which had established petrochemical and downstream industries.[30]

(4) The nationalisation of the oil companies which centralized oil and its production in official hands, coupled with the flow of oil revenues after the 1973-74 put the government in a much better financial position. This allowed the government to "invest heavily without suffering the typical foreign exchange crises and inflationary pressures of 'underdeveloped' countries which force the pace of economic growth".[31]

The nationalization also meant the access to flared gas which could be utilised to create an additional export outlet for crude oil.[32]

As far as the scope of this study is concerned, government policy can be criticized as it emphasised gas as the only feedstock for this industry ignoring the possibility of using oil as raw material. Also, it concentrated on developing a large scale industry for export without giving any attention to domestic demands.

In the first place, it seems that the government was influenced by those previous recommendations which suggested the utilization of gas only, rather than oil or both. Using gas only may lead to future problems, because natural gas in Iraq is associated with crude oil production. Any future increase in natural gas supplies therefore will mean increasing oil production, which of course will have to be exported since no petrochemical and downstream activities which depend on oil for raw materials exist. Such a policy may cause higher gas cost and price and lower crude oil price. This is in addition to higher production activities which would require higher investment and could result in lower returns.

In the second place curiously, the government appeared interested in developing an export market, but uncertain of a domestic market. There is no reason why fertilizers should not be exported when a market is available, but this

should not mean neglecting the potential domestic market which governments in developing countries should help to create. In comparison with its estimated needs of 1.000.000 tons of nitrogenous fertilizers, Iraq consumed an average of only 29151 t/y (or 2.9% of its essential needs) between 1969/70-1979/80. This low domestic consumption will surely create a big problem if export markets prove volatile.

A number of factors should always be taken into account when planning the development of a plant for export purposes mainly those of a political nature. Historically, many examples are evident in Iraq's case eg the oil export cuts during the Suez crisis in 1956, the conflicts with Syria in 1957 and the problem of the Arab-Israili war of 1973. After nationalisation in 1972/73 both Syria and Lebanon also hampered Iraq's exports of crude oil. Any political disturbance with Turkey or Iran, as with the above countries, may stop completely crude oil production and exports, because the main outlets for Iraq to the Mediterranean and the Gulf are through these countries. Moreover, misunderstanding between Iraq and countries to which she exports may also affect the level of demand for fertilizers, and this would mean lower working capacity for the large-scale plants built to satisfy export markets. This in turn may lead to higher production costs per unit.

Other factors which might reduce the security of export markets could be the multi-national companies which

control almost all the export markets for nitrogen fertilizers and competitive pricing by other new exporting countries, mainly of the Middle East such as Kuwait, Saudi Arabia and Qatar.[33]

Finally, the location of the fertilizer plant at Basra can be criticized for two reasons. First, the plan required huge amounts of sulphur which are not available at Basra, and have to be supplied from the Kirkuk plant in the north of Iraq. This means extra transportation costs to be added to total production costs. Secondly, as mentioned earlier, the majority of the domestic market (at least until large scale draining systems have taken place in the south) is in the northern and some parts of the central areas of Iraq. In order to save in transport costs, therefore, it would be advisable to locate the industry somewhere between the central and the southern areas. In doing so, the demand by these areas for fertilizer may also be encouraged.

7.4 Conclusions

This chapter has examined the development prospects for a petrochemical - based fertilizer industry in Iraq from the points of views of some development economists, oil companies and the Iraqi government.

Unfortunately, the economists who visited Iraq during the fifties did not all agree on a decision concerning the establishment of a chemical fertilizer industry in the country. While the International Bank clearly indicated the feasibility of developing such a project, Little strongly argued that, at that present time, such a venture would not prove to be feasible. The focus of the argument between the above consultants was market conditions; the International Bank suggested the availability of both domestic and export markets; Litte, however, doubted the existence of such markets.

The oil companies, which controlled oil and gas production, had no interest in developing any type of petrochemical industry in Iraq. Rather, they encouraged the argument which suggested that Iraq should not force the development of heavy industries, such as fertilizer, because this type of project requires wide markets, highly skilled labour and massive infrastructure facilities all of which Iraq lacked. The oil companies, as with refining projects, also insisted that large scale capacity should always be located near the demand side, meaning developed countries, particularly those in Europe .

The argument of the above consultants went on until 1958. During the sixties, all the governments which came to power were involved in sustained conflicts with the oil companies; up to 1971-72, these companies adopted an oil production policy that kept Iraq in desperate need of funds and prevented it from utilizing its oil and gas in domestic projects.

The nationalization of the oil companies in 1971-72, together with the increases in oil prices, was therefore a solution to the government's problems. The government at the end of the first half of the seventies rushed through a plan for developing a large scale petrochemical plant. The plant was actually planned to serve export markets. Due to this policy, the potential domestic demand was almost neglected. The plant was designed as gas-based rather than oil-based, or both. This meant that future operations depended on a high level of oil production, as gas in Iraq is associated with oil. Unless a high level of oil production continues, the amount of gas needed for the fertilizer industry will not be sufficient.

CHAPTER 7

NOTES

1) IBRD, The Economic Development of Iraq, 1952, pp. 287-88 and 37.

2) Langley, 1961, p.220.

3) Arthur D Little, "A Plan for Industrial Development in Iraq", Cambridge 1956, p.9.

4) P Buringh, "Soils and Soil Conditions in Iraq" Ministry of Agriculture, Baghdad - Iraq, 1960, pp.304-308.

5) Ibid, pp.253-54.

6) UNIDO, First World Wide Study of the Petrochemical Industy 1975-2000, 1978, p.149.

7) Ibid.

8) Ibid, pp.400-402. Also see Middle East Industrialization, 1979, pp.162-163.

9) Langley, 1961, p.128.

10) IBRD, The Economic Development of Iraq, 1952, p.289.

11) "Chemicals in The Third World", Petroleum Press Service, August 1972, p.297.

12) Edith Penrose, "The Growth of Firms, Middle East Oil and Other Essays", Frank Cass and Co Ltd, 1971, pp. 3-23.

13) See Chapter 2.

14) Al-Naft Waltanmiyah June 1977, No. 9 - year 2, Baghdad - Iraq.

15) Ibid.

16) See Chapter 2.

17) Penrose, 1971, p. 139.

18) See Chapter 2.

19) Penrose, 1971, p. 148.

20) Ibid, p.172.

21) Green and Seidman, 1968, p. 118.

22) Lord Salter, "The Development of Iraq: A plan of Action, 1955", p.15.

23) FAO, Fertilizers: An annual review of world production consumption, trade and prices, 1969, Table III, P.74.

24) The Economy of Iraq, development and perspective 1958-1976-1980, Ministry of Information, 1977, p.74.

25) Quarterly Economic Review of Iraq, Annual Supplement 1978, The Economist Intelligence Unit LTD, p.12.

26) "The Economy of Iraq ..., 1977", p.73.

27) Ibid, p.83.

28) Al Jamhuriyah, Baghdad - Iraq, May 15, 1981, p.7.

29) "The Economy of Iraq ...., 1977", p.121.

30) Ibid.

31) D Seers, "The Life Cycle of a Petroleum Economy; Discussion Paper", Institute of Development Studies at The University of Sussex, September 1978, p.10.

32) "The Economy of Iraq ...., 1977", p.82.

33) Chapter 8, Note 31.

CHAPTER 8

Domestic potential demand for, and export possibilities of nitrogenous fertilizer in Iraq.

One of the main problems facing industrialization in developing countries is the small size of the domestic market. Despite this, economists still argue that potential demand for both agricultural and industrial products in most of these countries is high. The case of Iraq is, perhaps, a good example. In the previous chapter it was shown that the focus of the argument for the development of a fertiliser industry in the country was the availability of a domestic market. This chapter, in sharpening the focus of the research will concentrate on examining potential demand of the Iraqi market for nitrogenous fertilizer. It will analyse the export possibilities that may be available for Iraq in both the short and the long terms. In addition, the role of government in accelerating this type of demand will be analysed and suggestions as to the way this development might be achieved will be given.

8.1 Consumption of N. fertilizer in Iraq: historical and present situation

Even though nitrogenous fertilizers (N) were recommended for use in Iraq in 1952, it was not until the sixties that small amounts were actually used in agriculture. Table 8.1 shows that the average of N

consumed in Iraq between 1960/61 and 1968/69 was only 3270 metric tonne. The amount of N consumed through the period, however, was increased from 730 m.t. in 1960/61 to 8257 m.t. in 1968/69.

The main reasons behind the low fertilizer consumption during this period are due to the following factors:

(1) Nitrogenous fertilizers were not widely known in the country before the 60's.

(2) As seen in Chapter 4, during the fifties and until the first half of the sixties, agricultural land was almost completely owned by a very small number of landlords who had no intention of increasing agricultural output by using costly inputs such as N fertilizers, especially when organic fertilizers were available cheaply or completely free in their areas. In addition, because they owned very large areas, none of the agricultural land was ever completely cultivated. Therefore, the notion of increasing land productivity never occurred since land owners could increase production by cultivating larger areas.

(3) Before the revolution, much of the cultivated land was divided into two parts, each half being cultivated every second year. This method of leaving uncultivated areas (Bor) for one year was meant to increase fertility.

(4) The high levels of poverty that existed among other small-holding farmers caused them to utilize only small plots, mainly for their daily food requirements rather than for commercial purposes. With a subsistence level of land

TABLE 8.1

Consumption of Nitrogenous Fertilizers in Iraq, 1960/61 - 1979/80

Year	N in metric ton
1960/61	730
1961/62	1,040
1962/63	n.a.
1963/64	2,027
1964/65	2,271
1965/66	2,622
1966/67	4,750
1967/68	6,395
1968/69	8,257
1969/70	10,152
1970/71	12,000
1971/72	13,469
1972/73	15,000
1973/74	20,139
1974/75	27,317
1975/76	25,000
1976/77	35,000
1977/78	45,000
1978/79	43,388
1979/80	74,200

Source: FAO, "Fertilizers, An annual review of world productions, consumption and trade 1965 and 1969".

FAO, Annual Fertilizer Review, 1971 and 1975.

FAO, Fertilizer Yearbook, 1978 and 1980.

utilization one would not expect nitrogenous fertilizers to be used.

(5) Because of the problem of land distribution, the first agrarian reform of 1959 (after the revolution of 1958) concentrated on land ownership and land redistribution as a first step towards agricultural development. No serious attention was therefore given to improving the use of nitrogenous fertilizers on farms.

(6) The period of the sixties saw serious political and socio-economic changes, but resulted in no significant improvement in the use of fertilizers in particular and in agricultural development in general. The main reason was, that the government which came to power during this period, for political reasons, placed more emphasis on industry rather than on agriculture in their development plans, (Chapter 3).

Between 1969/70 and 1979/80 the consumption of N fertilizers rose from 10,152 m.t. to 74,200 m.t. with an average annual rate of growth of about 23.8%. The average of N fertilizer used during this period was 29,151 m.t. p.a. This improvement in N consumption was partly due to an increase in farmers' credits in general and a rise in their incomes in the second half of the seventies in particular.

It was argued that government agencies responsible for importing and distributing N fertilizers in the country were inefficient in that the majority of agricultural areas of the country lacked chemical fertilizers.[1] In fact, it

was estimated that only 4.9% of the cultivated area of Iraq was actually fertilized in this way in 1970/71.[2] Moreover, because government had primarily concentrated on industrial development, the second agrarian reform of 1970 had also emphasised land ownership rather than land productivity. Accordingly, the use of N. on land did not significantly improve.

Table 8.2 shows Iraq's consumption of fertilizers per hectare of agricultural land, compared with fifteen selected developing countries during 1956-77. Even though its consumption increased from 0.4 kg/h in 1965 to 7.8 kg/h in 1977, Iraq still showed one of the lowest levels of consumption per hectare; in the same year, it was 12.2 kg in Iran, 23.5 kg in India, 30.3 kg. in Costa Rica, 77.9 kg. in Lebanon and 187.5 kg. in Egypt. A comparison of the consumption of fertilizers per hectare of arable land and permanent crop land shows a similar result. This indicates that Iraq had been using a very low level of fertilizer on the land.

Finally, Fig. 8.1 shows clearly that Iraq's consumption of fertilizers per hectare was lower than that of the average of all developing countries, much lower than that of the world, and significantly lower than that of all developed countries.

TABLE 8.2

Consumption of fertilizers in selected developing countries, per hectare of agricultrual land (in kg N, P_2O_5, K_2O)

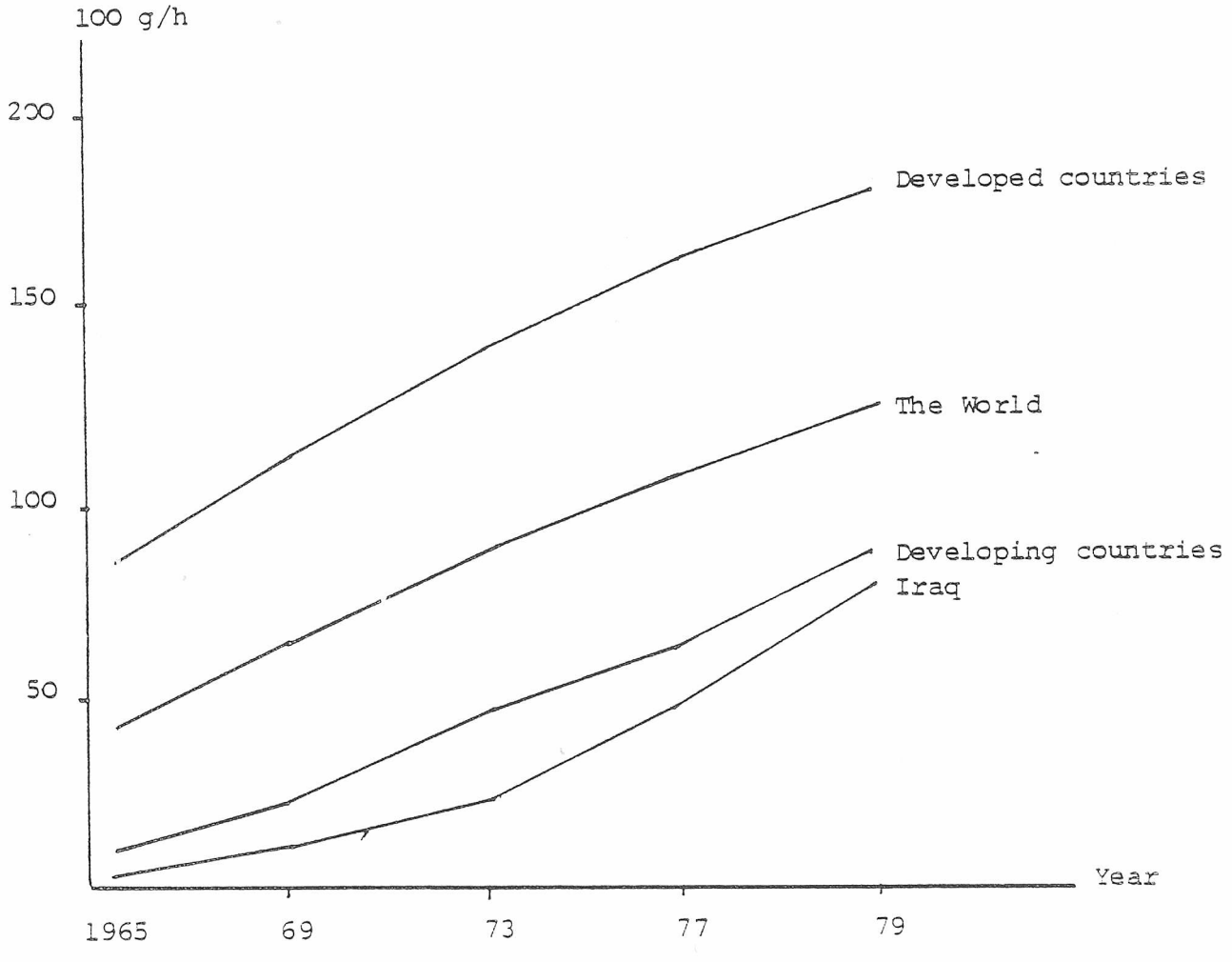
Country	1965	1969	1973	1977
India	4.3	11.2	15.9	23.5
Iran	1.4	3.2	12.1	12.2
Iraq	.4	1.6	3.1	5.8
Venezuela	1.8	2.3	3.9	10.8
Brazil	1.5	3.3	8.0	15.2
Chile	7.5	9.2	11.0	6.0
Syria	1.4	2.6	3.4	5.9
Pakistan	2.9	12.7	15.3	28.2
Costa Rica	15.8	30.3	31.2	30.3
Egypt	126.4	122.7	141.7	187.5
Algeria	.9	2.0	4.5	4.2
Jordan	3.8	1.8	2.8	3.8
Lebanon	48.1	100.0	205.9	77.9
Mexico	3.4	5.4	7.7	10.9
Fiji	23.7	20.1	28.0	39.9

Source: FAO Annual Fertilizer Review, 1975, Table 12.
FAO Fertilizer Yearbook, 1978, Table 12.

N : Nitrogenous Fertilizer
P_2O_5 : Phosphate Fertilizer
K_2O : Potash Fertilizer

Fig. 8.1

Consumption of N per hectare of agricultural area in Iraq, Developing Countries, Developed Countries and the World. (1965 - 79)



8.2 Iraq's potential demand for N. Fertilizers

Introduction

Generally, there are three main factors which determine the amount of N used on a farm:

(1) The type of soil

(2) The type of crop

(3) Others (climate, rainfall levels, and the nitrogen index of the soils).

Beside other factors, crop yields are usually determined by the inherent fertility of land which, in turn, depends on the nature of the soil/s.[3] Medium-textured loams, for example, often give better yields over a run of seasons than light sands or heavy clays. Also, a deep soil is usually more productive than a shallow one.[4] Fertilizers generally give larger increases in yield on more productive than on less productive soils, and in turn this may indicate the heavy use of fertilizers on soils with high yield potentials. But, on the other hand, N fertilizers may appear to be very damaging when used on some other groups of soils, particularly those of high salinity because they may increase such levels in soils.[5] Therefore, it is important to test the level and type of salinity in slightly saline soils before applying N. An experimental test carried out in the southern area of Iraq using saline soil proved that hardly any increase occurred in crop yields by applying N.[6] But a significant increase in wheat production was found on non-saline plots in Abu

Ghraib near Baghdad by applying N.[7] Similar results have also been achieved in vegetable production in the same area, particularly with tomatoes.[8]

On the other hand, N will have to be applied in large amounts after the leaching of saline soils. This is because during leaching most nitrogen in the soil will be washed out. In fact in the Dujaila area, experiments on leaching have indicated that all the nitrogen in the soil has actually been washed out.[9] This was also the case in the northern areas of Iraq where heavy rain takes place.[10]

The three levels of nitrogen reserves in soil are called the "Nitrogen Index"; fields in Index 0 have low nitrogen reserves and more N is needed compared with fields in Index 1; Index 2 soils have the highest soil nitrogen reserves and less N is required.[11]

The most important factors affecting nitrogen in soil are the nitrogen released from crop residues and the nitrogen remaining from previous manuring.[12] Usually it is only necessary to consider the last crop grown to determine a field Nitrogen Index, but after crops of long leys (mainly fruit trees), it is important to consider cropping histories for longer than one year. This method of ADAS, for determining the nitrogen index of a field, however, is explained in more detailed in Appendix D.

Iraq's need for N

In this analysis, two main crops are used: wheat and barley. The data required is taken from Chapter 4, Table 4.5, while amounts of N recommended for the two crops are taken from "Fertilizer Recommendations" published by The Ministry of Agriculture, Fisheries and Food, London 1979. Only three common types of Iraqi soils are used, and two assumptions are made:

(1) That the area utilized for the four crops, barley, wheat, rice and cotton (2.202.329 hectares), is only used for wheat or barley.

(2) That total consumption of N during the period 1970-75 is applied only to wheat and/or barley.

Results

Before showing the results, it is necessary to see the actual amount of N per hectare used for the above two crops during the years 1970-75 in Iraq. Applying the two assumptions above, the result is an average of only 8.5 kg./h.[13]

Table 8.3 show three different amounts of N needed for wheat, in three different types of soil with three levels of nitrogen index, while table 8.4 shows the different amount of N needed for barley.

According to the Tables, Iraq's average essential requirements of N when utilizing an area of 2.202.329 hectares for wheat are 220,233 ton per annum on sandy soils; 168,845 ton p.a. on silty soils and 168,845 ton p.a. on clay

TABLE 8.3

N required for Wheat Production

Nitrogen Index	Sandy Soils Kg./h	Sandy Soils Total (ton)	Silty Soils Kg.h	Silty Soils Total (ton)	Clay Soils Kg./h	Clay Soils Total (ton)
0	150	330,349	125	275,291	125	275,291
1	100	220,233	75	165,175	75	165,175
2	50	110,117	30	66,070	30	66,070

TABLE 8.4

N required for Barley Production

Nitrogen Index	Sandy Soils Kg./h	Sandy Soils Total (ton)	Silty Soils kg./h	Silty Soils Total (ton)	Clay Soils Kg./h	Clay Soils Total (ton)
0	125	275,291	125	275,291	100	220,233
1	100	220,233	60	132,140	60	132,140
2	50	110,117	30	66,070	30	66,070

soils. These results are compared with an actual average consumption of only 18821 ton p.a. in the period under investigation (1970-75). Similar results are attained when using barley instead of wheat.

In fact, because almost all the wheat and barley in Iraq are grown in the northern areas, one may expect that maximum amounts of N are required. This is because most types of soils in these areas are sandy, and northern Iraq is characterized by high levels of rainfall indicating the need for high amounts of N, 200 kg./h. This amount will increase in the case of vegetables to reach 250 kg./h on a farm with a long leys pasture history.(14)

Iraq's potential demand for N.

As mentioned in previous chapters, Iraq is basically an agricultural country with about one-third of its total area (15 million hectares) suitable for agricultural cultivation. Out of this, only about 4 million hectares were actually cultivated during the period 1960-75.

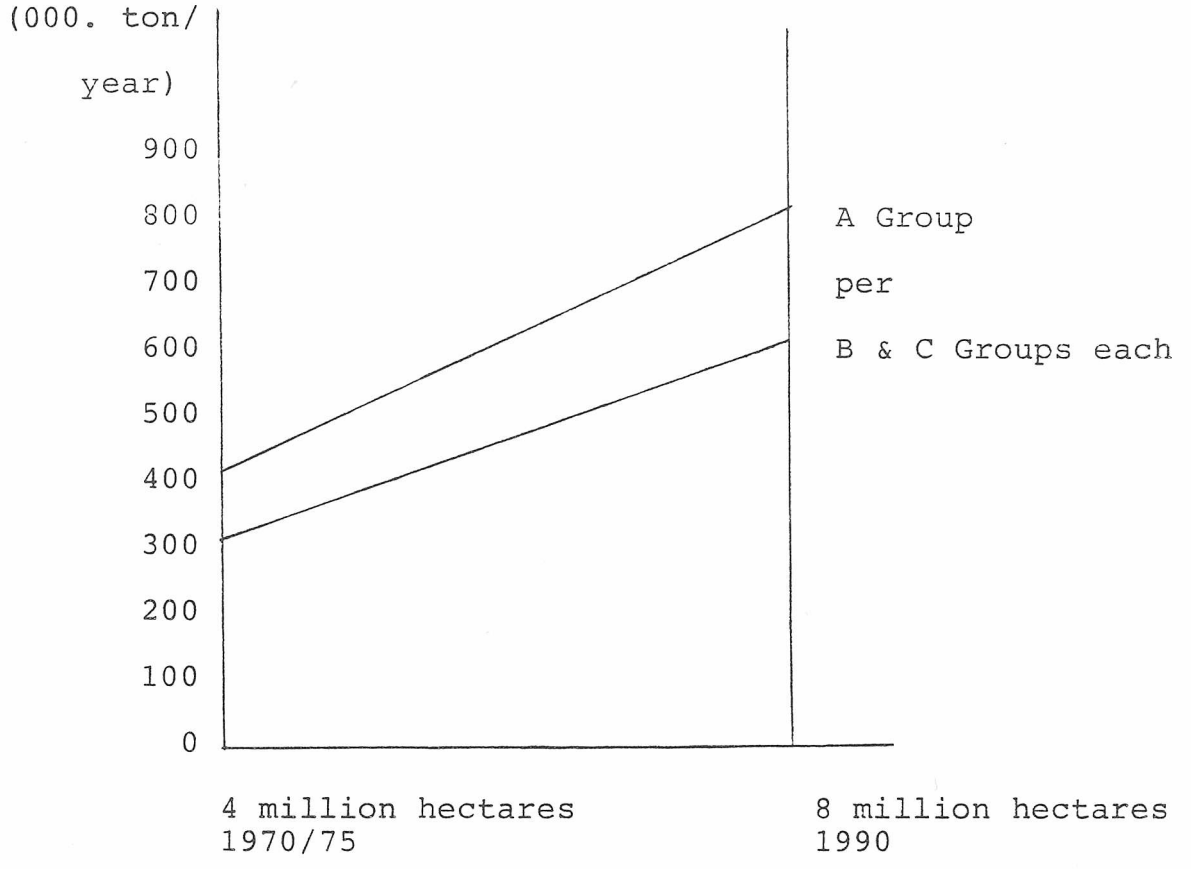
By applying the average of N need for wheat and barley according to the method mentioned previously, the 4 million hectares can be shown to require the following amount of N:

Group	Classification of soil	Tonne/annum	
A	Sandy soil	400,000	(100 kg/h)
B	Silty soil	308,000	(77 kg/h)
C	Clay soil	308,000	(77 kg/h)

Significantly, Iraq during 1970-75 consumed an average of only 18,821 tone of N per annum. This means that it only applied an average of 4.6 kg/h to the land under cultivation (4 million hectares). According to the results above, Iraq would have required an additional amount of 289,179 ton of N p.a. to satisfy its minimum needs for this type of fertilizer.

On the other hand, if Iraq were to increase its land cultivation for agriculture within the 15 million hectares, these figures would increase significantly. Assuming that by 1990 the country will have sufficient irrigation and drainage systems to help it cultivate about double the area actually under cultivation in 1970-75, the amounts of N needed then would be approximately 800,000 ton p.a. for sandy soil, 616,000 ton p.a. for silty soil and 616,000 ton p.a. for clay soil (Fig. 8.2).

Fig. 8.2: Iraq's potential demand for N fertilizers.



8.3 Farmers' attitudes to the use of nitrogenous fertilizer

It is arguable that Iraq, under certain conditions (availability of irrigation and draining systems, applying the essential requirements of nitrogens, etc.), may be able to consume over half a million tons of nitrogenous fertilizer per annum. However, despite these conditions, I would suggest that there are, still other significant factors which lie with the farmers themselves and which influence their use of fertilizer. Evidence for such a

view comes from a survey of farmers' attitudes carried out in one area of central Iraq in the Diyala region - Al-Huwaish village. The sample consisted of 34 independent farmers. These farmers were asked two groups of questions:

(a) whether they were aware technically of the relationship between nitrogenous fertilizer and types of soils, time of application, climate effects and the response of crops to fertilizers?

(b) what factors they considered had (or would have) most affected their choice in nitrogenous application?

Results of Survey

Almost all the farmers reported no background information either about soil classification or about the nitrogen index of soils. They however distinguished between two types of land: first, land with a high rate of salinity; and secondly, land without or with a low level of salinity. No scientific experiment had taken place in the area, and this classification was made by the farmers. In this they depended on either the look of the land itself (most of the time land with a high level of salinity looks white) or the resulting effects on growing crops. Knowledge of when to apply fertilizers depended on the knowledge of some farmers who told other farmers, and so on. Some farmers were actually told by government suppliers about the amount of nitrogenous fertilizer they had to use on their farms without any experimental testing

of the soils of their farms. This information, however, was crop - specific, in that it depended on the type of crop. About two-thirds of farmers, in addition, indicated that they did not think that they were using the optimum amount of nitrogenous fertilizer on their lands. Half of the other third considered they were using the optimum amount, while the other half had not yet applied any nitrogenous fertilizer but, due to recommendations from their colleagues, they were willing to apply it as soon as their financial situations "got better".

The second group of questions, proved more attractive to, and more readily understood by the farmers. Out of the 34, only two said that nitrogenous fertilizer prices were fair; the rest (32) said they were highly priced. All the farmers blamed transport costs for raising fertilizer prices. In fact "without our co-operating with each other, some would be paying more money for transport than for the fertilizer itself", one farmer said. Two farmers were waiting for another farmer who was to go to Al-Khalis (about 30 miles from the village) for his yearly supply of nitrogenous fertilizer, in order to gain the advantages of cheaper transport; "if he does not go for his supply this year, we will wait until next season, and probably use cheaper organic fertilizer", they said.

Prices of other inputs, especially those of new plants, and the cost of labour, were also problems all the farmers complained about. Most of them agreed that the

rapid increases in these prices had affected the amount of nitrogenous they could afford to buy in the last years. Even with government credits of about I.D. 1800-2200, they had still found it very difficult to cover all the expenses they had incurred during their work season (February-March).[15] Unlike modern farms, all Al-Huwaish farms are intensively planted with fruit trees, and no adequate space was left for the use of new machinery. Therefore the farmers had to hire special workers every year in order to help them cultivate their farms, and this proved very costly.

Finally, 29 farmers agreed that they would use nitrogenous fertilizer on their farms and even increase its amount every year "only if the government gives more credits and subsidies, and if prices of other inputs are to go down or at least remain stable". Five farmers considered organic fertilizers as "more effective on their lands than chemical fertilizers", but they would still change to nitrogenous fertilizers if the government helped partly to reduce its cost below that of the organic.

Factors encouraging fertilizer use

Basically, the motive for the farmer to use fertilizer depends on the relation between the price of this input delivered to him, the extra yield that he can attain as a result of its application, and the increase in his income that he will get from production increase.[16] The first

and the last of these conditions can be directly influenced by government intervention, while yield response depends on a number of factors, e.g. soil conditions, climate, irrigation and draining facilities, cultivating practices, variety of crop, etc. Apart from climate and soil conditions, however, a government can and should still be able to influence these factors.

There is very limited data available on fertilizer prices in Iraq, especially by regions. It was estimated by the FAO that the price of one tonne of nitrogenous fertilizer received by a farmer in Iraq was $280 in 1967/8, and decreased to $217 in 1974/75. According to the previous survey, the price of this type of fertilizer stood at $273 in 1980/81.

Even though these prices appear to be low in comparison to many developing countries, the Iraqi farmers still complained about them. (17) The main reason here may lie with the fact that the majority of these farmers are very poor. Accordingly, only a small number of them can afford to use fertilizers. This small number, however, has still not managed to optimize the use of this input. Therefore, no significant effects on output were attained.

The government in this case can directly influence the situation. This can be tackled by either paying a direct subsidy on fertilizers, or by giving indirect subsidies, e.g. credits, transport subsidies, etc. (18) In fact, the Iraqi government have already applied the first through its

30% payment for "controlling fertilizer prices".[19] On the other hand, the government have also given agricultural credits which cover fertilizer purchases. These credits were to be paid back in 2-3 years (six months - payment) with a rate of interest of 6% p.a.[20] Extra charges in case of delays in payments were imposed. To obtain a certain amount of credit, however, a farmer has to comply with a number of conditions, e.g. a certain size of farm, a certain type of cropping, and a requirement that most of the work on the farm has to be done in advance.[21] Accordingly, a great number of farmers failed to satisfy these conditions, and those who managed to do so were only able to obtain a small amount of credit (I.D. 300 - 700).

The main feature of credit payment in Iraq is that it is paid in cash rather than in kind. Because farmers are poor, most of this cash payment is diverted by the majority to some other non-approved purpose. As a result, farmers were unable to afford their repayments and the government did not manage to achieve a reasonable increase in agricultural output. This scheme also meant that many farmers were put in debt for years. This was coupled with the harsh requirements of the system which ruled that no farmer was to obtain any credit unless he repaid the last credit.[22] "Credit in kind" may be a solution in this case. This is done by giving a farmer a slip entitling him to take a delivery of, say, a specific amount of fertilizer. This kind of slip is usually not transferable

and does not have a sale value. The advantage of this method is that it not only secures a proper use of the credit, but also can be tied to the supervision and advice that must be available to the farmers in order to determine their need for fertilizers.(23)

Technical measures taken by governments through research and development will also encourage farmers to use fertilizers. For example, experimental work on soil classifications can help farmers in determining the amount of nitrogenous fertilizer required on their land per hectare. Other measures, such as crop response to fertilizer and timing of application, would also help in increasing agricultural output and prevent the risk of improper application. These measures should, of course, be coupled with the assurance of other facilities that are vital for the use of fertilizers, mainly irrigation and draining schemes. Unless the latter conditions are met, no significant results will be attained.

The government, on the other hand, can and should help farmers by protecting their incomes. This may be achieved by different measures, e.g. preventing any sharp decline in agricultural prices through price stabilization and tariffs if necessary, securing the stabilization of other inputs' prices, and ensuring adequate social facilities in rural areas, such as education, hospitals, markets and other general and agricultural services.

There are indeed a large number of examples of support and stabilization programmes in effect in many developing countries.[24] It goes beyond this chapter to review these examples, but it may be worth mentioning that these measures appear more effective in one country than in another, in so far as the government in that country seriously attempts to help its farmers.

In conclusion, in order to encourage the use of N in the rural areas, the Iraqi government should seriously consider the following:

(1) As a first step, special recommendations related to N should be provided to all farmers. These recommendations, which could be given either directly through government agents or indirectly through booklets, should give information on soil classifications together with the related amounts of N to be used, explain the nitrogen index, showing the relationship between the amount of N to be used and type of crop, and indicate timing of N application. These recommendations should also be coupled with field and scientific work.

(2) Because the majority of Iraqi farmers are poor, effective subsidy and credit systems concerning N should be adopted. Unfortunately, the current subsidy system in Iraq is only related to N prices and neglects other costs such as transport which turn out to be very high. The credit system, on the otherhand, apart from being very strict on certain conditions that most farmers could not meet, has

been based on "cash payments" which led to the fact that most of those poor farmers directed these cash payments to satisfy other personal needs rather than to buy N. Accordingly, a great number of those farmers who were counted by the government as N users were non-users.

8.4 Export possibility

In the previous chapter, the argument as to whether Iraq should develop an export market for nitrogenous fertilizer was considered. It was seen that while in the 1950s one group of international experts suggested there was a good possibility for such an export market, an other group stressed the "uncertainty" of such a market. In this section, a closer examination of this market will take place. The argument as to the possibilities of developing an export market was first raised thirty years ago when the socio political context differed widely from that existing now.

The structure of a N. Fertilizer world market

Table 8.5 shows world imports and exports of N. Fertilizer in 1974/75 and 1979/80. It can be seen that developed countries have contributed about 92% of total exports during 1974/75, while their imports stood at only 36% of total world imports. But these percentages changed slightly in 1979/80 when the export rate dropped to 87% and the import rate rose to 45%. The main reason may be seen

TABLE 8.5

World trade in nitrogenous fertilizers, 1974/75 and 1979/80 in m.t.

1) 1974/75	EXPORTS		IMPORTS	
	Tonne	%	Tonne	%
The World	8,151,124	100%	7,952,129	100%
Developed Countries	7,464,942	91.6%	2,822,204	35.5%
Developing Countries	686,182	8.4%	5,129,925	64.5%

2) 1979/80	EXPORTS		IMPORTS	
	Tonne	%	Tonne	%
The World	12,070,018	100%	12,435,242	100%
Developed Countries	10,522,426	87.2%	5,604,035	45.1%
Developing Countries	1,547,692	12.8%	6,831,207	54.9%

Source: Tables 2,3,19 and 20, 1978 and 1980 FAO Fertilizer Yearbook.

in the Table which show that developing countries have increased their exports of N from 686,182 million tons in 1974/75 to 1,547,592 million tons in 1979/80, raising their share in world exports from 8% to 13%. A number of developing countries which had their fertilizer industries under construction during the seventies were able to start production at the end of this period, thus sustaining their domestic consumption of fertilizers and exporting the surplus to other countries.(25) Moreover, with the help of price competition and joint ventures with international companies, oil exporting countries, particularly Saudi Arabia, Kuwait, Qatar, and some other Latin American countries, namely Brazil, Chile and Mexico, managed to gain access to international export markets. This was probably encouraged by the energy crisis after 1974/75 which slowed down the rates of growth of petrochemical industries in the developed countries. But even with such increases in the production of nitrogenous fertilizers in developing countries they still constituted a major import group accounting for about 55% of the world's total imports in 1979/80. The main importers of nitrogenous fertilizers in the developing world are shown in table 8.6.

The main exporting countries in the developed world are relatively few in number, chiefly the United States, Canada, France, the Netherlands, and the Federal Republic of Germany.(26) On the other hand, and since the socialist countries of Asia are not active fertilizer exporters, most

fertilizer exports in the developing world came from a small number of developing countries, mainly those with oil and gas resources.[27] In fact, about 40% of the total fertilizer exports of the developing countries came from the Arab area in 1979/80 (Table 8.7).

Market possibilities in the Arab countries

During the year 1974/75, the Iraqi government announced its new plan for constructing a large nitrogenous fertilizer complex, and stated that after "meeting the requirements of the country, the surplus will be exported, particularly to the Arab countries".[28] The complex, as mentioned earlier, was to have an annual capacity of over two million tons of ammonia and urea.

Now, it is one thing to make such a statement, but it is quite another thing to put it into practice. In other words, it may be possible for "rich" Iraq to finance such a capital intensive scheme, but the marketing of such products is another matter. It has been seen already that during 1974/75-1979/80 Iraq had only consumed domestically about 2.1% of the above planned capacity. In fact, even if the country were to use nitrogenous fertilizer for the essential needs of its present cultivated agricultural lands, this would still leave a surplus of over 80% (1.661.333 tons) cf fertilizer for export. The question is: whether the Arab countries, that the Iraqi government

TABLE 8.6

Import of Nitrogenous Fertilizers by some Developing Countries in 1964/65 - 1979/80
(in m.t.)

Country	1964/65	1969/70	1974/75	1979/80
Brazil	43,565	157,970	238,900	497,000
India	213,721	574,428	884,751	1,295,300
Indonesia	15,180	107,600	581000	14,356
China	472,000	1461000	844,800	1,473,400
Cuba	76,000	199,000	120,000	149,000
Mexico	103,700	37,169	252,820	185,036
Iran	14,395	28,000	117,699	157,500
Pakistan	3,204	287,900	106,895	373,400
Turkey	10,230	205,993	179,600	448,600
Philippines	27,000	47,978	239,440	217,100
Peru	27,300	39,930	108,465	24,847
Guatemala	9,050	19,396	36,900	56,200
Nicaragua	10,000	17,000	317,000	17,800
Egypt	120,337	158,000	263,500	208,000
Total (1)				5,117,539
All developing countries (2)				6,831,207
1 : 2 (%)				75%

Source: FAO, Annual Fertilizer Review 1975
FAO, Fertilizer Yearbook 1980

TABLE 8.7

Export of Nitrogenous Fertilizers by Developing Countries in 1964/65 - 1979/80
(in m.t.)

Country	1964/65	1967/70	1974/75	1979/80
Saudi Arabia	64,900	n.a.	80,000	133,900
Chile	144,513	85,230	79,300	71,491
Venezuela	7,000	2,175	5,000	74,800
Kuwait	-	77,911	273,900	290,600
Korea Rep.	-	44,679	n.a.	279,153
Qatar	-	-	40,000	181,700
Indonesia	-	-	-	137,678
Total (1)				1,169,322
All developing countries (2)				1,547,592
1 : 2 (%)				75.6%

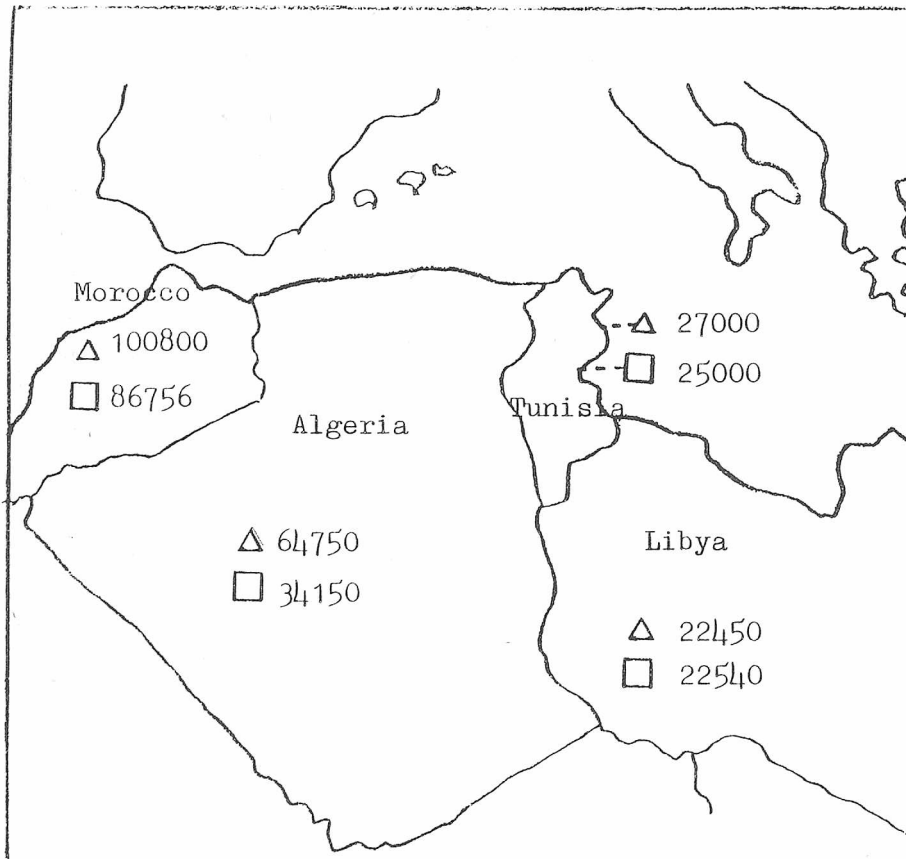
The symbol "-" indicates nil or negligible.

Source: FAO, Annual Fertilizer Reveiw 1975.
FAO, Fertilizer Year books 1978 and 1980.

has in mind will be able to absorb this surplus in the near future, or even in the long-term.

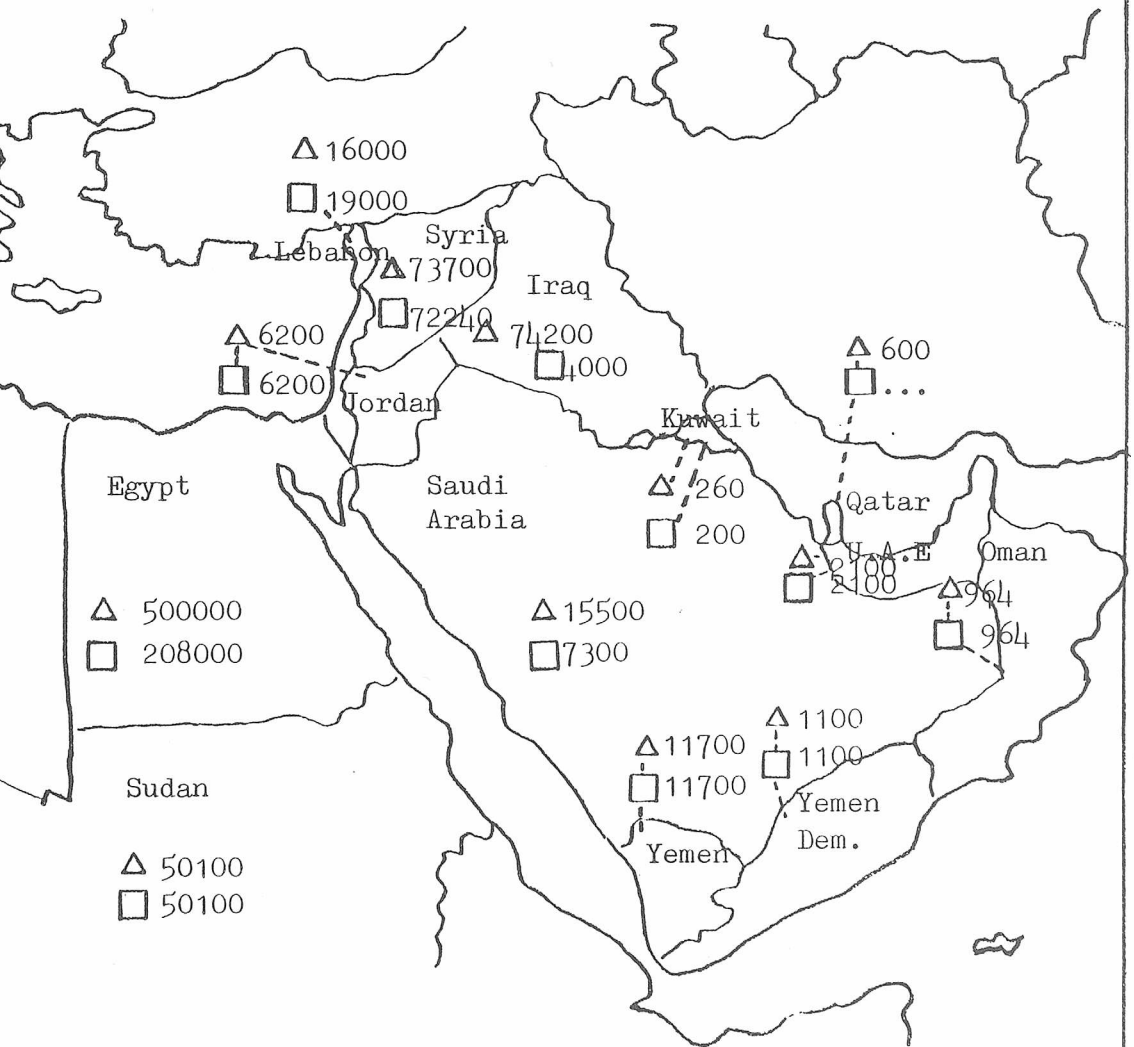
Even though total imports of nitrogenous fertilizer by the Arab countries (excluding Iraq) have more than doubled between 1964/65 and 1979/80, this still contributed only 7% (447,360 tons) of total imports among the developing countries (including China). The main Arab countries which import heavily are Egypt, Syria, Morocco and Sudan. They contributed 93.2% of total Arab imports of nitrogenous fertilizers in 1979/80 (see map). These same countries are probably the main target for Iraqi exports, since they have considerable agricultural potential and they have no adequate raw materials to sustain a sufficient production of nitrogenous fertilizers for their needs. There are of course other Arab countries (Yemen, Yemen Dem., Oman, and Sudan) which desperately lack both raw materials and funds to establish a domestic fertilizer industry, and are likely to continue importing increasing amounts of nitrogenous fertilizers. However, apart from the Sudan, these countries, at the present time, have a very low level of demand for fertilizers.

But the main challenge to Iraq in developing such an export policy may came from other Arab oil countries, namely Saudi Arabia, Kuwait and Qatar, which probably have passed Iraq in such industrial development and have already started exporting large amounts of nitrogenous fertilizer



CONSUMPTION & IMPORTS OF NITROGENOUS FERTILIZERS IN THE ARAB COUNTRIES .

1979/80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□ IMPORTS
(Unit = one ton)

to various countries in the world. Saudi Arabia for example signed a contract with the biggest market in the area (Egypt) to supply 100.000 tons of fertilizer in 1978. Moreover, what makes it more difficult for Iraq is that these oil countries are basically non-agricultural, and unlikely to develop their own large domestic markets in the near future. This is mainly due to their small areas (excluding Saudi Arabia), the unsuitable climate conditions for agriculture, their small populations, lack of water and fertilised lands. Therefore, they will continue to export almost all their fertilizer production, and will be looking for markets in Arab and neighbouring countries.

Another problem may arise from the regulations of "the Arab Common Market" which could partly influence both Iraq's choice of size of fertilizer production and of the countries to which it will be exported. But such influence will depend on how much Iraq and other Arab countries stick to these regotiations. It also depends on the flexibility of the fertilizer supplies of member countries, together with their political conditions which have always influenced the common market negotiations and, have in turn, affected trade operations between the Arab countries.(29)

It was mentioned in the previous chapter that probably the main factor which will effect export markets is price. Iraq with its cheap raw materials may be able to attain a low production cost for nitrogenous fertilizer. But, what

about other oil exporting countries, particularly those in the area (Saudi Arabia, Kuwait and Qatar) which may be able to attain similar, or perhaps lower, production cots than those of Iraq? Some Arab and Middle Eastern writers have warned that competition between these countries could cause great damage to the petrochemical industry in the area.(30) But, again, such "deadly" competition could only happen if similar products are produced by these countries. In other words, if Iraq was to produce nitrogenous fertilizers and Saudi Arabia to produce plastics, such competition would not arise. This argument, however, would logically lead to an examination of the theory of industrial "integration", which is beyond the aim of this thesis. I raise the significance of the above point (price) merely to establish the fact that Iraq should be aware of the dangers; it must study very carefully its future industrial capacity and should not plan its own fertilizer complex without paying attention to the plants (especially capacities) and existing market of other countries in the area, even if its own production costs may seem attractively low.

Other options

Iraq, in addition to the Arab countries, may have to look for markets in one or both of the following groups of countries:

(1) The developed countries.

(2) Other developing countries.

It has been shown that more than three-quarters of the world's total exports of nitrogenous fertilizers are contributed by a small number of developed countries, of which half of this amount goes to developing countries. These exports are channelled through highly organized export associations which are protected by substantial tariff barriers against any other groups or countries which may attempt to export to these developed countries.(31) In fact the protection provided by the structure of tariffs in the developed countries has discouraged many developing countries from processing their basic petrochemicals into more advance products for export.

The other issue which Iraq must bear in mind if it is to look for access in the developed world markets is the degree of "concentration" in these countries.(32) If the market is essentially served by very few suppliers in the developed countries, it is possible that the major companies would jointly determine the allocation of supplies in the market. Such arrangement may be more effective in the case where some of these companies are at the same time multi-national oil as well as fertilizer producers. Even if Iraq managed to gain a part in the markets of these countries, in such circumstances it would be very difficult to export in large quantities unless its productive capacity is taken into account by the multi-national corporations' market policy. Some developing countries have only managed to take part in the

developed markets via long-term arrangements with these multi-national corporations. In the previous section it was shown that the three Arab oil exporting countries, Kuwait, Qatar and Saudi Arabia, have already signed long-term joint venture agreements with large multi-national oil companies thus helping them exporting large quantities of urea and ammonia. Iraq, in its turn, may be able to act in the same way. In doing so it may be able to find markets in developing non-Arabic countries, particularly those with large agricultural potential, e.g. Brazil, China, India, Pakistan and Turkey. In fact, in this case, Iraq may not need to worry about the competition likely to arise from other countries since multi-national companies can assure the export of its fertilizers in their own right.

It has been argued that a developing country which signed a joint venture agreement with an international company may have to pay a high price in terms of industrial development. In other words relevant joint ventures are usually "directed towards the replacement of traditional products manufactured from alternative or natural origin resources, which are usually less competitive in developed regions".(34) Joint ventures usually stipulate a range of conditions related to markets, product mix and specifications which must be followed by the parties concerned. These conditions may not just hamper the development of the industry in developing countries, but

may influence these countries future general economic development. "The most damaging tactic to the developing countries in conjunction with joint ventures would be the delays in implementation of new productive capacities."[35]

Iraq however may still have some factors in its favour which could help in its planning for future export capacity. The first factor is the availability of oil and gas resources, coupled with the world energy crisis in the last years of the seventies. The oil crisis affected world trade in ammonia during this period. In 1973 the United States exported three times as much ammonia as it imported; while in 1979/80 it imported three times more ammonia than it exports.[36] At the beginning of 1980, Canada, Mexico and Trinidad increased their exports of ammonia to the United States to a level of 1,090,000 tons.[37] As a result of this changing pattern of trade, about 28 ammonia plants in the United States have closed down since 1976.[38] In western Europe (EEC countries), the case was similar and many companies since 1979 have been conducting an intense rationalization programme which has reduced ammonia production capacity by some 750.000 t/y in the area.[39]

Another factor which may improve the possibility of Iraq's access to international markets is the steady increase in world demand for nitrogenous fertilizers particularly from developing countries. For example, according to Ewell, India should be using at least 10

million tons of fertilizers;[40] yet in 1979/80 it only consumed about half of that, of which 70% (3.5 million) was nitrogenous fertilizer. In 1969/70 the same country consumed a total of 1.989.603 tons of fertilizer, of which 68% (1.360.320 tons) was nitrogenous. India, to sustain its needs for nitrogenous fertilizers, had to more than double its imports from 574,428 tons in 1969/70 to 1,295,300 tons in 1979/80 (Table 8.6). Other examples of increasing imports of nitrogenous fertilizers by developing countries can also be seen in Table 8.6. If India has to double its imports, some other countries such as Brazil, China, Turkey and Pakistan have to increase their imports by more than ten times in a ten year period. What this indicates is that the demand for nitrogenous fertilizers has been growing very rapidly in these countries. Moreover, the problems of food and population increases in the world in general and in many developing countries in particular, surely indicate the need for increases in agricultural inputs, especially fertilizers.

8.5 Conclusions

The analysis has shown that Iraq has not been using even the minimum of recommended amount of nitrogenous fertilizer on the land. During the seventies, it required about 400,000 tonnes of nitrogenous fertilizer just to

sustain its essential needs for agricultural land actually under cultivation, which was only 15 percent of the total land available for agriculture. This indicates potentially a rapid increase in domestic demand for fertilizers which may reach, under certain conditions, up to one million tonnes per annum.

A survey of farmers' attitudes towards nitrogenous fertilizer has shown that, unless serious attempts are made by government to ensure delivery systems, domestic demand for this product will continue to be very limited. Apart from the shortages of direct, and the difficulties in obtaining indirect (credits) subsidies, a major part of the problem appeared to be the farmers' lack of understanding and experience concerning nitrogenous fertilizer. This chapter therefore suggested that more effort and attention in terms of subsidies and education and appropriate supervision is required if a rapid increase in demand is to be achieved.

Iraq, on the other hand, still have an opportunity to export fertilizers. There are, indeed, some problems (local and external) that may effect such a policy at the present time, but in the near future they may lessen. In other words, Iraq with its advantages of funds and cheap raw materials should be able to sustain a place in the world expanding export market for fertilizers.

CHAPTER 8

NOTES

1) Issan J M Jawad Al-Tahan, "Some Factors Affecting Agricultural Production and Productivity in Iraq including Seclected Climate Variables and Crops". A thesis submitted to the Social Science Faculty, University of Durham for the degree of Doctor of Philosophy, June 1982, p.289.

2) Ibid, p.284.

3) G W Cooke, "Fertilizers and Profitable Farming", Crosby Lockwood and Son Ltd, London 1960, p.33.

4) Ibid.

5) P Buringh, "Soils and Soil Conditions in Iraq", Ministry of Agriculture, Baghdad - Iraq, 1960, P.254.

6) Ibid.

7) Ibid.

8) Ibid.

9) Ibid.

For more details on Losses of Nutrients from Soil, see G W Cooke, "Fertilizing for Maximum Yield", Crosby Lockwood and Son Ltd, London, 1972, pp. 10 - 12.

10) Ibid.

11) See, "Fertilizer Recommendations", Ministry of Agriculture, Fisheries and Food, Her Majestry's Stationery Office, London 1979, pp. 11 - 12.

12) "Soil Nitrogen Index", Ministry f Agriculture, Fisheries and Food, Leaflet 603, Published 1982 (see Appendix D).

13) Average in kg/h = $\frac{18,820,833.33}{2,202,329} = 8.5$

14) Fertilizer Recommendations, 1979, p.45. Also, it is recommended for Notherlands that 200 - 300 kg/h of N Should be applied for high-yielding apple trees in full production (see Fertilizing for Maximum Yield, 1972, pp. 251 - 52).

15) This figure was mentioned by one farmer with a large fruit farm.

16) Development Centre Studies, "Supply and Demand Prospects for Fertilisers in Developing Countries", Development Centre of The Organization for Economic Co-operation and Development, Paris 1968, p.60.

17) The following table indicates that Iraq's price of N, paid by farmers, was one of the lowest in developing countries in 1974/75.

Price paid by Farmers for N (ammonium sulphate)

Country	Price ($ per metric ton)
Iraq	217
Egypt	330
Syria	643
Rwanda	872
Peru	713
Ecuador	667
India	535
Iran	362
Jordan	920
Kuwait	494
Zambia	444
Uruguay	1556

Source: FAO Fertilizer Yearbook 1978, Table XVIII, pp. 81 - 83.

18) "Supply and Demand Prospects for Fertilizers in Developing Countries", 1968, pp. 66 - 67.

19) "Some Factors Affecting Agricultural Production and Productivity in Iraq incuding Selected Climate Variable and Crops", 1982, p.288.

20) Central Bank of Iraq Bulletin, No III, July - September 1977, Statistics and Research Department, Central Bank of Iraq, Baghdad - Iraq, p.36.

21) Personal investigation.

22) Ibid.

23) "Supply and Demand Prospects for Fertilizers in Developing Countries", 1968, p.88.

24) Examples were given for Pakistan, Taiwan, Japan and Ceylon, in the above source, p.67.

25) Examples are shown in Table 8.7 in the case of Venezuela, Korea Rep. and Chile.

26) These five countries contributed 50.6% of total world export of N in 1979/80 (see FAO Fertilizer Yearbook 1980).

27) Saudi Arabia, Venezulela, Kuwait and Qatar together contributed 44% of total N exported by developing countries in 1979/80.

28) The Economy of Iraq, Ministry of Information, 1977, p.83.

29) For example, most of the Arab countries cut their diplomatic and commerical relations with Egypt after the visit of Sadat to Israel in 1978. Other examples were seen in the case of Iraq and Syria after the Iraq - Iran war, and in the case of Libya and Saudi Arabi during 1980-83.

30) See, Elias T Ghantus", Arab Industrial Intergration, A Strategy for Development", Croom Helm, London and Canberra, 1982, pp 174 - 194.

31) These associations also play a major role in setting the price and other conditions for internatinal fertilizer transactions. "It should be noted that price fixing and other monopoly practices inherent in the export operation of these associations are generally tolerated and even promoted by governments of the developed market - economy countries although such practices are usually prohibited in relation to domestic transactions".

Examples of these export associations can be seen in the case of the following:

"NITREX, founded by the major nitrogenous fertilizer producers and producer groups from the Federal Republic of Germany, France, the Netherlands, Belgium, Italy, Switzerland, Austria and Norway, has an average yearly turnover of more than one million tons of nutrients valued at between $US 350 and 400 million. Its function is to "co-ordinate its members" export sales of straight nitrogenous fertilizers and to sell on their behalf to a selected number of markets where purchasing is effected by the government or a centralized purchasing organization", Excluded from NITREX activities are sales to EEC member countries, the United States, Puerto Rico and Canada. KIMPLEX, which has members in common with NITREX except for two French manufacturers that are affiliate members, deals with complex/compound fertilizers of the NP/NPK type.

In the United States, SULEXCO, PHOSROCK and PHOSCHEM handle respectively one half of the total United States sulphur exports, two thirds of the phosphate rock exports and two thirds of the phosphate fertilizer exports. In Japan, all nitrogenous fertilizer producers are organized to channel their exports through JUASECO".

See, "Fertilizer Supplies for Developing Countries: Issues in the Transfer and Development of Technology", United Nations Conference on Trade and Development, UNCTAD/TT/45, United Nation, 1981, pp. 19 - 20.

32) United Nations Industrial Development Organization, "Second World Wide Study on the Petrochemical Industry: Process of Restructuring", Second Consultation Meeting on the Petrochemical Industry, Istanbul, Turkey, 22 - 26 June 1981, prepared by the Secretariat of UNIDO 1981, pp. 199 - 200.

33) Saudi Arabia, for example, signed two major contracts in 1978 with India and Pakistan to supply them with 30,000 and 100,000 ton of Urea, respectively (see "Middle East Industrialization", 1979, p.163).

34) Second World Wide Study on the Petrochemical Industry, 1981, p.201.

35) Ibid.

36) Ibid, p.174.

37) Ibid.

38) Ibid.

39) Ibid.

40) "Fertilizers in Short Supply", in The Petroleum Economist, April 1974, p.145.

CHAPTER 9

RAW MATERIALS

This chapter will examine the role raw materials (oil and gas) play in the development of the fertilizer industry in Iraq. It will analyse present and future supply and demand for these raw materials and finally examine the influence these materials have on strategic planning for this industry.

9.1 Oil and Gas as Raw Materials

The importance of raw material for the fertilizer industry varies substantially. In some cases, raw materials represent over 50% of the industry's production costs. This percentage, however, may differ from one location to another depending on raw material prices and the price of labour, capital, utilities, etc. It may, for example, fall to less than 10% of total costs in some oil countries and rise to 80% of costs in some non-oil developed countries.[1] The cost of raw material directly affects the operating cost of fertilizer production and consequently the final price.

In the previous chapters, it was seen that the petrochemical industry (including ammonia) in the developed world had enjoyed high rates of growth and profitability before the oil crisis in 1973/74. This was due to both the

very low prices of raw materials and the stability of supplies. During the seventies, the industry experienced various disturbances, represented mainly by the rapid increases in oil prices and difficulties in supply. These factors discouraged many countries (or companies) from investing heavily in petrochemicals. In fact, many of the smaller companies have left the petrochemical market. This has led to the dominance by the large multinational oil companies which have a stronger financial and political position.[2] The crisis in oil prices, on the other hand, has encouraged some oil countries to enter this industry, since they have both the funds and control over the supplies of raw materials. At a world level a promising factor was the increasing demand for petrochemical products created by the shortage of supplies in some developed countries. In the second half of the seventies the picture of the petrochemical industry slightly changed. Whereas before the increase in oil prices, the main bargaining factor had been technology, which was controlled by the petrochemical companies, the critical factor suddenly changed to that of raw materials which were controlled by the oil exporting countries. This factor pushed many multinationals to sign long-term contracts and joint venture agreements with the oil countries in order to secure both their supply of raw materials (mainly gas) and their future share of international markets, as well as to avoid competition from these countries[3] Accordingly, the price of natural gas also went up rapidly, hence increasing the production costs of petrochemicals in general and ammonia in particular.[4]

The oil countries suddenly realised that, apart from oil, they had another valuable source of raw material which could be heavily used in petrochemical production without affecting their levels of crude oil exports. Some oil countries, such as Algeria, also started studying the possibilities of exporting associated gas in addition to crude oil, since the latest increases in gas prices could now justify its high transport cost.

On the other hand, developed countries started seeking alternative sources of raw materials for their industries. But even though these sources already existed e.g. synthesized liquid fuel from coal, shale and bituminous sand, they may still not "in all likelihood, be significant because of the heavy capital investments required and the need to solve a number of difficult scientific and technical problems".[5] In addition, it is obvious that even when alternative raw materials and energy resources are being developed, this may not lead to cheaper oil and gas since the development of such alternatives will require very high amounts of the existing energy sources, mainly oil and gas. This may lead, apart from high expenditure, to a higher demand for petroleum, thus increasing its price. For this reason, some developed countries, in order to save oil and gas for energy uses, have laid emphasis on coal as their feedstock for different types of chemical, especially ammonia, production.

In the Federal Republic of Germany, this alternative source (coal) has increased the production cost of ammonia by 20% in comparison to oil and gas based techniques. Accordingly, it may be assumed that, despite shortages and high prices, oil and gas will remain, at least through the decade ahead, the chemical industry's basic source of hydrocarbon raw material. In turn, changes in the raw material and fuel components in chemical production costs may be determined by the movement of oil and gas prices, and, for the most part, these mirror the changes in the price of oil and gas. In these circumstances, in developed countries, one may not expect that the production costs of petrochemicals will drop. This, in turn, will be reflected in end-product prices for at least the next decade. Oil exporting countries, therefore, may find themselves in a more favourable competitive situation then that of developed countries in the near future, since they possess the supply of these raw materials at stable low prices. In fact, in an industry such as petrochemicals, the security of stable raw material supplies may sometimes become more important than that of prices. Due to the time cost factor, a highly capital intensive industry cannot afford to stop operations several times a year to seek feedstock.

In conclusion, two reasons suggest that the main sources for feedstock and energy for the petrochemical industries in the next decade will be oil and gas.

Economic decision making has to take into account the high risks involved in high-cost investment in alternative feedstock and energy sources at this stage; The time required to set up the huge capital investment needed to create significant alternative sources makes it unlikely that a large section of existing industry would shift to non-petroleum based resources within a relatively short period of one decade.

9.2 Different choices

The choice of raw material used in the fertilizer industry depends on the cost of raw material and its availability. A country which uses naphtha as feedstock in its ammonia production probably has no cheaper alternative source like gas. Its industry therefore has already been built as naphtha-based.[6] Several examples can be seen in Eastern-European countries where the industry has existed in this form as far back as the fifties. But a country with greater reserves of natural gas (associated, and/or non-associated) than oil may utilize gas for feedstock rather than oil. This is mainly because the cost of gas is usually lower than that of oil and the opportunity cost of crude oil when exported is much higher than that of gas particularly in the case of flared gas. In Iraq, for example, because more than 85% of its associated gas is flared, the opportunity cost of this gas may fall to as low as zero. Accordingly, Iraq, as far as the cost factor is concerned, will surely be in the position to use gas as a

feedstock for ammonia production rather than oil. Apart from the advantages in terms of revenue the country would attain from exporting crude oil, it can still derive great benefits through the utilization of wasted gas. Unlike non-associated gas, Iraq's gas (associated only with oil production) cannot be left in the ground for future generations, and consequently it is usually flared. In fact, the country does not even re-inject this gas to enhance oil production. Thus apart from about 14% of total gas which is utilized for domestic energy purposes (maily in power stations) none of the rest is saved. To understand Iraq's existing losses from its flared gas, a simple method which calculates gas equivalent to crude oil and ammonia is used in table 9.1.

Between 1969-79, Iraq's losses of gas in oil equivalent were estimated at an average of about 6.8% of its daily production of crude oil. While oil production increased from 1.5 million b/d in 1969 to 3.5 million b/d in 1979, flared gas automatically increased from 14.8 million m^3/d to 33.4 million m^3/d in the same years. These quantities of gas are estimated to have been adequate to produce about 15.000 and 33.000 tons of ammonia, respectively.

The main problem involved in developing a gas-based industry in Iraq, however, may arise from crude oil production itself. Because the supply of gas is associated with oil production, the country would have to sustain a

TABLE 9.1

Estimated flared gas losses in Iraq 1969-79

Year	(1) Gas flared m. cu.m/d	(2) Oil equivalent 1000 b/d	% of Oil output	(3) Ammonia equivalent 1000 t/d
1969	14.8	97.0	6.4	14.8
1971	19.4	127.2	7.5	19.4
1973	20.6	135.1	6.7	20.6
1975	24.1	158.0	7.0	24.1
1977	24.4	160.0	6.8	24.4
1979	33.4	219.0	6.3	33.4

(1) Derived from Appendix E, Table 3.

(2) Calculated as one barrel of crude oil equivalent to 152.5 m^3 of natural gas. (See table 4 of UNIDO/PC., 11-20 July 1981, P.24.)

(3) Calculated as 1000 m^3 of gas is adequate to produce one ton of ammonia when used as feedstock and energy. See p.35 of UNCTAD/TT/45; Fertilizer Supplies for Developing Countries: Issues in the Transfer and Development of Technology, 1981.

level of crude oil production that ensures an adequate level of gas supplies for both a fertilizer industry and for increasing gas demand for domestic energy purposes. This assumes that the demand for crude oil is high in the short-term; but what happens if this level of demand declines? The answer leads to another question; will the country manage to sustain adequate supplies of gas to satisfy both the industry and other domestic needs? If the answer is yes, at what level of oil production will the above requirements be met? The significance of this factor can clearly be seen in the case of Kuwait. It was estimated that the Kuwait ammonia industry, due to feedstock shortages, has been operating at 50% of its total capacity since 1980, and will continue to do so until 1986[7]. Since until then, the industry will require all associated gas produced in the country, any further attempts at higher production will require a higher level of crude oil output. But higher level of oil production is not in the Kuwait plans, at least at the present time. Therefore, the Kuwaitis have already planned to import gas from Saudi Arabia in 1984.[8] This will mean higher feedstock costs which in turn will lead to higher production costs.

To avoid such a possibility in the future, Iraq must plan very carefully and should not jump to conclusions because of its present losses from gas. As mentioned earlier in Chapter 7, the country has another source of raw material, namely oil. Even though, as can be seem from the

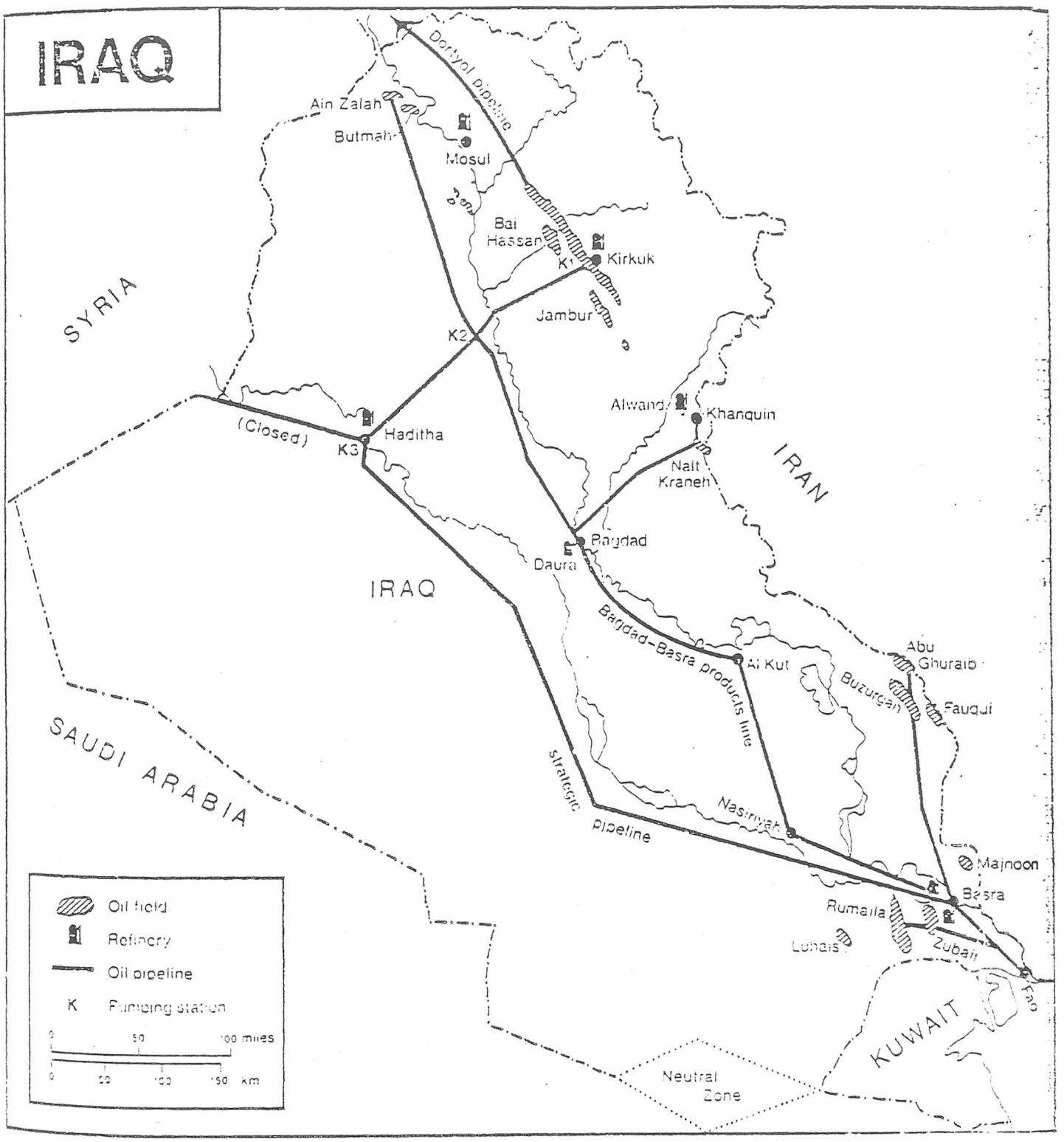
arguments already presented, the cost of naphtha is higher than that of gas, it may still be empirically possible to use it as feedstock in fertilizer production if supplies of adequate gas are not acquired. In addition, a country can still use both gas and oil for petrochemical production. It may even plan its industry to consume naphtha in case of gas shortages. This can be useful where great supplies of crude oil are available and need to be absorbed.

On the other hand, one may argue that gas utilization in oil countries is practical in a case when the cost of this utilization is lower than the losses resulting from flaring the gas itself. Associated gas can be indeed utilized in different ways; it can be reinjected to produce oil; it can also be used as an energy source for daily use especially in power stations, and of course it can be used as feedstock in the production of nitrogenous fertilizers. The difference here may arise from the quantities required for each possible use. Because Iraq has only utilized about 15% of its total gas production for energy purposes, it may have to compare the cost of using the rest (85%) with its losses resulting from flaring the gas. This comparison is usually made for long-term operations due to the high costs of constructing such an industry. However, such a comparison may not be satisfactory. In such an undertaking a total cost - benefit of the industry is surely a minimal requirement.

9.3 Raw materials and industrial location

When the Iraqi government planned to construct a large ammonia and urea complex at Basra, it stated that "after meeting the requirements of the country, the surplus will be exported".(9) Priority, it seems, was given to the domestic market. It goes beyond the scope of this chapter to examine what this statement meant in practice. However, it can be asked: Why was this plant located in the south when the majority of the domestic market is in the central and northern areas of the country? The government, it appears, chose Basra for this industry because of the availability of raw materials (oil and gas) and the availability of infrastructure requirements, mainly the large refining capacity of 140,000 b/d in the area.

These reasons can be challenged on the ground that oil and gas resources are available not only at Basra, but also in several other areas of the country, for example, at Kirkuk and Mosul in the north, Khanaquin in the east, and Al-Quaim in the west (see map). Although the latter areas are characterized by low oil and, therefore, low associated gas production, small sized fertilizer industries could still be provided for from these levels of production and thus could be constructed in these areas. The other reason (refining capacity), is not relevent since the ammonia complex dependes on gas rather than oil (naphtha) for its feedstock. In other words, an oil refinery is not needed for a gas-based industry unless the feedstock used is derived from the gases resulting from refining operations.


IRAQ
Dortyol pipeline
Ain Zalah
Butmah
Mosul
Bai Hassan
K1
Kirkuk
Jambur
SYRIA
K2
Alwand
Khanquin
(Closed)
K3
Haditha
Nait Kraneh
IRAN
Baqdad
Daura
IRAQ
Baqdad-Basra products line
Ai Kut
Abu Ghuraib
Buzurgan
Fauqui
SAUDI ARABIA
Strategic pipeline
Nasiriyah
Majnoon
Basra
Rumaila
Zubair
Luhais
Fao
KUWAIT
Neutral Zone
Oil field
Refinery
Oil pipeline
K Pumping station
0 50 100 miles
0 50 100 150 km

Such industries exist mainly in the United States and Europe where refining capacities are very high, and thus high levels of gas production are attained. In Iraq where millions of cubic metres of associated gas are flared every day, dependence on small refineries' gases for feedstock for large scale industry does not seem either logical or practical.

However, as Robinson pointed out:

> Production is likely to be at the place of consumption where the final product is more expensive to carry ... but ... it is likely to be at the source of material if the material is more expensive to carry then the finished product.(10)

Accordingly, the location of Basra may be justified only if the raw material (oil or gas) is more costly to transport than the finished product (fertilizer). But this may not be true since oil and gas in Iraq are already transported through existing pipelines. This therefore, indicates that fertilizer transportation which is carried out mainly by roads may be more costly than that of the raw materials, particularly in the long-term.

As far as the domestic market is concerned, it can be suggested that if the cost of raw materials is lower than that of the fertilizers, the industry then can be located anywhere as long as it is close to the domestic market in Iraq. Construction of a larger fertilizer capacity in Kirkuk, for example, would benefit from the availability of raw materials in the area, and would also be close to the

northern and north-east domestic markets and to those of the central region. This is because the distance between Kirkuk and the central areas is shorter (about 350 kilometres) than that between Basra and these areas (654 kilometres), This, at least, would reduce transport costs of fertilizer to the central areas. The Kirkuk zone also seems more convenient for nitrogenous fertilizer production than Basra because in this area (Kirkuk) there is a larger reserve of gypsum of hydrous calcium sulphate which is usually used in the processing operation of nitrogenous fertilizer. This material has formed the basis for an existing large production plant of sulphur. Significantly this product was to be transported to the complex at Basra in order to assist in the production of fertilizers there as neither the material nor the industry are available at Basra.

On the other hand, in suggesting the Kirkuk zone for a large fertilizer plant, it may still be argued whether, in the long-term, the raw materials available will be adequate to satisfy such an industry. At the present time, with about one million b/d of oil and over 90,000 million cubic feet of associated gas production, the Kirkuk oil fields will surely satisfy the envisaged capacity of a fertilizer industry. As far as gas for raw material is concerned, the problem which may arise in the future will mainly be connected with other domestic demands for the gas from these oil fields. This is mainly due, apart from the existence of a large sulphur gas-based plant in that area, to the fact that almost all gas requirements for power

stations, industries, and other daily needs in the Kirkuk and the central areas are supplied by these fields. Since the potential demand of these uses is expected to be much higher than at present, supplies from this source may be influenced in the future, thus in turn affecting the viability of a fertilizer industry in the Kirkuk area.

The central areas (mainly Baghdad or nearby), on the other hand, may also prove suitable for the location of a large fertilizer plant. Again, the availability of a larger domestic market and comparative proximity to both northern and southern markets, coupled with the existence of infrastructure facilities (refineries, roads, power stations, water, and other types of services, etc.) would probably justify this location. The only counter argument is the non-availability of raw material sources in the area. However, Baghdad is already connected to the Kirkuk and Khanaquin oil fields by large oil pipelines. Baghdad also enjoys the second largest refining capacity (Al-Doura) of 80,000 b/d in the country. As far as gas is concerned, there are two pipelines between Kirkuk and Baghdad; the first one of 16 inches is used for associated gas transportation, while the second one of only 8 inches is used to transport LPG. These two pipeline capacities run at 2-6 million m^3 (44 million F^3) per day and 8,500 b/d respectively. But these pipelines are only just enough to satisfy the central area with gas supplies. Therefore, another pipeline/s would have to be constructed. Moreover,

as mentioned earlier, due to possible future growth in demand for the Kirkuk gas, a large plant in Baghdad may in the long term require additional supplies of gas that are available in large quantities at Basra. Thus a pipeline/s from Basra to transport this source to Baghdad would be vital if fertilizer production was to be located in the area.

In addition, it is suggested that Iraq might be capable of constructing more than one plant in different locations. The country, for example, could develop two medium sized (say, 500-1000 t/d) fertilizer plants; the first one could be located near Baghdad and the second one at Kirkuk or Mosul. In this case, both raw materials and infrastructure facilities would be adequate. Moreover, no extra expansion in refining and pipeline capacities in these areas would required. Such a scheme would help by reducing raw materials and end product transportation costs. It might still be argued that by concentrating on two medium sized plants rather than on a large one, the country would lose the advantage of economies of scale which results from large capacity. But due to Iraq's comparative advantage in terms of the cost of raw materials, the effects of large capacity operations on production cost per unit may not be as high as those in developed countries (See Chapter 11). The influence of large scale capacity on production costs, however, will be examined in more detail in Chapter 11.

9.4 Conclusions

Oil and gas as raw material have played a significant role in the development of chemical fertilizers in the world during the last twenty years. Due to the rapid increases in the prices of these raw materials, especially oil, the costs of constructing and operating fertilizer industries have also risen sharply in the last ten years. This increase in raw material costs, coupled with the danger of disturbances and cuts in supplies, has made it more difficult for many small chemical companies to stay in business.

Oil exporting countries, on the other hand, have profited from both the increase in their oil revenues and the control over raw material supplies. These factors have encouraged these countries to utilize their petroleum resources, especially the associated gas which has been flared for tens of years. Iraq, for example, flared over 85% of its daily production of gas of 33.4 million of cubic metres. Between 1969 and 1979 this loss is estimated to be equivalent to 6.3% of Iraq's daily oil production, or 33,400 tonnes of ammonia.

Iraq with its almost negligable cost of gas can be seen as a favourable location within which to develop a fertilizer industry. The significant feature of this source of raw material is also seen in its availability in different locations in the country including those where the markets for nitrogenous fertilizers are available. Hence the country can save on raw material and end product transport costs. This indicates that the final product can be sold cheaply to consumers.

CHAPTER 9
NOTES

(1) UNIDO, "Second World Wide Study on the petrochemical industry: Process of Restructuring", United Nation ID/WG 336/3, 19 May 1981, P. 88.

(2) Examples of these powerful multinationals are seen in the case of Shell, Amoco, Texaco, BASF, PCUK in Europe, and MITI in Japan.

Due to factors mainly related to the increase of oil prices large oil companies are expected directly or through some chemical companies to be drawn more and more towards downstream and petrochemical operations. In fact some oil companies such as BP and EXXON have already taken over petrochemical assets of the chemical companies of Phone Polene, Union Carbide and USI in Western Europe (in 1980). A report by the Guardian newspaper (13/7/83) suggested that by 1985" more European plants must be closed and thousands more jobs will be extinguished".

It seems that this situation has also effected the oil companies themselves. The chairman of BP Chemicals and the Chemical Industries Association summarize this as follows,

> "Our industry (petrochemicals) has lurched from puberty to middle age without a decent period of robust growth in between", (The Guardian Ibid).

For more details, see The UNIDO (Ibid) pp. 270-77, The Guardian above, and A-Al-Wattari, "Oil downstream, opportunities, limitations, policies", Lecture delivered by the Assistant Secretary General of OAPEC at Oxford Energy Seminar, held at Oxford University, September 3-14, 1979, OAPEC Kuwair, 1980.

(3) Examples can be seen in the case of Shell and Mobil in Saudi Arabia (1979), BP in Kuwait, CFP (French company) in Abu Dhabi, and Mitsubishi in Iran. (See Middle East Industrialization, 1979, p. 56).

(4) The Price of Ammonia has increased from $50 in 1970 to $150 in 1974, and then to $200 per tonne in 1980 (see UNIDO, Ibid, p. 84).

(5) UNIDO, Ibid, p. 91.

(6) See "Thirteen in need of Plastic Surgery", in The Guardian, Wednesday, July 13 1983, p. 19.

(7) The Kuwaiti petrochemical industry was based on associated gas as raw material. It was already built to consume all the gas produced within the oil production of one million b/d. But this level of production dropped to 650,000 b/d in 1980-82 creating a gas shortage. In 1982, therefore, the petrochemical plant in Kuwait operated at only 50 per cent of its full capacity. PLC Chairman, Abdul Bakr al Noori, says in an interview with the Financial Times (23/2/1983):

> "We are still looking at the aromatics project (new plant to be constructed), but whether it will be done in Kuwait or outside is undecided. Between now and 1986 we will need all the gas we produce, but after 1986 this could change ..... we hope that we will be able to continue operating at 50 per cent capacity through 1983"

See, Kathleen Evans, "When small means big in the field of success", in the Financial Times, Wednesday, 23 February 1983.

(8) Ibid.

(9) "The Economy of Iraq: Development and prospectives 1958-1976-1980", Ministry of Information, Baghdad-Iraq, p. 83.

(10) E.A.G. Robertson, "The Structure of Competitive Industry", Cambridge University Press, 1960, pp. 128-29.

CHAPTER 10

SKILLED LABOUR

In the first part of this thesis, the shortage of skilled labour was seen as one of the main factors that limited the economic development of Iraq, particularly in the industrial sector. This chapter argues the necessity of skilled labour planning. It attempts to identify the problems of, and recommends some remedies related, to skills development in the country. The chapter will also examine the demand of the fertilizer industry for skilled labour.

10.1 Introduction

The size of the labour market in Iraq can be estimated depending on the size of the labour force (employment and unemployment) of the country. According to Chapter 1, the total labour force stood at 3,057,800 million in 1974; out of this only 260,400 were unemployed. Unfortunately there is no data on labour by sex, by type of skill and by labour turnover. Therefore it is very difficult to estimate the supply and demand factors of the market for different types of skills, e.g. skilled, semi-skilled and unskilled workers. It can be mentioned, however, that generally the share of women in the labour market has been increasing rapidly during the seventies. This is mainly due to

factors such as the compulsory education system which was put in to action in 1971/72, and also to the encouragement by the government of women to take part in the development process of the country.[1] This share was significant after the Iraqi-Iranian war which started in 1980; it is estimated that in some governmental department the percentage of female workers has exceeded 50% of the total.[2] Though no information is available, this percentage may be applicable in the rural areas during the same period. The age of people entering the labour market in the rural areas may be put at 10-12 years; this is compared to about 16-18 in the urban areas. In fact under the Civil Service law, no one under the age of 18 years can be employed by any department of the public sector.

Total employment in 1974 stood at 2,851,400 persons. Out of this 1,774,600 persons (63% of total) were engaged in the productive sectors, agriculture and industry. The rest, 1,076,800 persons, were engaged in mining (19,200) and services (1,057,600). The significant feature of Iraq's labour distribution is that only 6% of the total was contributed by manufacturing industries; this is compared to 52% in agriculture. Between 1960-75, the size of employment in the industrial sector increased by only 37% compared to that of 46% in services and 118% in agriculture. This indicated the small size of and the slow rate of growth in the industrial sector. Knowing that almost all the workers in the agricultural sector are

unskilled, this situation indicates the small size of the skilled labour pool and the very slow process of its enlargement in the productive sectors. The high rate of growth of the unskilled compared to that of the skilled has resulted in a substantial surplus of unskilled labour and an overall lack of skilled labour.

10.2 Analysis of Skilled Labour Shortage

The Small Size of the Industrial Sector

This factor has affected the situation of skilled labour in Iraq in two ways by limiting the demand for skilled labour and by preventing the country building a suitable base for training labour through on-the job methods.

Employment Policy

In order to absorb the increasing number of immigrants in the urban areas, the government, since the first half of the sixties, adopted a labour intensive policy. Great numbers of workers with an agricultural background therefore were employed in different industries and services, hence increasing the percentage of unskilled labour to total employment in the urban areas. Due to these hasty decisions and the desire of governments during 1960-80 to keep unemployment level as low as possible, workers were very badly distributed among industries and regions.[3] Accordingly, a large number of unskilled workers occupied skilled workers' positions. This

situation damaged the industrial sector by affecting its final output and labour productivity, created a great losses in terms of capital equipment and prevented many new skilled workers from entering this sector. This situation caused most of the new skilled workers to look for jobs in other sectors, mainly the expanding - unproductive - civil and military services.

Iraq has, always encouraged, and sometimes forced, a large number of highly skilled engineers, technicians, scientists and graduate students to work in military services. This situation was made worse during the seventies when the government deliberately passed laws giving military service great social and financial benefits in order to attract more qualified people.[4] As a result, a large number of skilled workers and graduate students permanently joined the army. In addition, in many cases, skilled workers were transferred from their key positions in different industries leaving their vacancies for unskilled workers. Though official data on military service is not available, one can argue that the military demand for skilled labour in Iraq has increased the scarcity of skilled labour in the country. At the same time, this sector has damaged the overall productivity of labour by turning large numbers of skilled workers into consumers rather than producers.

Finally, the political conditions of the country have had the most significant influence on employment policies affecting labour distribution and skilled labour creation. For example, for key positions, political beliefs were in many cases the basic condition required.(5) Subsequently, most key postions were given to unqualified personnel who had to prove their political acceptability rather than their productivity to stay in these high positions. This situation led to great damage in industrial relations, income distribution, capital equipment and skills development.

Education:

Education, at all levels, is the main base for skilled labour development. The larger the number of students in a country, the larger the potential of skilled labour. In Iraq the total number of students at the first and second levels (primary and secondary education) stood at 3,579,169 million in 1979; an increase of 2,946,789 million over that of 1970.(6) This shows a rate of growth significantly higher than that of total population. Students rose from 6.7% of total population in 1970 to about 25% in 1979. In addition, students at the third level (institutes and universities) also increased in number, but not as fast as those at the two levels above. Between 1970 and 1979, third level students rose from a number of 42,431 to 99,375, amounting to 0.7% of total population.(7) The sharp increase in the number of

students is mainly due to the introduction of compulsory education in 1971/72 and also to the fact that greater benefits in terms of financial and social advantages could be derived from higher levels of education.

The increase in the number of students obviously reflects an improvement in the potential for skilled labour. However, one should not always judge this by the number of students only. In the case of Iraq, which is seeking industrialization, one should not ignore the quality of students.

The main feature of education in Iraq is that it lacks independence. The few institutions and universities have always been dominated by different political parties. This has turned some of them into political rather than educational institutions. This situation has affected students (under and post-graduates), staff and administrators. In some cases (this is valid in all colleges) the political interest of the student has become a primary entry criterion and, in many cases, this affected graduation as well as chosen subjects of study. This phenomena has led to a lower level of teaching and, in turn, to a lower standard of graduating students.

Another feature of Iraq's educational system is that it lacks specialisation. For example, a student of business administration may, after four years, end with having studied thirty different subjects of which over half may not be related to his field of study. Such a general

system is probably useful in creating students with general backgrounds in administration, engineering, sociology, etc, but certainly not specialised administrators or engineers.

Supply of Foreign Labour

During 1973/74, the government decided to allow unlimited immigration into Iraq. This increased every year to reach about 3 million workers in 1981; of this number 2 million were from Egypt. This massive influx of foreign labour had no houses, no certainty of employment and was almost completely unskilled.

By 1980/81 this was a source of major economic and social problems, yet the country was still in desperate need of skilled labour. What is more, because of political reasons, a great number of these workers today are counted as Iraqis by nationality.(8) The failure of the government in attaining any economic advantages from such labour can be very clearly seen in Iraq's high rate of inflation, a decline in agriculture and industrial production, and in the social problems of housing shortages and differences in culture which appear in large cities such as Baghdad and Basra. Moreover, this unproductive group of labour became a large source of loss of foreign exchange; for example, two million Egyptian workers in Iraq have been transferring over $400 million per month from Iraq to Egypt over the last five years.(9) A developing country seeking industrialization like Iraq would surely have been much better off importing a small number of skilled labour than

a great number of unskilled workers. Iraq, after all, already had a surplus of local unskilled labour.

In conclusion, it seems that the government with its ill-conceived employment policy and political interference mainly in education, was, and still is, to be blamed for the continuing shortage of skilled labour. In order to absorb the large number of unemployed immigrants in the urban areas, the government adopted a labour intensive policy. What made the situation even worse was that the political factor (the political interest of the workers) was always a major condition for obtaining good and key position jobs. Thus a large number of qualified (skilled) people were left in unproductive jobs. In addition, the nature of education led to great quantities of non-unspecialized students with general knowledge compared to very few specialized and low standards of graduate students.

10.3 Developing Skilled Labour

Having identified the main reasons for skilled labour shortage in Iraq it is necessary to develop possible solutions.

Redistribution of Labour

It was shown earlier in this Chapter as well as in Chapter 5 that the inefficient distribution of labour by industry and by occupation has resulted in low productivity

of both worker and industry, great losses in term of capital equipment and a lack of new technology, particularly in the industrial sector. The redistribution of labour by type of skills - this implying the right man in the right job and vice versa - would help to increase general output, reduce losses from the misuse of capital equipment and create a more suitable ground for technology transformation.

The redistribution of labour, however, involves four main processes; training, change in management, change in the technique of production and change in methods of work.

Training

Shifting a worker from one job to another should always be coupled with training in order to prepare the worker for his new job. The kind of training depends on the skill of the worker and on the nature of the job. For example, the transformation of an engineer from the civil (or military) service to, say, the petroleum industry would require a certain training (off the job and on the job) which would help him understand the different nature and type of machinery used in the petroleum industry. If the engineer is already specialized in the petroleum industry but had to work in a different sector of the economy, he should be given "refresher" training to allow readjustment and familiarisation with present day techniques and practices.

Training of unskilled labour, on the other hand, may be more complicated because different problems are encountered. Due to reasons such as the need for work, the majority of unskilled workers during 1965-75 accepted any type of employment. Neither government nor workers attempted to match ability and skill to relevant work. An efficient redistribution of labour must always direct the right man to the right job. Accordingly, in order to identify the background of unskilled workers, a full survey of the ability, interest, past experience and background of workers is needed. The necessary type of training could then be determined and directed to the appropriate workers. A good survey may also discover those who were classified as unskilled in say the steel industry when they could be used as semi-skilled (or skilled, with the help of training) in other industries.

The majority of unskilled workers are illiterate. Since training requires a level of literacy in order to help the trainee follow instructions, high rates of illiteracy slow down the process of training and redistribution of labour. An illiterate worker may be a problem during training, but a danger in industrial operations since most of modern industry, require instructions to be understood and followed carefully. However, during the seventies, the government announced that literacy was to become compulsory for employment. This action has helped reduce the number of illiterate

workers in both urban and rural areas and offers hope for future training programmes.

Change in Management

Efficient management would be a great help in the process of labour redistribution by identifying workers for training, and by provide industry with the required skilled labour.

In Iraq, management is always influenced by political interference and change in government and this negatively affects industry and employment.(10) In order to bring change in management, two factors should be considered; the improvement of managerial personnel, specially those at the top, and the independence of management. The first involves appointing qualified and experienced personnel receving regular training, while the second factor involves freeing management from political interference. Only with these efforts can a better redistribution of labour be obtained.

Change in the Technique of Production

The inefficient distribution of labour and capital equipment, has damaged productivity and caused out-dated equipment to be retained. Since one of the main aims of labour redistribution is an increase in worker productivity, the improvement of production techniques is necessary. Furthermore, since training of labour should always be updated, capital equipments must also be modernised. By changing the technique of production, one

can expect a better base for skilled labour creation and then a better level of productivity from both worker and industry.

As shown in Chapter 5, the industrial sector lacks modern technology, mainly due to the absence of modern industry. The development of highly technical industries such as petroleum-based fertilizer would not only improve the degree of labour skill, but, through backward and forwards linkages, would faster the development of new techniques of production in many other industries.

Change in the Methods of Work

Workers are usually attracted by factors such as high wages, low work hours and better work conditions.(11) These factors cause the movement of labour between industries. In order to allow the redistribution of labour to take place with stability improvement in these conditions is vital. Unless this is achieved, most workers will either stay in their present jobs, or revert to their previous jobs after redistribution has taken place. In Iraq this movement is seen clearly between different industries. In Iraq there are two types of employment legislation, namely, the law of the civil services and the law for semi-official institutions. The second system is very attractive because a worker gets higher wages, higher annual pay increases, more benefits in transport and housing and better work conditions.(12) Thus, the workers under the first system are determined to

move to jobs under the second system. If Iraq was to create equality between forms of work, redistribution of labour may be successful.

Change in the Education System

The educational sector is the only local potential source of supply of skilled labour in Iraq. A more efficient educational system therefore would help create a better quality and a larger quantity of skills in the country.

As shown earlier, education in Iraq lacks both indpendence and specialisation. To improve this situation, it should be freed of political influence and interference which have badly affected the quality of both staff and students at all levels of education in the last two decades. To achieve independence in education, two main targets should be set.

Qualified managerial personnel should be appointed to all educational institutes (up to the ministerial level) with emphasis on universities and higher education units. Management including teaching staff should always have the final decision concerning their institute. In other words, the government should be prepared to listen to and help management rather than force laws on them through political interest, such as changing staff and managers.

Independence of both students and subjects of study from political and union interference must be attained. The government should not interfere in subjects of study

nor use students for political purposes such as demonstrations and propaganda conferences. The authority given to the student's union should be limited in order to lessen its influence on both the students and the staff of institutes.

Changing the education system to provide students with specialisation in certain subjects can be another way of developing skilled labour. However, such a change may be arguable because Iraq has no wide-modern industrial base. A large number of specialised students may be a waste of time and funds, since no demand for their skills may exist. On the other hand, students with general knowledge can be more flexible because they can be employed in different sectors of the economy. This argument, however, can still be criticised on the ground that the desire of developing countries is to break the chain of underdevelopment and skilled labour is a main element of this policy . Iraq, has been trying to enter the highly technical field of petrochemicals. Accordingly, as a first step, it would surely require an efficient quality and quantity of specialised skilled labour. To achieve this, the country should seriously concentrate on the improvement of education bearing in mind the time and the increasing cost required for developing this sector.

The Return of Emigrant Iraqi Skilled Workers

It is estimated that 49,815 Iraqis were working abroad in 1965; approximately half of them could be counted

skilled.[13] This number of foreign-based workers however contributed about 0.62% of total population and 3% of total employment in the same year. Due to the unavailibility of data I will assume that the same percentage was still valid in 1980. Accordingly, about 82,000 were working abroad in 1980. In fact this number may still seem very low due to the political conditions of the country during 1965-80 which increased the rate of emmigration.[14]

The encouragement of Iraqis to return and work at home is very important because, apart from increasing the skilled labour stock of the country, they can be more productive than foreign skilled labour due to their knowledge of the language and familiarity with Iraq's social and economic system. They would probably have more enthusiasm than foreign labour who only may be interested in the financial rewards. Iraqi skilled labour, in addition, would be much more useful in training programmes.

The government realised the advantages of attracting these Iraqis and passed the law no. 25 of 1973 which encouraged qualified Iraqis abroad to return and work in their own country. According to this law, every qualified Iraqi returning home could bring back a car and any amount of furniture completely free of tax, acquire a plot of land with an interest-free mortgage to build a house, and have allowable the years spent abroad in determining his salary. The law however limited the qualified people to only those with either a Master or a Ph.D degree and ignored a great

number of skilled Iraqis who only had first degrees. Though some of these qualified people actually went back to Iraq, most of them left again after a short period. Financial benefits are not always the most attractive factor when indpendence and freedom in work, are not available. Those who left the country again made it clear to other skilled Iraqis abroad that the country has still not reached a point of political and economic stability.

In addition to the Iraqis working abroad, it was estimated that over 30,000 Iraqi students are outside Iraq.[15] Over half of these students were postgraduates. Some of these students, for the above reasons, may never go back, home causing great damage to their country. Therefore, again, unless work conditions are improved the number of students who stay abroad may continue to increase.

Limiting the Supply of Foreign Labour

Foreign skilled labour is unavoidable because local labour lacks the knowledge to operate machines of new technology in new industries. Nevertheless, reliance on foreign labour can still create social and economic problems, related to housing and inflation. To avoid these problems and help derive maximum benefit from foreign labour, Iraq must bear in mind certain factors.

a) Efficient work conditions (housing, transport and other services) should be made available.

b) The supply of foreign labour should be limited in

terms of quality and quantity and this involves a full investigation of the number and type of foreign labour required in different industries. Also, since the country already suffers from a surplus of unskilled labour, only skilled workers should be imported.

c) Immigration of foreign labour into Iraq should be controlled by limiting the number and type of workers. In addition, the government should be very strict in giving visas and nationality to workers.

10.4 Skilled Labour and Fertilizer Industry

The fertilizer industry, like any other petrochemical industry, demands highly qualified personnel mainly engineers, administrative and technicians. The creation of this type of personnel usually requires a lengthy time (4-5 years) and a large amount of investment.[16] Accordingly wages paid to this type of worker are very high in comparison to those of other industries. This puts the proportion of labour cost to total operating cost at a high rate ranging between 20-30% of total variable cost per unit of product. This rate, however, varies from one country to another depending on the source of labour supplies. For example, in 1980, the cost of labour in the petrochemical industry in Kuwait and Saudi Arabia was almost double that of a similar industry in Mexico and Brazil.[17] The reason

was that the latter two countries employed local while the first two depended on foreign skilled workers.

The supply of skilled labour for a fertilizer industry in its construction and operation processes depends on the size of the pool of skilled labour and the types of skills available in a country. The size of the pool of labour reflects the general situation and the potential of skilled labour, while the types of skills indicate the possibility of supplying skilled labour required by the fertilizer industry. In Iraq, the problem of skilled labour required for operating the fertilizer industry is much more complicated that that of skilled labour needed for the construction of the industry itself. This is basically because Iraq may be able to provide the quality and the quantity of skills, basically civil engineers and semi-skilled technicians, needed for building the fertilizer plant (still a shortage of specialists for the installation of capital equipments), but, it needs skilled labour for operating the industry and most would have to be imported. Dependence on foreign labour would result in higher total production cost per unit, a slowing down in the development of local skilled labour and the creation of many social and economic problems. Furthermore, the supply of foreign skilled labour may not always be obtainable due to conditions in the international market. Accordingly, Iraq should emphasise the development of its own skilled labour in general, and of types of skills needed for the

development of this industry in particular. This in turn leads to the necessity of developing efficient education and training systems. With a fertilizer sector in the country the industry itself could be used as an institution of training skilled labour, mainly by on-the-job methods.[18] More, the foreign skilled labour in the industry could be a great help in this process.

10.5 Conclusions

The analysis has shown that Iraq does not just lack skilled labour but also a manpower planning programme. This situation has led to a rapid growth in the use of unskilled compared to skilled labour. As a result the country continues to depend on foreign labour in most of its modern industries, namely the petrochemicals.

The reasons for the shortage of skilled labour are seen in the underdevelopment of the industrial sector, the ill-conceived employment policy, the backwardness of the education system, and the vunerable supply of foreign labour. The political conditions, can be blamed for the continuous existence of these problems.

Unless the above problems are discussed, the country will require the aid of foreign skilled labour for both the construction and operation of the proposed petroleum-based fertilizer industry. This situation will in turn lead to higher capital and production costs for this industry.

This Chapter suggested that Iraq has a skilled labour potential. With certain remedies the country should be able to accelerate this development. For these remedies to succeed the adoption of new strategies for labour development with emphasis, on the specialization of training will be necessary. In turn, this will require a new education system that concentrates on specialization of studies in universities and institutes (mainly engineering and science). Political influence and politicans' interference in university and institute programmes must be reduced. Technical schools mainly offering engineering and industrial training must be provided.

Finally, co-operation with developed and developing countries which have already reached a high level of technology and labour training must be maximised and greater use made of the foreign skilled labour in the country without political interference is important.

CHAPTER 10

NOTES

1. Ministry of Information, Republic of Iraq, The Economy of Iraq: Development and Perspectives 1958-1976-1980. 1977 p.128.

2. Personal Contacts with the Ministry of Finance, Baghdad.

3. See Chapter 5.

4. This Policy was confirmed by the Government on the 17th of July 1973. This was followed by rapid increases in the salaries of all members of the armed forces. In addition, greater benefits were provided for this type of employees, eg priorities in housing, health, transport and social welfare. The main reason behind this action was to attract as many as possible into the army, mainly those of third level of education.

5. E.I.U. Special Report No.88, Iraq: A New Market in a Region of Turmoil, The Economic Intelligence Unit Ltd, London, 1980 p.51.

6. UNESCO Statistical Yearbooks 1975 and 1983.

7. Ibid.

8. "Al-Ahram" News Paper (Cairo), No.35310, 16 August 1983, p.9.

9. Ibid.

10. Also see, EIU, 1980, p.51.

11. Belton M. Fleisher, "Labour Economics: Theory and Evidence", Prentice-Hall, 1970, p.106.

12. The law of the Civil Service covers all ministerial departments while the law of the semi official institutions covers banks, associations and all other institutions which are not covered by the law of the Civil Service.

13. SPB 1970.

14. This was seen more significant after the Iraqi-Iranian war which started in 1980. Large numbers of students abroad decided not to go home and they started to look for jobs in other countries, mainly Arabic.

    Also see, EIU, Iraq: "A New Market in a Region of Turmoil", 1980, p.42.

15. According to the Cultural Department of The Embassy of The Republic of Iraq, in London, there were over 5,000 Iraqi students in the U.K. in 1981.

16. First World-Wide Study on The Petrochemical Industry: 1975-2000, UNIDO, 1978, p.176.

17. Second World-Wide Study on The Petrochemical Industry: Process of Restructuring, 1981, Annex II.F, pp.37-38.

18. The advantage of having a local fertilizer industry can clearly be seen in the case of Brazil, Venuezuela and the Rupblic of Korea where this industry has acted as an institute for skilled labour training. On the other hand other countries like Algeria and Morocco, where the industry has not yet been completed, have came up against great difficulties trying to train staff and skilled labour. For more details, see the First World-Wide Study on the Petrochemical Industry: 1975-2000, UNIDO, 1978, p.135.

CHAPTER 11

The Economics of Fertilizer Production

In the previous chapters an analysis has been made of the prospects for developing a petroleum based fertilizer industry in Iraq. This was followed by an examination of current and potential domestic demand and possible export sales. The local requirements for fertilizer production were seen to be significant.

In chapters 9 and 10, two basic inputs of the industry were examined: raw materials and skilled labour. It appears that since raw materials, namely gas, are available at significantly low cost in Iraq compared to that in the developed countries, all other inputs may become insignificant since the raw materials alone represent over 50% of production costs.

This chapter is divided into two main sections. In Section I, an estimation of investment and production costs in Iraq compared to a developed location will be undertaken. This will be followed by a comparative analysis of ex-factory and export prices in both locations. Section II will analyse the benefits of this development to the Iraqi economy with emphasis on the impact on foreign trade, GDP and farmer's income. An attempt will also be made to identify other direct and indirect benefits which could be expected to follow from the development of this industry.

I Investment and Production Costs of Fertilizer (Urea)

11.1 The Data

The discussion in Appendix A shows that detailed data and comprehensive information relating to petrochemical development in Iraq were very difficult to obtain. This was mainly due to the fact that such development only started in the late seventies. Thus no data was actually collected by either official or non-official sources. What made the task even harder was that most data relating to this development was regarded as confidential. Therefore, in many cases it was impossible to estimate many of the variables particularly those relating to investment cost.

The process of gathering data and information for this analysis therefore required great effort and proved to be time consuming. Appendix A explains the methodology used to obtain reliable data required for the analysis in this chapter. In addition, other sources of data are referred to in the chapter itself, as well as in Appendix F.

11.2 Investment Cost

There are three main factors that influence the size of investment required for fertilizer plants; time (rate of inflation), minimum scale of plant and geographical location (load factor).

Against time, Iraq probably can do nothing; inflation rates have risen rapidly in the last 10-15 years in the world including Iraq itself and this has significantly increased the costs of constructing fertilizer plants. In the United States, for example, between 1970-79 the cost of building fertilizer plants rose by 119%, an annual rate of 8.5%[1]. This rate was faster than the change in the consumer price index which averaged 7.2% p.a. during the same period[2]. Moreover, it is estimated that during the first half of the 1980's construction costs will rise by even 10-20% p.a.[3]. Accordingly, Iraq's construction costs will be directly affected since almost all machinery and equipment and other services required for building and installing the plant have to be imported from developed countries.

Another factor is plant size and in the short term this may also work against Iraq. Potential domestic demand for fertilizers appears to be high but at the present time actual demand is still low. Accordingly, as far as the present domestic demand is concerned, the country will have to bear in mind the consequences of building a large scale plant when only limited opportunity for full capacity utilisation exists. However, this should not be a problem in case of export possibilities. On the other hand, smaller plant capacity than that required for the future will lead to higher production costs per unit. In developing countries where fixed costs are

already higher than those developed in countries, a lower capacity scale than planned would increase net production cost even more than in developed countries (see next pages).

It was mentioned earlier that almost all machinery and equipment required for establishing a fertilizer plant in a developing country have to be imported from the developed world. Transport and insurance costs will therefore have to be added to the final capital cost. However, these costs will vary depending on the distance between the location country and the equipment supplier country and transportation methods. Other conditions such as engineering materials, climate, infrastructure (port facilities, roads, electricity, water and other services) and political stability will also directly effect investment costs.

Basically, there are two methods of calculating (or estimating) the capital costs of fertilizer plants in developing countries; namely the detailed analytical approach and the points system. Both methods are explained in Appendix F. In brief, the first method consists of using full feasibility studies to determine the component cost of machinery and equipment, engineering, insurance, royalties, site development, installation, and feasibility and prefeasibility studies[4]. Actual up-to-date data and accurate information are needed when applying this approach. The second method is based on a comparative estimation of cost components with a developed country

giving a number of points to each component and then weighing it to the total (100% in the developed country); the same components are then given a different number of points in the developing country, according to their estimated importance to the whole and then again weighted to total points. Even though the first method appears to be more accurate, the points method may still be considered viable in a country like Iraq where detailed relevant data is not available. (Appendix A)

Due to lack of relevant data, and for the benefit of the analysis, two different available location factors (or load factors) will be used in estimating capital costs in Iraq; first, a load factor of 1.3 which was estimated by the UNIDO as a base for the "Arabian Gulf"[5]; second, a load factor of 1.5 which was estimated by the "Gulf Organisation for Industrial Consultancy" (GOIC) as a base for the Middle East area[6]. Both rates were estimated for the year 1980. The first rate was calculated using the points system, while the second rate was calculated using the detailed analytical approach. In fact similar rates for developing countries are recommended by the "FAO Commission on Fertilizers" in its eighth session in Rome, (31 January - 3 February 1983)[7]. The latter suggested that in a developing country with some sort of infrastructure a rate of 1.35 is ideal; this rate rises to 1.5 in a country with no infrastructure (remote location).

The above rates simply indicate that capital cost in Iraq is assumed to be 30% and 50% respectively higher than in the developed location.

The capacity base of the plant chosen for the analysis is of 544,500 t/y of urea (1650 t/d). The reasons for choosing this capacity are:

(a) The availability of data and information regarding investment and production costs of this capacity in the developed world. This serves the analysis in both the estimation of capital cost in Iraq and then in the comparison of operating costs of the two locations.

(b) According to the FAO this size of capacity is still the most popular base since the economies of scale in larger ammonia urea plants at the present time seem rather limited although there are, however, advantages in building several large plants on one site in order to share infrastructural costs (8).

(c) This size of capacity matches our estimation of the size of the present domestic market (Chapter 8).

The capital installation costs of a gas based-fertilizer plant, with the above capacity, using the two location factors 1.3 and 1.5, are shown below in comparison to a developed location:

(in $ million)

Cost Components	Location Factor	D. Location 1.0	Iraq's Location 1.3	Iraq's Location 1.5
Capital Cost		205.00 (a)	266.50	307.50
Working Capital		19.25	15.38	16.01
Total Investment		224.25	281.88	323.51

(a) FAO Estimation for 1980/81; includes the cost of built-in facilities for steam and power generation

As a result of the 30% and 50% increases in load rates in Iraq, capital costs are valued at $266,5 million and 307,5 million compared to $205,00 million in the developed country location. Working capital on the other hand is seen to be lower (using either method) than in the developed location. As explained in Appendix F, this is mainly due to the significant difference in the cost of raw materials (which is used in the estimation working capital) between the two countries. Consequently total investments ($281.88 and $323.51 million) in Iraq are higher by $57.63 million under the location factor 1.3, and by $99.26 million under the location factor 1.5 in comparison with the developed location investment ($224.25 million). Thus it follows that fixed capital costs per unit of product will be higher in Iraq than that of the developed location.

11.3 Production Cost

The methodology used to estimate production cost of urea in both Iraq and the developed location is elaborated

in Appendix F. In brief, production cost is classified under two groups:

(1) Fixed costs:
    (a) depreciation
    (b) interest on working capital
    (c) plant overheads
    (d) taxes and insurance

(2) Variable costs:
    (a) raw materials (feedstock, energy and gas for steam and electricity)
    (b) labour
    (c) maintenance materials
    (d) chemicals
    (e) cooling water
    (f) control laboratories
    (g) operating supplies

Assumptions

Assumptions (or conditions) regarding the estimation of production cost of urea vary from one source to another depending on the methodologies applied and the purposes of studies. Different assumptions usually lead to different values of production costs. For example, an increase in the rate of depreciation from 10 years (UNIDO estimation) to 12 years (FAO estimation) increases production cost in both Iraq and the developed location by $6.28 and $8.15 respectively. This is also the case when estimating cost and size of labour required in this industry[9].

Other cost components such as maintenance, taxes and insurance, which are usually estimated as percentage of capital cost will also vary in value with the size and their estimated rates of capital.

The most significant variation in the production cost of urea from one source to another results from the difference in quantity and the price of gas used for raw materials. For example, the quantity of gas needed to produce one tonne of urea (this includes gas for feedstock, energy, steam and power generation) varies from about 30,000F^3 (UNIDO and ICI estimations) to about 35,000F^3 (FAO estimation). The price of gas used in the calculations also varies from one source to anther depending on time, country and the base of this price itself; some prices are based on market, while others are based on industrial and oil equivalent conditions[10]. The following simple calculation shows the effect of these variations in quantity and price of gas used to estimate production cost at one tonne of urea:

Quantity of Gas needed for one tonne of Urea (in F^3)		1980 Prices (in $) per 1,000 F^3 3.0 (FAO)	5.0 (UNIDO)
(Case 1)	30,000	90,0	150,0
(Case 2)	35,000	105,0	175,0

This example indicates that net production cost of one tonne of urea will increase by $15 with the change in the quantity from Case 1 to Case 2, and by $60-$70 with the change in the price in the same cases.

All these various assumptions, and others, will directly effect cost and then ex-factory price of urea in any time and any country.

In an attempt to be more consistent in our estimation of production cost of urea, the following assumptions have been made:

(1) Depreciation (or the operating life of the plant) is taken as 12 years in both Iraq and the developed location (FAO estimation).

(2) Interest on loans for working capital has been assumed at 10% of the loan (total working capital) in the developed location (UNIDO estimation) and 6% in Iraq (actual rate - Central Bank of Iraq).

(3) Plant overheads, which include services such as fire protection, security, canteens, cleaning, etc., as well as administration, have been assumed at 80% of total labour costs for the developed location (UNIDO estimation). Because cost of labour is already high, and because some of these services can be locally supplied with lower costs, plant overheads in Iraq are estimated at 60% of operating labour.

(4) Taxes and insurance have been estimated at 2% of fixed capital in the developed location (UNIDO estimation). Because there are no taxes (direct or indirect) imposed on development projects (including imports of equipment and services) in Iraq, only

insurance is relevant and this has been estimated at 1% of fixed capital.

(5) It has been estimated that about 35,000 F^3 of natural gas is required for the production of one tonne of urea (or 893 m^3). This includes feedstock, energy, and gas for steam and power (electricity) generations. For the benefit of analysis two different prices (or costs) have been estimated for each location; \$3 and \$5 per 1,000 F^3 in the developed location and zero (see Chapter 9) and \$0.57 per 1,000 F^3 (market price for the Gulf area - Qatar in Iraq[11].

(6) The cost of operating labour has been estimated at \$15.4 man/hour in 1980 in the developed location (UNIDO estimation for the U.S.A.)[12]. No data is available for Iraq. Therefore, assuming that operating labour will be completely foreign (at least for the first 3-5 years of operations), 25% of the cost above (\$15.4) is added, putting the total cost of labour in Iraq at \$19.25 man/hour[13]. It should be noted that in the medium term Iraq should be able to develop its labour in such a way that it would no longer require great numbers of foreign skilled labour for its industries. This would rapidly reduce the cost of production in the fertilizer industry in Iraq.

Results

The production costs of urea per tonne under the two different load factors (1.3 and 1.5) in Iraq, compared to that of the developed location are shown in Table 11.1. They can be summarised as follows:

(1) In the case where the cost of gas in Iraq is zero, total production cost of one tonne of urea (bulk) stood at a significantly low level of $92.31 (at L.F. 1.3) and $102.21 (at L.F. 1.5), compared to that of $186.08 in the developed location. The comparative advantages of Iraq over the developed location, therefore, are $93,77 and $83,87 respectively.

(2) On the other hand, in the case where the cost of gas in Iraq is given a market price of $0.57 per 1,000 F^3, total production cost increased to $112.26 (at L.F. 1.3) and $122.16 (at L.F. 1.5) per tonne of urea. Despite this however, Iraq's comparative advantage over the developed location still stood at $73.82 and $63.92 respectively.

(3) The different values of comparative advantage mentioned in 1 and 2 above (when assuming the cost of gas in the developed location is $3.0 per 1,000 F^3) would increase by $70.0 each if the cost of gas in the developed location was to be assumed at $5.0 per 1,000 F^3.

(4) Total fixed cost per tonne of urea is seen to be higher in Iraq, under both load factors ($60.09

TABLE 11.1

ESTIMATED PRODUCTION COST OF UREA IN IRAQ COMPARED TO A DEVELOPED LOCATION (USA) AT 90 PER CENT CAPACITY UTILISATION

Capacity Base : 544,500 t/y (1650 t/d)
Capacity Utilisation : 90%
Production : 490,050 (1485 t/d)
Raw Material : Natural Gas

Cost Components	Location Factor	Developed Location 1.0		Iraq's Location 1.3		1.5	
A) Fixed costs							
Depreciation		34.85		45.32		52.28	
Other Fixed Costs		20.24		14.77		15.69	
Total Fixed Costs		55.09		60.09		67.97	
B) Variable Costs							
Raw materials (includes Feedstock, energy and gas for steam and power generation)		105.00	(175.00)(a)	0.00	(19.95)	0.00	(19.95)(b)
Other Variable costs		25.99		32.22		34.24	
Total Variable Costs		130.99	(200.99)	32.22	(52.17)	34.24	(54.19)
C) Total Production Cost (A + B) (Bulk)		186.08	(256.08)	92.31	(112.26)	102.21	(122.16)
+ Bags		10.00	10.00	10.00	10.00	10.00	10.00
Total Production Cost per Tonne of Bagged Urea		196.08	(266.08)	102.31	(122.26)	112.21	(132.16)

a) Assuming cost of gas at $5.00 Mscft (UNIDO Estimation for USA)
b) Assuming cost of gas at $0.57 Mscft (UNIDO Estimation for Qatar)

Source: Appendix F

and 67.97), than in the developed location ($55.09). This is due in part to depreciation costs which vary in proportion to size of fixed capital which is already higher in Iraq than in the developed location.

(5) A significant difference in total production costs between the developed location and Iraq appears to arise in the area of total variable costs which are dominated by the high cost of raw material in the developed location; out of total variable costs of $130.99 in the developed location, this component contributed 80.16%. In fact this percentage will increase to 87.10% in the case where gas is priced at $5.0 per 1,000 F^3. This is compared to only 38.24% of total variable costs of $52.17 in Iraq (cost of gas is assumed at $0.57 per 1,000 F^3).

(6) Because the cost of bags required per tonne of product is given at $10 in both locations (FAO estimation), the final cost of bagged urea will only increase by this value and there will be no change in the above levels of Iraq's comparative advantage.

To demonstrate the impact of low working capacity on production cost per tonne of urea, a further calculation has been carried out for the same plant when working at 60% of capacity base. Table 11.2 summarises this calculation.

TABLE 11.2

ESTIMATED PRODUCTION COST OF UREA IN IRAQ COMPARED TO A DEVELOPED LOCATION (USA) AT 60 PER CENT CAPACITY UTILISATION

Capacity Base : 544,500 t/y (1650 t/d)
Capacity Utilisation : 60%
Production : 326,700 t/t (990 t/d)
Raw Materials : Natural Gas

Cost Components	Location Factors	Developed Location 1.0		Iraq's Location 1.3		Iraq's Location 1.5	
A) Fixed Costs							
Depreciation		52.28		67.98		78.42	
Other Fixed Costs		30.36		22.16		23.54	
Total Fixed Costs		82.64		90.14		101.96	
B) Variable Costs							
Raw materials (includes feedstock, energy and gas for steam and power generation)		105.00	(175.00) (a)	0.00	(19.95) (b)	0.00	(19.95)
Other Variable Costs		38.49		46.83		49.86	
Total Variable Costs		143.49	(213.49)	46.83	(66.78)	49.86	(69.81)
C) Total Production Cost (A + B) (Bulk)		226.13	(296.13)	136.97	(156.92)	151.82	(171.77)
+ Bags		10.00	10.00	10.00	10.00	10.00	10.00
Total Production Cost per Tonne of Bagged Urea		236.13	(306.13)	146.97	(166.92)	161.82	(181.77)

a) Assuming cost of gas at $5.00 Mscft (UNIDO Estimation for USA)
b) Assuming cost of gas at $0.57 Mscft (UNIDO Estimation for Qatar)

Source: Appendix F

NOTES

1. It is obvious that fixed costs in general do not vary with change in capacity of Industry. Accordingly no change in total fixed costs has taken place in this calculation.

2. Cost of raw material is assumed to be unchangeable per unit of product. Its total cost therefore will change with the change in capacity.

3. Chemical and cooling water will change with the change in capacity.

4. Other variable costs (labour, control laboratory and operating supplies) are assumed to be fixed (identical to full capacity utilisation). The reason for this is that, apart from their proportions to total production costs being small, their quantities may not significantly be effected under lower capacity in the fertilizer industry. Maintenance materials will also be fixed because it is already estimated as a percentage of Battery limits.

Even where the cost of gas is given a market price of \$0.57 per 1,000 F^3 in the case of Iraq, total production cost per tonne of urea at 60% capacity still stood at lower levels of \$156.92 (at L.F. 1.3) and \$171.77 (at L.F. 1.5), compared to that of \$226.13 in the developed location. The comparative advantages of Iraq over the latter location are \$69.21 and \$54.36 respectively. Again these advantages would increase by \$70.0 each if the cost of gas in the developed location was to increase from \$3.0 to \$5.0 per 1,000 F^3.

Three main observations can be made from these results:

(1) With 60% working capacity Iraq's total production cost per tonne of urea is still lower than that of the developed location.

(2) Iraq's comparative advantages will slightly decrease with lower working capacity. This is of course due to higher fixed costs resulting from higher capital cost in the case of Iraq.

(3) The high cost of raw material in the developed location is seen to be more decisive in increasing production cost per unit than the high fixed capital in Iraq.

11.4 Ex-Factory and Export Prices of Urea

Bascially, the price of urea is estimated by adding a rate of return on investment, ROI, (or a capital charge) to total production cost. Such a price (production cost + ROI) therefore will vary depending on size of capital and also on the rate of return to be used.

Using the total capital costs of both Iraq and the developed location, three rates of annual return on investment are assumed; 5%, 10% and 15%. The returns in $ value are divided by output in tonnes and are added to the previous costs per unit to produce ex-factory prices (local prices) in both locations. These calculations are shown in Table 11.3.

The major observation which can be made from this Table is that due to higher capital cost in Iraq, higher returns on investment per unit produced have appeared. If the rate of 15% of capital is earned, for example, Iraq's ROI per tonne of urea (bulk) amounts to $81.57 and $94.11 compared to $62.75 in the developed location, thus putting ex-factory prices at $173.88 and $196.32 compared with $248.83 in the developed location. The value of return per unit produced using the same rate of 15% is higher under a working capacity of 60%. With this low working capacity ex-factory prices stand at $259.31 and $293.00 in Iraq while it was $320.24 in the developed location. This indicates that while ex-factory prices of the different capacities in the developed location increased by 28.7%, they increased at a higher rate of 49.1% in Iraq. In other words, as far as ex-factory price is concerned, Iraq's comparative advantages are higher at 90% working capacity than under 60%. In fact if a higher rate of return on investment of 20% was required, Iraq's prices per unit (when working capacity is 60%) would be higher than those of the developed location (at the same capacity). However, Iraq's comparative

TABLE 11.3

ESTIMATED RETURN ON CAPITAL AND EX-FACTORY PRICES

Capacity Utilisation

	90 Percent						60 Percent					
	Developed Location		Iraq's Location				Developed Location		Iraq's Location			
Location Factor	1.0		1.3		1.5		1.0		1.3		1.5	
A) Production Cost ($ per tonne of urea bulk)[a]	186.08	(256.08)	92.31	(112.26)	102.21	(122.16)	226.13	(296.13)	136.97	(156.92)	151.82	(171.77)
B) Return on Capital $ per tonne at:												
5 Percent	20.92		27.19		31.37		31.37		40.78		47.06	
10 Percent	41.83		54.38		62.74		62.75		81.56		94.12	
15 Percent	62.75		81.57		94.11		94.12		122.34		141.18	
C) Ex-Factory Prices (A + B) $ per tonne of Urea (bulk)												
5 Percent	207.00	(277.00)	119.50	(139.45)	133.58	(153.53)	257.50	(327.50)	177.75	(197.70)	198.88	(218.83)
10 Percent	227.91	(297.91)	146.69	(166.64)	164.95	(184.90)	288.87	(358.87)	218.53	(238.48)	245.94	(265.89)
15 Percent	248.83	(318.83)	173.88	(193.83)	196.32	(216.27)	320.25	(390.24)	259.31	(279.26)	293.00	(312.95)

a) Production costs are derived from Table 11.1 and 11.2

advantages are so high that they are still sustained when comparing Iraq's price of 60% capacity with that of the developed location of 90% at 5% ROI. This clearly shows the strong position for Iraq to become a fertilizer exporter.

But the ex-factory price does not usually count as final price of export. There are other costs which must be added to it before it can be used as an export price[14]. The major cost here is that of transport from the exporter to the importer country. As far as Iraq is concerned, Table 11.4 shows this cost between Iraq and different countries and also Iraq's final export prices (landed) in comparison to local prices of urea in these countries.

It can be seen from this table that Iraq's export prices (landed) to different developed countries are highly competitive with local prices in these countries. For example Iraq's landed prices per tonne of urea (bulk) in Japan, U.S.A. and FRG are $168.7, $183.7 and $171.1 compared to the local prices of these countries of $397.0, $207.0 and $216.0 respectively. As also shown in the table, the competitiveness of Iraq's landed prices in some Arabic and developing countries is even higher than that in the developed locations. Iraq's opportunity to export fertilisers (urea) to many parts of the developed and developing world is substantial.

TABLE 11.4

COMPETITIVITY OF IRAQ'S UREA PRICES:
LANDED VS. LOCAL IN SOME DEVELOPED
AND ARABIC COUNTIRES, 1980

(in $ Tonne - Bulk)

Country	Cost of Transport[d]	Landed Price[a]	Local Price	
Japan	49.2	168.7	397.0[b]	(905.0)[c]
U.S.A.	64.2	183.7	207.0	(277.0)
F.R.G.	51.6	171.1	216.0[b]	(921.0)[c]
Sudan	42.0	161.5	826.0[c]	
Egypt	28.0	147.5	284.0[c]	
Lebonan	20.0	139.5	n.a.	
Syria	12.0	131.5	573.0[c]	
Jordan	7.0	116.5	n.a.	
India	35.0	154.5	526.0[c]	

(a) Calculated using Iraq's ex-factory price at 5% ROI (L.F. 1.3, 90% capacity)

(b) UNIDO estimation (85% capacity, 25% ROI), second world wide study on petrochemicals, 198, p. 142

(c) Market price (FAO estimation), Fertilizer Yearbook, 1983.

(d) Cos of transport for Japan, U.S.A. and F.R.G. are UNIDO estimations (source above, P. 153) for Qatar plus the cost of transport between the latter and Basra of $10 per tonne. The source of other costs is A. Ghartous, 198, p. 206.

II Benefit Analysis

The benefits of a fertilizer development to the Iraqi economy may appear to be numerous, both direct and indirect. Some of these benefits can be calculated in terms of $ value while others may be identified as social benefits which are difficult to calculate.

In this section however, an attempt will be made to estimate the value of some of these benefits and also analyse others which may not be calucaltable. The emphasis will be on the following major areas:

(1) Foreign exchange benefits and the effect on foreign trade.
(2) Impact on GDP
(3) Benefit for the farmer
(4) Other benefits to the agricultural sector
(5) Industrial benefits via linkages

11.5 Methodology

The "National Development Plan" of 1976-80 recommended the maximisation of agricultural output[15]. To achieve this, it suggested two measures;

a) the maximisation of output per hectare and
b) the utilisation of more land for agriculture.

Though there has been no evidence that this recommendation was actually introduced, one possible way of doing so was as follows; increasing the present area under cultivation for wheat production (a yearly average of 1,468,091 hectares) to around four million hectares. At the same time this

area must be treated with fertilizers in order to increase productivity per hectare. To achieve this increase in productivity the country was to treat one million hectares in the first year, two million in the second year, three million in the third year and four million in the fourth year. The application of fertilizer in this case would have to be increased every year according to land needs; this is put at 100,000 t/y per million hectares (100 kg/h - Chapter 8).

Assumptions

(1) For the benefit of analysis a period of ten years will be used to examine the impact of such a plan on the economy.

(2) The plan will be put into action at the same time as the start of constructing the fertilizer plant in the country in 1980.

(3) The fertilizer plant will require three years for construction and another three years working at a rate of 60% of its capacity base before reaching a normal working rate of 90%.

(4) For consistency the increase of wheat output as a result of applying fertilizer (urea) is to be 30% per hectare per annum. This figure is based on a conservative reduction of the 50% increase calculated by the United Nations (see both the "Introduction to Part Two" and Chapter 7)[16].

(5) The productivity of the new land to be cultivated for wheat production will be assumed at the same rate (by hectare) of the land already under cultivation. Using two averages (see Appendix F, Table 4) this will be 800 kg. per hectare (average of the period 1970-80) and 679 kg. (average of the period 1975-80).

(6) Any surplus in local fertilizer and wheat can be exported in the same year when the surplus is made.

The data used for calculating land already under cultivation for wheat, local productivity by hectare and quantities and values of imported wheat are all based on yearly averages of the two periods 1970-80 and 1975-80 which are derived from Tables 4 and 5 of Appendix F. The data used for calculating the values of imported and exported fertilizer are derived from section I. Other sources of data are also referred to when used.

11.6 Results

(1) Foreign Exchange Benefits

Three different possible cases are investigated in the next pages in order to estimate the benefit of foreign exchange as a result of the increase in local wheat production after the application of nitrogenous fertilizer on the land already under cultivation and also the land to be utilised according to the plan.

Case 1: Table 11.5

The main reason for presenting this case is to show the actual effect of applying nitrogenous fertilizer on the land already under cultivation in the country. This will draw attention to the fact that very limited benefits can be derived when limiting the use of fertilizer only to the land under cultivation. This case will later act as a comparative measure to highlight the importance of maximising the application of fertilizer as well as the area under cultivation for wheat production. This will be elaborated in the next cases.

To satisfy its average consumption of 1,949,565 t/y of wheat, Iraq had to import an average of 774,656 tonnes per annum during the period 1970-80. This cost the country an average of $153.59 million p.a. Iraq's production of wheat, on the other hand, averaged 1,174,909 tonnes p.a. in the same period.

These figures are presented for 1979 which is the year before any nitrogenous fertilizer was applied. As a result of the 30% increase of productivity per hectare from the first one million hectares after the use of fertilizer in 1980, imports of wheat declined to 534,656 tonnes at the end of the same year saving the country an amount of foreign exchange of $47.58 million.

In the second year (1981) the rest of the present area under cultivation which is 468,091 hectares will also be treated with nitrogenous fertilizer (urea) again based on an increase in productivity per hectare of 30%.

TABLE 11.3 (Case 1)

Estimation of Consumption, Local Productions and Imports of Wheat in Iraq using Land already under Cultivation (1,468,091 hectares)

1980 - 89 (in metric tonne and $ million)

YEAR	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984
Consumption of Wheat [a]	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565
Local Production of Wheat before N Application [b]	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909
Increase in Local Production of Wheat Post N Application [c]	0	240,000 [d]	352,342 [e]	352,342,	352,342	352,342
Total Local Production of Wheat	1,174,909	1,414,909	1,527,251	1,527,251	1,527,251	1,527,251
Imports of Wheat:						
Quantities (Tonne)	774,656	534,656	422,314	422,314	422,314	422,314
Value ($ million) [f]	153.59	106.01	83.73	83.73	83.73	83.73
Benefit of $ Value of increased Wheat Production as Import Substitutes ($ million) [g]	0	+47.58	+69.86	+69.86	+69.86	+69.86

TABLE 11.5 (Case 1) cont.

Estimation of Consumption, Local Productions and Imports of Wheat in Iraq using Land already under Cultivation (1,468,091 hectares)

1980 - 89 (in metric tonne and $ million)

YEAR	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Consumption of Wheat [a]	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565
Local Production of Wheat before N Application [b]	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909
Increases in Local Production of Wheat Post N Application [c]	352,342	352,342	352,342	352,342	352,342
Total Local Production of Wheat	1,527,251	1,527,251	1,527,251	1,527,251	1,527,251
Imports of Wheat:					
Quantities (Tonne)	422,314	422,314	422,314	422,314	422,314
Value ($ million) [f]	83.73	83.73	83.73	83.73	83.73
Benefit of $ Value of increased Wheat Production as Import Substitutes ($ million) [g]	+69.86	+69.86	+69.86	+69.86	+69.86

NOTES TO TABLE 11.5 (Case 1)

(a) Consumption of wheat is estimated as the total of local production plus imported wheat. It is assumed to be fixed for ten years.

(b) Assumed to be fixed for ten years.

(c) Increases in local production as a result of nitrogenour fertilizer is assumed at 30% per hectare.

(d) Only one million hectares of the total 1,468,091 is treated with nitrogenous fertilizer in this year. (Appendix F. Table 4) Therefore, the result can be calculated as follows:

800 kg. x 30% = 240 kg. increase in each hectare

$$\frac{240 \times 1{,}000{,}000}{1000} = 240{,}000 \text{ tonne increase in the first million hectares}$$

(e)

$$\frac{240 \times 468{,}091}{1000} = 112{,}342 \text{ tonne increase in the rest of the land already under cultivation}$$

240,000 + 112,342 = 352,342 tonn, total increase

(f) Price of imported wheat is assumed fixed at $198.27 per tonne (Appendix F, Table 5)

(g) Benefit = $ value of import substitutes, calculated using the equation:

$$B = N \times P$$

Where N = increase in wheat production

P = price of imported wheat

N.B. 800 kg. per hectare is calculated by dividing average annual production by average annual hectares.

This will increase total production of wheat by 112,342 tonnes in the same year. As a result this will save the country an additional amount of $21.98 million p.a. Accordingly during the plan period of 1981 to 1989, the country could make an average total saving in foreign exchange of $69,86 million per annum.

No wheat surplus can be achieved according to this case. In fact the country will still have to import wheat at a value of $106,01 million in 1980 and an average of $83,73 million p.a. in 1981-89. Since in the first three years of the plan no local fertilizer is produced, the country will also have to import fertilizer at a value of $30,21 million in 1980 and at $44,35 million in each of the years 1981 and 1982. But in 1983 and up to 1985 the fertilizer plant will start to work at 60% capacity thus meeting the limited requirements of the country (only 146,809 tonnes) in this case leaving a surplus with a value of $43.52 million p.a. for export. This value will be increased to $63.05 million p.a. in 1986-89 as a result of the increase in the plant capacity to 90%.

The effects of imports and exports of the two products on Foreign Trade balance in 1980-89 is shown in Table 11.6[17].

According to this Table the change in the balance of Trade due to the above activities will be positive in all years; + $17,37 million in 1980, + $25,51 million p.a. in 1981-82, + $113,38 million p.a. in 1983-85 and + $132,91 million in 1986-89.

TABLE 11.6

Foreign Trade, 1980 - 89

(in $ million)

Case 1 (Table 11.5)

YEAR	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Balance of Trade (excluding wheat) (a)	4431.64	4431.64	4431.64	4431.64	4431.64	4431.64	4431.64	4431.64	4431.64	4431/64	4431.64
Fertilizer											
Export (b)	0.00	0.00	0.00	0.00	43.52	43.52	43.52	63.05	63.05	63.05	63.05
Import (c)	0.00	30.21	44.35	44.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat											
Export	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Import	153.59	106.01	83.73	83.73	83.73	83.73	83.73	83.73	83.73	83.73	83.73
Balance of Trade $\bar{+}$	4278.05	4295.42	4303.56	4303.56	4391.43	4391.43	4391.43	4410.96	4410.96	4410.96	4410.96
Net Change $\bar{+}$ (1,2..N-1979)	0.00	+17.37	+25.51	+25.51	+113.38	+113.38	+113.38	+132.91	+132.91	+132.91	+132.91

NOTES

(a) Assumed fixed for 10 years, (average of the latest available years 1976-77. Source: UN Handbook of International Trade and Development Statistics 1983, UN New York 1983).

(b) The price of export of fertilizer is estimated at $241.95 per tonne landed in U.S.A. (60% capacity) and for 90% capacity at $183.7.

(c) The price in years 1, 2 and 3 are estimated at $302.11 landed at Basra (U.S.A. ex-factory price at 10% ROI plus cost of transport of $64.2 per tonne).

Case 2: Table 11.7

Using the same averages of consumption, local production and imports of wheat as well as the price for the period 1970-80, as that used in the previous case (Case 1), an extraction will be made to value foreign exchange benefits which will result from the increase in local wheat production after the use of fertilizer and expanding the area under cultivation from 1,468,091 hectares to 4,000,000 hectares.

According to Table 11.7 the country will be saving $106,0 million in 1980 which is the same amount seen in Case 1 (Table 11.5). This is simply because no increase in the area under cultivation is required in year 1. Therefore, this saving is the result to the 30% increase post urea application on the first one million hectares. In 1981, the area under cultivation will be increased to 2 million hectares coupled with fertilizer use on all areas. Local wheat production will therefore grow by 47% of total production. This will not just meet all the requirements of local consumption of wheat, thus saving $153,59 million in this year, but will also produce a wheat surplus of 130,871 tonne which may be exported, thus earning foreign exchange.

Increasing land under cultivation from 2 to 3 million hectares in 1982 will increase local production by 1,225,527 tonne of wheat in this year. Adding an extra 720,000 tonne resulting from the application of urea will then put total local production of wheat at 3,120,436 tonne at the end of this year (1982). Since only 1,949,565

TABLE 11.7 (Case 2)

Estimation of Consumption, Local Production and Imports of Wheat in Iraq, using 4 million hectares, 1980 - 89

(in metric tonne and $ million)

YEAR	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Consumption Of Wheat	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565	1,949,565
Local Production of Wheat before Plan Emplantation	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909	1,174,909
Increase in Wheat as a result of increase in land Utilisation	0.00	0.00	(a) 425,527	(b) 1,225,527	(c) 2,025,527	2,025,527	2,025,527	2,025,527	2,025,527	2,025,527	2,025,527
Increase in Wheat Production post N Application (d)	0.00	240.000	480,000	720,000	960,000	960,000	960,000	960,000	960,000	960,000	960,000
Total Local Production	1,174,909	1,414,909	2,080,436	3,120,436	4,160,436	4,160,436	4,160,436	4,160,436	4,160,436	4,160,436	4,160,436
Imports of Wheat											
Quantities (tonne)	774,656	534,656	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Value ($ million)	153,59	106,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saving in FX (import substitutes) ($ million)	0.00	47,58	153,59	153,59	153,59	153,59	153,59	153,59	153,59	153,59	153,59
Surplus in Local Production (tonne)	0.00	0.00	130,871	1,170,871	2,210,871	2,210,871	2,210,871	2,210,871	2,210,871	2,210,871	2,210,871

NOTES TO TABLE 11.7 (Case 2)

(a) By increasing land already under cultivation of 1,468,091 to 2,000,000 hectares an additional 531,909 hectares is utilised. Assuming the new land also produce 800 kg./h of wheat, the result is as follows:

$$0.800 \times 531{,}909 = 425{,}527 \text{ tonne}$$

(b) This is calculated as follows:

$$1{,}000{,}000 \times 0.800 = 800{,}000 \text{ tonne}$$

$$800{,}000 + 425{,}527 = 1{,}225{,}527 \text{ tonne}$$

(c) This is calculated by adding extra 800,000 tonne to the above total.

(d) Calculated as in Table 11.5.

All other notes in Table 11.5 are also applicable here.

tonne p.a. of wheat is required for consumption, a surplus of 1,170,871 tonne will then be available for export. At the same time the country is still saving $153,59 million of import substitutes of wheat. In fact this saving will be made every year between 1981-89.

In 1983 and up to 1989, the two main objectives of the plan will be reached, namely the utilisation of four million hectares of land, and the application of 400,000 tonnes of urea to these hectares. This will result in putting total local production of wheat at a high level of 4,160,436 tonne p.a. Accordingly a wheat surplus of 2,210,871 tonne p.a. should be available in the same period.

On the other hand, the local production of urea will be completely consumed between 1983-85. (Fertilizer should be completely imported in 1980-82). To meet its full requirement from fertilizer however, the country will still have to depend on imports. During these years the country will need 73,300 tonnep.a. of fertilizer in addition to its local production of 326,700 tonne p.a. This will cost the country $22,14 million p.a. in 1983-85. But in 1986 and up to 1989 the industry will be brought up to its 90% of capacity, thus providing all the country needs and producing a surplus of 90,050 tonne p.a. for export.

As far as this case in concerned, the situation of foreign trade will again be effected positively during 1980-89; net changes in the balance of trade will be

TABLE 11.8

FOREIGN TRADE, 1980 - 89

(in $ million)

Case 2 (Table 11.7)

YEAR	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Balance of Trade (excluding wheat)	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64	4431,64
Fertilizer											
Export	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16,54	16,54	16,54	16,54
Import	0.00	30,21	60,42	90,63	22,14	22,14	22,14	0,00	0,00	0,00	0,00
Wheat											
Export (a)	0.00	0.00	25,95	232,15	438,35	438,35	438,35	438,35	438,35	438,35	438,35
Import	153,59	106,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balance of Trade $\bar{+}$	4278,05	4295,43	4397,17	4573,16	4847,85	4847,85	4847,85	4886,53	4886,53	4886,53	4886,53
Net Change $\bar{+}$ (1,2..n-1979)	0.00	17,38	119,12	295,11	569,80	569,80	569,80	608,48	608,48	608,48	608,48

NOTES

(a) The price of exported wheat is assumed to be competitive at $198,27 per tonne (landed).

All other notes in the Table 11.6 are applicable.

$17,38 million in 1980 increasing to $119,12 million in 1981, to $295,11 million in 1982, to $569,80 million p.a. in 1983-85 and then to $608,48 million p.a. in 1986-89. In comparison to case 1, in ten years, foreign trade should show a total positive change (increase) of $4574,93 million; it was $940,17 million in Case 1 (Table 11.8).

The major observation which can be made here is that in the case of Iraq, where a limited fertilizer capacity exists, it seems more practical to consume local fertilizer to increase local wheat production for export than to export fertilizer itself. This is because the use of 400,000 tonne of urea p.a. will increase wheat production by 960,000 tonne p.a. If this amount of wheat is to be exported, the country can earn around $190,34 million p.a. in foreign exchange whereas it can only earn $73,48 million p.a. if it is to export the above amount of fertilizer. This, however, does not mean that Iraq should always produce fertilizer for domestic consumption only. Bearing in mind an export diversification factor, it should expand its fertilizer capacity to meet the need for expanding export as well as domestic markets. This can therefore maximize the earning of foreign exchange which is shown in Table 11.8.

Case 3: Table 11.9

This case, as in the previous one, is based on increasing the area under cultivation for wheat up to 4 million hectares.

TABLE 11.9 (Case 3) (a)

Estimation and Trends in Consumption, Local Production and Imports of Wheat in Iraq, using 4 million hectares, 1980 - 89

(in metric tonne and $ million)

YEAR	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Consumption of Wheat (b)	2,087,025	2,087,025	2,154,853	2,224,886	2,297,195	2,371,854	2,448,939	2,528,529	2,610,707	2,695,555	2,783,160
Local Production of Wheat before Plan Emplantation	990,500	990,500	990,500	990,500	990,500	990,500	990,500	990,500	990,500	990,500	990,500
Increase in Wheat Production as a Result of Increase in Land cultivation (c)	0.00	0.00	361,166	1,040,166	1,719,166	1,719,166	1,719,166	1,719,166	1,719,166	1,719,166	1,719,166
Increase in Wheat Production post N Application (d)	0.00	203,700	407,400	611,100	814,800	814,800	814,800	814,800	814,800	814,800	814,800
Total Local Production	990,500	1,194,200	1,759,066	2,641,766	3,524,466	3,524,466	3,524,466	3,524,466	3,524,466	3,524,466	3,524,466
Import of Wheat											
Quantity (tonne)	1,096,525	892,825	395,787	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Value ($ million) (e)	235,07	191,40	84,85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saving in Foreign Exchange (import substitutes in $ million)	0.00	43,67	164,77	235,07	235,07	235,07	235,07	235,07	235,07	235,07	235,07
Surplus in Local Production (tonne)	0.00	0.00	0.00	416,880	1,227,271	1,152,612	1,075,527	995,937	913,759	828,911	741,306

NOTES TO TABLE 11.9 (Case 3)

(a) This table is based on averages of six years (1975-80) of wheat production per hecatre, and of price of imported wheat (Tables 4 and 5, Appendix F).

(b) Consumption is assumed to increase by the same average annual growth rate of population of 3.25% p.a. (for the period 1970-75, see table 1, Appendix B).

(c) The increase in local production of wheat as a result of increased land cultivation is calculated using the same method in Table 11.7 and an average of production of 679 kg. per hectare.

(d) Calculated as 30% increase per hectare p.a.

(e) The price of imported wheat is assumed fixed at $214.38 per tonne (Table 5, Appendix F).

But, however, due to the rapid decrease in wheat productivity per hectare and the increase of average consumption of wheat during the second half of the seventies and its impact on wheat imports, it was important for consistency to use the figures of this period to estimate future foreign exchange position. In addition it was also important to show the effect of any future annual growth in consumption on foreign exchange. Accordingly, the cultivation of wheat productivity per hectare, consumption, imports of wheat and its value in this case will be based on the averages of the six years 1975-80. (Tables 4 and 5, Appendix F). Annual growth of wheat consumption, in addition, will be assumed at3.25%based on population growth (in 1970-75).

According to this case, to meet its average consumption of wheat of 2,087,025 t/y, Iraq had to import an average of 1,096,525 t/y in the period of 1975-80. This cost the country an average of $235,07 million p.a. Iraq's production of wheat in the same period averaged 990,500 t/y. These figures are shown in the year 1979 of Table 11.9. The rest of the calculations in this table can be summarised as follows:

(1) Higher levels of saving have appeared (a total of $2089 million) in comparison to the previous case ($1429,89 million). This is due to the higher levels of imports of wheat in this case than in Case 2 which resulted from higher levels of consumption.

(2) Lower levels, with continuing decline of the wheat surplus than that of Case 2 are seen. This is due to two factors; namely the low average of productivity per hectare and the3.25%growth in the level of consumption which is already higher than that in Case 2.

(3) According to 2 above, between 1980-89 the country will consume a total of 4,707,053 tonne of wheat more than the last case. The surplus of wheat will then be reduced by a total of 9,425,636 tonne in the same period.

Table 11.10 shows the impact of the above calculations on foreign trade. No change in the earning of foreign exchange as a result of exporting fertilizer is seen. This is because the same amount of fertilizer is required in both cases (2 and 3). Any change in the balance of trade therefore will result from the movement of wheat (mainly wheat surplus). The main observation which can be made from this table is that the balance of trade between 1980-83 will positively increase as a result of wheat export before it starts to decline slightly in the following two years. In 1986, it will increase again due to fertilizer export, but will again start to decline continuously in the last three years of the plan. The reason for these declines is the annual growth of consumption which will directly effect the size of wheat surplus for export. In comparison to Case 2 (Table 11.8) total net change in this case will reach +$3469,09 million in 1980-89;

TABLE 11.10

Foreign Trade

(in $ million)

Case 3 (Table 11.9)

	(0) 1979	(1) 1980	(2) 1981	(3) 1982	(4) 1983	(5) 1984	(6) 1985	(7) 1986	(8) 1987	(9) 1988	(10) 1989
Balance of Trade (excluding wheat)	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71	4666,71
Fertilizer											
Export	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16,54	16,54	16,54	16,54
Import	0.00	30,21	60,42	90,63	22,14	22,14	22,14	0.00	0.00	0.00	0.00
Wheat											
Export	0.00	0.00	0.00	89,37	263,10	247,10	230,57	213,51	195,89	177,70	158,92
Import (a)	235,07	191,40	84,85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balance of Trade $\bar{+}$	4431,64	4445,10	4521,44	4665,45	4907,67	4891,67	4875,14	4896,76	4879,14	4860,95	4842,17
Net Change $\bar{+}$ (1,2---n-1979)	0.00	13,46	89,80	233,81	476,03	460,03	443,50	465,12	447,50	429,31	410,53

NOTES

(a) The price of wheat export is assumed to be competitive at $214,38 per tonne, (landed). See Table 5, Appendix F.

it is +$4574,93 million in Case 2 (a decrease of $1,105,84 million, of 32%) in the same period.

This suggests that to avoid such decline in the value of trade as a result of wheat activities, the country should increase the level of local wheat production. this can be achieved by either maximising productivity per hectare through maximising the application of fertilizer or by utilising more land for wheat production, or a combination of both.

The Importance of Local Fertilizers for the Foreign Trade

It is obvious that a 30% increase in wheat production can be achieved by either local or imported fertilizer. However, as far as the situation of foreign trade is concerned, the dependence on imported fertilizer (absence of local industry) would reduce the value of benefit in terms of foreign exchange. To demonstrate this, Table 11.11 shows net changes in the balance of trade with and without local fertilizer.

According to this Table, during 1980-89, change in the balance of trade in Case 1 will reach +$871,78 million when ferilizer is available locally; this will drop to $246,98 million (a decrease of 253%) in the absence of local fertilizer industry. Such changes will also be seen in Cases 2 and 3. The absence of local fertilizer industry would, in other words cost the country's balance of trade an estimated total of +$415,06 and +$508,55 million in the same period respectively.

TABLE 11.11

The Impact of Local Fertilizer on the Balance of Trade

1980 - 89

(in $ million)

YEAR	CASE 1		CASE 2		CASE 3	
	With Local Fertilizer (a)	Without Local Fertilizer (b)	With Local Fertilizer (a)	Without Local Fertilizer (b)	With Local Fertilizer (a)	Without Local Fertilizer (b)
1980	n.a.	+17,37	n.a.	+ 17.38	n.a.	+ 13,46
1981	n.a.	+25,51	n.a.	+119,12	n.a.	+ 89,80
1982	n.a.	+25,51	n.a.	+295,11	n.a.	+233,81
1983	113,38	+25,51	+569,80	+470,75	+476,03	+377,33
1984	113,38	+25,51	+569,80	+470,75	+460,03	+361,33
1985	113,38	+25,51	+569,80	+470,75	+443,50	+344,80
1986	132,91	+25,51	+608,48	+471,10	+465,12	+327,74
1987	132,91	+25,51	+608,48	+471,10	+447,50	+310,12
1988	132,91	+25,51	+608,48	+471,10	+429,31	+291,93
1989	132,91	+25,51	+608,48	+471,10	+410,53	+273,15
Total	871,78	+ 246,96	+4143,32	+ 3728,26	+3132,02	+2623,47
Change		-624,82		-415,06		- 508,55

NOTES

n.a. = not applicalbe because no local industry is available.

(a) Includes export of fertilizer.

(b) Assuming that the fertilizer needed in each year will be imported.

It should be noted that the effect of local fertilizer may still be shown in different ways. For example, if we assume that the industry already existed in 1980, the results of "a" columns would be then positively changed. Such changes would however only appear during the period 1980-85. The main reason for this would be due to fertilizer exports

(2) Impact on GDP

To estimate the effect of local fertilizer production and also the increase in wheat production on GDP, it is necessary to estimate the annual value added of these products. The latter values then will be related to the industrial and the agricultural sectors respectively.

The estimation of value added of fertilizer is based on the infromation available in Appendix F, Table 3. It is simply calculated by excluding all types of materials from the cost of fertilizer leaving only capital (including capital charge) and labour to make the total value added of fertilizer[18].

On the other hand, no information whatsoever is available on cost and price of total production of wheat. Therefore, this has meant that the only way to estimate wheat's value added has been to use the agricultural coefficient rate of 0.6772 (for Iraq, 1974)[19]. The price of wheat used for the calculation is that of imports (also see notes on Table 11.12).

To estimate the percentage increase in the agricultural and the industrial sectors value added in total GDP, the latest data available (of the years 1976-77) will be used.

Tables 11.12 (A and B) and 11.13 show the results of the calculation. These results can be summarised as follows:

(1) The increase in wheat production resulting from using only the land already under cultivation (Case 1) will make a total value added of $32.22 million in 1980 before rising to $74.31 million p.a. in 1981-89 (Table 11.12, A). The latter figure will increase the share of the agricultural sector in GDP by 0.27% (or from 6.57% to 6.84%).

(2) In the case where 4 million hectares are utilised for wheat production (Cases 2 and 3), total value added due to the increase in wheat will increase gradually every year in the first four years before it stands at a stable annual level of $400,86 million in the rest of the period of the plan (1985-89). This value will increase the share of the agricultural sector in GDP by 1.46% p.a. (or to 8.03% of GDP) in the same period (Table 11.12, B).

(3) Since the fertilizer plant will be under construction in 1980-82, no fertilizer will be produced and thus no value added will be made. But as soon as the industry starts its operations, in 1983, it can be estimated that a total of $60.45 million p.a. of value added will be added to that of the industrial sector. This will increase the latter secotr's share in GDP by 0.23% (from 6.45% to 6.68%).

TABLE 11.12

Estimation of the Increase in Agricultural Value Added and its Contribution to GDP as a Result of Increased Wheat Production, 1980-89

(in $ million)

(A) Case 1 (Table 11.5)

Year		(1) Value added of the Agricultural Sector before an increase in Wheat Production (a)	% of GDP	(2) Value Added of increased Wheat (b)	Total value Added (1 + 2)	% of GDP
(0)	1979	1661,41	6,57	0.00	1661,41	6.57
(1)	1980	1661,41	6,57	32,22	1693,63	6,69
(2)	1981	1661,41	6,57	74,31	1735,72	6,84
(3)	1982	1661,41	6,57	74,31	1735,72	6,84
(4)	1983	1661,41	6,57	74,31	1735,72	6,84
(5)	1984	1661,41	6,57	74,31	1735,72	6,84
(6)	1985	1661,41	6,57	74,31	1735,72	6,84
(7)	1986	1661,41	6,57	74,31	1735,72	6,84
(8)	1987	1661,41	6,57	74,31	1735,72	6,84
(9)	1988	1661,41	6,57	74,31	1735,72	6,84
(10)	1989	1661,41	6,57	74,31	1735,72	6,84

(B) Case 2 (Table 11.7)

(0)	1979	1161,41	6,57	0.00	1661,41	6,57
(1)	1980	1661,41	6,57	32,22	1693,63	6,69
(2)	1981	1661,41	6,57	121,58	1782,99	7,02
(3)	1982	1661,41	6,57	261,22	1922,63	7,53
(4)	1983	1661,41	6,57	400,86	2062,27	8,03
(5)	1984	1661,41	6,57	400,86	2062,27	8,03
(6)	1985	1661,41	6,57	400,86	2062,27	8,03
(7)	1986	1661,41	6,57	400,86	2062,27	8,03
(8)	1987	1661,41	6,57	400,86	2062,27	8,03
(9)	1988	1661,41	6,57	400,86	2062,27	8,03
(10)	1989	1661,41	6,57	400,86	2062,27	8,03

NOTES TO TABLE 11.12

(a) This figure is the average of 1978 and 1979 (rate of exchange was ID = $3,37 in 2 January 1980. Financial Times, 2 January 1980). The figures for the two years above are taken as the latest up to date figures available. Source: The U.N. National Accounts Statistics: Main Aggregates and Detailed Tables, 1982. UN, New York 1985.

(b) No information whatsoever on cost or/and value added of wheat production in Iraq exists. Therefore the only alternative available was to use the price of imported wheat (Table 5, Appendix F). This price is assumed to be the price of the Iraqi wheat. The value added coefficient rate used to calculate wheat value added is 0,6772. This rate is taken from: A.A. Kubrusi, D.N.Butterfield and Se Mark Park, "Industrial Activity in Iraq: A Quantitative Analysis and some Projections to the Year 2000", OESP Research Report No. 8, McMaster University, Faculty of Social Sciences, Hamilton, Ontario, Canada 1981. Accordingly the value added of one tonne of wheat should be as follows:

$198,27 x 0.6722 = $134,27

* The situation in Case 3 (Table 11.7) should only slightly differ from that of Case 2 (Table 11.6). This is due to the lower productivity of wheat per hectare assumed in Case 3. Therefore a slightly lower total value added should appear.

TABLE 11.13

Estimation of the Increase in Industrial value Added and its Contribution to GDP as a Result of Fertilizer Production, 1980-89

(in $ million)

Year	(1) Value Added of the Industrial Sector before Fertilizer Production (a)	% of GDP	(2) Value Added of Fertilizer Production (b)	Total Value Added (1 + 2)	% of GDP
(0) 1979	1632,43	6,45	0.00	1632,43	6,45
(1) 1980	1632,43	6,45	0.00	1632,43	6,45
(2) 1981	1632,43	6,45	0.00	1632,43	6,45
(3) 1982	1632,43	6,45	0.00	1632,43	6,45
(4) 1983	1632,43	6,45	60,45	1692,88	6,68
(5) 1984	1632,43	6,45	60,45	1692,88	6,68
(6) 1985	1632,43	6,45	60,45	1692,88	6,68
(7) 1986	1632,43	6,45	60,45	1692,88	6,68
(8) 1987	1632,43	6,45	60,45	1692,88	6,68
(9) 1988	1632,43	6,45	60,45	1692,88	6,68
(10) 1989	1632,43	6,45	60,45	1692,88	6,68

NOTES

(a) This figure is the average of 1978 and 1979 (source and rate of exchange as in the previous table).

(b) This value includes costs of labour, capital (depreciation) and a 10% ROI only (see Appendix F).

Tha major observation which can be drawn from these results is the importance of maximising local consumption of fertilizer. As it has been shown, maximising the use of fertilizer on land for wheat production would maximise wheat productivity and in turn increase the general value added of the agricultural sector. This suggests that if the country has the development of agriculture in mind, it should give priority to improving local consumption rather than exporting fertilizer. Such action would lead to the expansion of the local fertilizer industry itself thus increasing even further the general value added of the industrial sector. With a combination of improving both the agricultural and the industrial sectors' productivity the general situation of the non-oil sectors and in turn their share in GDP can be improved. A situation like this can help to reduce the heavy dependence of the country on the oil sector. As it was shown in part one of this thesis, this has always been the main goal of planning economic development in Iraq.

11.7 Benefit for the Farmer

As it was shown in Chapter 8, the motive for the farmer to use fertilizer depends on the relation between the price of this input delivered to him, the extra yield that he can attain as a result of its application, and the increase in his income that he will get from a production increase. It follows that a farmer is not likely to use

extra input if the market value (price) of the increase in his crop production as a result of this extra input does not cover this input's cost and at the same time produce extra returns. In a case of identical inputs availability in the market, the farmer usually makes his choice of consumption depending on the price of these identical inputs. In this case he is likely to consume the input with the lower than that of the higher price. This is simply because he could make higher return as a result of reducing the cost of production. One way of demonstrating this is by using the basic profit equation:

$$\pi = TR - TC$$

or

$$\Delta\pi = \Delta TR - \Delta TC$$

where

$\Delta\pi$ = change in profit

ΔTR = change in revenue

ΔTC = change in cost

As far as the benefit to the Iraqi farmer is concerned, in the calculation any change in his final revenue will be assumed to be the result of using the extra single input which is urea. According to my estimation, one tonne of urea can meet the requirements of ten hectares of land used for wheat production (100 kg/h). The use of this single input should, as estimated earlier, increase the productivity of each of these hectares by 30% of present production. Assuming that the average production of wheat per hectare is 0.8

tonne (800 kg.), total production from these ten hectares should then rise from 8 to 10.4 tonne; an extra 2.4 tonne of wheat. The value of this extra production is estimated at $476 ($198.27 per tonne). The farmer's final income should therefore change by the difference between the value above and the cost of the fertilizer used. The level of this change will obviously vary depending on the price of urea which is in this case either local or imported;

II = $476.0 - $129.5 (bagged, local price, 5% ROI)

= $346.5

or

II = $476.0 - $281.2 (bagged, imported price, 5% ROI plus transport cost)

= $194.8

and

II = $476.0 - $323.0 (bagged, imported price, 15% ROI plus transport cost)

= $153.0

It can be seen that the benefit to the Iraqi farmer is greater in the case of local fertilizer than that of imported. The comparative advantages when using local urea are $151.7 and $193.5 respectively.

Now how do these differences in the price of fertilizer effect farmers' future incomes? Suppose that the price of wheat declines as a result of the increasing supply of the product. Also, suppose that the prices of both local

and imported fertilizer remain stable. This situation will effect farmers' income as follows:

(IN $)

Change in the Price of Wheat (decrease)		Farmer's net extra income post urea application (1)		
		with local input	with imported input a (2)	with imported input b (3)
10%	428.4	298.9	147.2	105.4
20%	380.8	251.3	99.6	57.8
30%	333.2	203.7	52.0	10.2
40%	285.6	156.1	4.4	- 37.4
50%	238.0	108.5	- 43.2	- 85.0
60%	190.4	60.9	- 90.8	-132.6
70%	142.8	13.3	-138.4	-180.2

(1) net income = extra revenue from 2.4 tonne of wheat - fertilizer

(2) Import price at 5% ROI

(3) Import price at 15% ROI

These results clearly indicate that, in the case of using imported fertilizers, the farmer will have negative - extra income (loss) if the price of wheat is to fall by 41% and 33%. However it takes a decline of 71% in the same price of wheat before a negative-extra income appears when using local fertilizer. In fact, as far as the analysis in this section is concerned, if the price of imported fertilizer is to increase, in addition to the decrease in

wheat price, the local fertilizer may be the only choice available to the farmer to earn extra income from the application of this single input.

11.8 Other Benefits to the Agricultural Sector

Nitrogenous fertilizer is seen as one of the main inputs required to maximise both crop productivity and land fertility. It is estimated that this input alone may have as much effect on land fertility as all other inputs together.

The advantages of fertilizers over other inputs can be seen from two main angles. First, their proper use shows up very quickly in greater crop growth, thus producing an economic benefit within one planting season. Second, they can be effectively used by a farmer even if his neighbour does not use them i.e., they are divisible. This, in other words, means that minimum effort and expenditure are required in contrast to building a dam or irrigation system which may require the cooperation of all the farmers in a particular area[20]. Other inputs like new seed (or plants) varieties are also known to be one of the main inputs that accelerate agricultural growth. Again, without proper quantities of fertilizer, they (the seeds) may not lead to much improvement in output. These characteristics of fertilizer use have led the FAO to identify them as the "spearhead" of agricultural development[21]. Little agreed with the above definition when he said:
If quick results are essential, and certain basic conditions

are met, the most promising approach is through using more fertilizers".[22]

Iraq, if aiming for agricultural development, should seriously attempt to increase its agricultural productivity. The two main features of Iraq's agriculture are seen in its low production per hectare and the surplus of agricultural land not under cultivation. To achieve higher agricultural outputs, therefore, the country has to concentrate on the application of higher quantities of nitrogenous fertilizers to land already under cultivation, and the cultivation of more land for agriculture. Unless nitrogenous fertilizers are applied to the lands already under cultivation, yields will start to decline because continuing use of land will lead to the depletion of the nutrient component in the soils. The more intensively the land is cultivated and the poorer the quality of soil the faster this will happen. This also applies to long term unused land and areas subjected to draining operations.

Increasing agricultural output will surely mean improving farmers' incomes. Apart from increasing farmers' incomes through improvement in the output of their land, the consumption of local nitrogenous fertilizers will save them a great deal of expenditure over imported fertilizers. Lower costs should encourage farmers to increase the use of nitrogenous fertilizers and help poor farmers who cannot afford the use of nitrogenous

fertilizers to appreciate the advantages. In addition, the use of other inputs will be improved, and more land will be utilised. This in the end will save the government a great deal of subsidies which were to be paid for imported fertilizers, and which could be invested in other systems to help farmers, e.g. transport, irrigation, health, education, new seen varieties, loans, etc.

Measures to stem the migration of rural population to the urban areas, should also become more effective. Many schemes such as rural settlement creation, irrigation and draining systems took place during the period 1953-75 in Iraq, yet none have successfully increased agricultural productivity enough to slow down the migration of farmers to the urban areas. As the analysis in the previous chapter shows there were many problems which hampered these schemes. However, one of the most important it seems was overlooked, namely, the need to improve agricultural inputs, in particular the use of nitrogenous fertilizers. During the fifties, for example, Iraq hardly imported any nitrogenous (or any other type) fertilizer. Up to 1971, only 4.9% of the total land cultivated for wheat production was actually fertilized with less than 2% of the essential needs of over 100 kg/h. Accordingly, no improvement in the average production of wheat in Iraq was seen (Table 4, Appendix F) during the period.

If a settlement required houses, schools, roads and other facilities before settlers were moved, then it is obvious that continuous growth in agricultural productivity is needed to retain farmers on the settlement. Unless the maximum amount of fertilizers is applied to agricultural land, the fianl output will start to decline, thereby decreasing the annual incomes of farmers. Farmers will indeed require social facilities but as an injunct to improvement in land productivity. They are more likely to be attracted by land productivity improvements rather than by expensive economic and social infrastructure.

Fertilizer use can also help to increase general employment and decrease seasonal unemployment in the agricultural sector. In Iraq, even where irrigation systems exist, much of the land is still only utilised every second year in an effort to increase land fertility by leaving a fallow year. Even the cultivated majority of land is, however, only used for a short season, mainly in the summer. A proper application of nitrogenous fertilizer (seasonally, or as required) will help in achieving a twice yearly cultivation and in addition will abolish the need for the "every second year system". Accordingly, part from keeping farmers occupied for a full year annual incomes of these farmers will rise and more employment can be created.

In time, fertilizer application may introduce changes in cultivating practices such as proper timing and depth of sowing, all of which are needed in order to derive the maximum benefit from the use of fertilizers.

11.9 Industrial Benefits via Linkages

As shown earlier, the development of a fertilizer industry can directly effect the industrial sector by increasing its general output and thus creating extra value added. The most important element however is that the industrial sector can directly gain in terms of the acquisition of technology and skilled labour as a result of this development.

These significant characteristics, after all, are the main factors that led the United Nations, in its conference on the development of petrochemical industries in developing countries (Tehran - Iran, 16-30 November 1964), to baptise this industry the "dynamic" and the "strategic" industry for the inducement of industrial development in developing countries[23].

On the other hand, the industrial sector will also benefit indirectly from the fertilizer industry. The application of fertilizers will increase and vary agricultural output, part of which will be supplied to the industrial sector as raw materials, e.g. cotton for the textile industry, sugar cane and beets for the sugar industry, fruits, vegetables and animal production to food industries, etc.

Improvements in the agricultural sector will increase the demand for industrial goods, especially machinery (tractors, combine harvesters, tools) and engineering products.

These developments will mean increasing backward and forward linkages not just between manufacturing and agriculture, but between other sectors, mainly oil and services. In Chapter 1, the heavy dependence on the oil sector was seen as one of the main economic problems from which Iraq has been trying to escape. A main factor behind this continued dependence has been the physical isolation of oil from the general economy. Accordingly, only primary commodities have been produced and exported, and this in turn has resulted in almost non-existent backward and forward linkages between the oil sector and the economy. A fertilizer industry would not just increase backward linkages through its heavey demand on raw materials, but would create and improve other sectors' demands mainly in terms of energy and raw materials. Forward linkages between oil and industry would also be improved through the supply of skilled labour, engineering, technology and other services by developing the industrial and service sectors.

As a result of increasing linkages, demand for transport services would increase. More roads, railways, and perhaps river transport would be needed, and this would stimiulate demand in the construction sector.

General demand for skilled and unskilled labour would rise and an expanding industrial base will reduce Iraq's dependence on imports and stimulate future expansion of exports.

11.10 Conclusions

In the first section of this chapter, an estimation of the capital and production costs of a fertilizer plant of 544,500 t/y was carried out. In comparison with a similar plant in a developed location Iraq's comparative advantage was seen as over $90 per unit of product. Significantly, even when capital cost in Iraq is 50% higher than that of the developed location, the comparative advantage of local industry was still over $80 per unit. These advantages also exist when the industry only operates at 60% of rated capacity. It appears that the main factor behind these advantages lies within the very low cost of raw material in Iraq compared to that of the developed location.

These comparative advantages in production cost have created an opportunity for Iraq to export fertilizer. The investigation has shown that the prices of Iraqi urea as landed in many developed and developing countries are highly competitive with local prices in these countries.

The benefits of fertilizers to the Iraqi economy are significant. It has been estimated that a total

saving of about $235 million p.a. of foreign exchange could be made by applying fertilizer to four million hectares used for wheat production. This is in addition to the larger values of foreign exchange earnings as a result of producing both wheat and fertilizer surpluses for export. The value of non-oil exports would in turn be maximised thus improving the existing positive balance of trade even more.

Other direct and indirect benefits of this industry are mainly seen by the development of both the agricultural and the industrial sectors in general. Apart from improving both the quantities and qualities of food, the agricultural sector would be more capable of supplying the textile, sugar and other food industries with raw materials. This would not only lead to higher standard of living amongst farmers but also strengthen backward and forward linkages between agriculture and the rest of the industries. The industrial sector could therefore be expanded in various directions depending on locally produced raw materials. This is in addition to the benefits which could be gained directly from the fertilizer industry in terms of skilled labour development and the acquisition of new technology. The growth in these sectors' output would increase their total value added thus leading to an increased contributions of the non-oil sectors to GDP.

Having attained these benefits, the domestic market which was characterised by its small size must surely expand, thus helping to overcome one of Iraq's main constraints to development.

CHAPTER 11

NOTES

1. UNIDO, second - wide study on the Petrochemical Industry: process of restructuring.
   Second consultation meeting on the Petrochemical Industry, Istanbul, Turkey. 22-26 June 1981.
   UNIDO, ID/WG.376/3, 19 May 1981, p. 101

2. Ibid. p. 101.

3. Ibid. p. 101.

4. Ibid. p. 110.

5. The industrial uses of associated gas: a joint study by United Nations Industrial Development Organisation, in cooperation with Gulf Organisation for Industrial Consulting - 30 April 1981.
   UNIDO/PC. 11 20 July 1981, p. 107.

6. Second - wide study on the Petrochemical Industry, UNIDO, pp. 110 and 122.

7. Commission on Fertilizers (Eighth Session), Rome, 31 January - 3 February 1983, "The Influence of Imported Technology on the Capital Costs of Plants and the Price of Fertilizers".
   FAO, FERT/83/3 Add. 2, October 1982, pp. 3-4.

8. Commission on Fertilizers (Sixth Session), Rome, 30 June - 3 July, 1980, "Investment and Production Costs for Fetilizers".
   FAO, FERT/80/4, April 1980, p. 6.

9. For example, while the UNIDO estimated the average cost of labour at $10 man/h in Qatar and $15.4 man/h in the U.S.A., the GOIC suggested that it should be the other way round. Other sources like E, Ghantous and the FAO indicated that cost of labour in both developed and developing countries can be the same, see E. Ghantous, 1982, p. 149, and the FAO, FERT/80/4 Aoril 1980, p. 8.

10. For example UNIDO estimation is based on market price (second wide study - Ibid. Annex 11.F p. 41) while FAO estimation is based on the price of energy equivalent.
FAO, FERT/80/4, April 1980, p. 8.

11. UNIDO, Second - wide study - 1981, Annex 11.F, p. 41.

12. The Industrial Uses of Associated Gas, UNIDO, 1981, p. 108.

13. It was stated by M. Al-Ani, the Managing Director of The General Directory of Light Industries - Baghdad, (Al-Risalah, 1978, p. 9) that foreign skilled workers in Iraq are paid 25% more than Iraqi labour working in the same industry.

14. Other costs would be those of taxes, tariff and insurance.

15. National Development Plan 1976-80, General Framework. Ministry of Planning, December 1975. Also see "The Economy of Iraq, Development and Prespectives 1958-1976-1980". Ministry of Information, Baghdad, 1977, pp. 115-130.

16. In fact the experimental work mentioned in Chapter 7 has shown that, under certain conditions, the application of nitrogenous fertilizer to different areas of Iraq had more than doubled output of crops.

17. It should be noted that the balance of payments in Iraq was dominated by foreign trade during 1976-77. Also, no change in the situation of Capital and Monetary Accounts will be seen as a result of our plan. Therefore, any change in the final balance of payments here will only be as a result of the change in the situation of foreign trade.

18. Excluding all types of materials in this case will help avoid double counting since all the materials used in this case are already valued and counted as value added for other sectors.

19. A. A. Kubrusi, D. W. Butterfield and Se Hark Park, "Industrial Activity in Iraq: A Quantitative Analysis and Some Projections to The Year 2000", OESP Research Report No. 8, McMaster University, Faculty of Social Sciences, Hamilton, Ontario, Canada. 1981.

20. OCDE, Development Centre Studies: Supply and demand prospects for fertilizers in developing countries. Development Centre of the Organisation for Economic Cooperation and Development, Paris 1968, p. 15.

21. Ibid. p. 15.

22. Ibid.

23. UN. Report of the First United Nations interregional conference on the development of petrochemical industries in developing countries. Tehran-Iran, 16-30 November 1964. United Nations, New York, 1966, pp. 1 and 9.

CHAPTER 12

CONCLUSIONS

The investigation in Part One of the thesis has revealed that the main feature of development planning in Iraq during the period 1953-75 was an absence of a viable strategy. During the 1950s planners, completely dependant upon the advice of foreign experts, attempted to apply various economic strategies directly to Iraq without appraisal of the full socio-political and economic conditions of the country. The lack of statistics and accurate information, the shortage of technical skills and relevant facilities in addition to the existing under-developed socio-political system, should have made it clear that economic theories could not be applied to the country without necessary adjustments. This was also found to be the case during the sixties and seventies. Both periods were characterised by the establishment of large scale projects without serious feasibility studies or accurate estimations of demand for their output. This was coupled with very poor surveys of raw materials, labour and power required for these projects. The result was under utilised capacity and bottlenecks in other sectors of production.

The failure of the development programmes in the period above have exaggerated the existing imbalanced structure of the economy. Up to 1975, both the agricultural

and the industrial sectors were severely underdeveloped and their total contribution to national income continually declined. Although the largest contribution has been provided by the crude oil sector, the role of this sector was mainly fiscal as demonstrated by the heavy dependence of the economy on oil revenue. These revenues have been the major (in many cases, the only) source of finance for government consumption, imports, foreign exchange reserves and investment capital. Real linkages with other sectors were found to be very weak. The only backward linkages of the crude oil sector was as a user of labour and yet less than one per cent of total employment was absorbed by crude oil activity. The majority of those employed were foreign nationals earning wages well above the average. The only forward linkage was provided by the sale of low cost oil for consumption as fuel.

Part of the oil revenues were invested in various development programmes during the period. However it was observed that little significant change in the basic economic structure resulted from these investments. The crude oil sector was no more than a source of revenue to finance consumption as no serious attempt was made to utilise its real potential for restructuring the economy through its integration with other sectors. The foreign oil companies have played a major role in the maintenance of this situation. In their long-term conflict with the Iraqi government, specially during 1960-72, they managed to

prevent any attempt to utilise crude oil as a raw material in any industry. They further insisted on flaring the associated gas which was estimated to be equivalent to about 6 per cent of Iraq's daily production of crude oil.

This state of the Iraqi economy makes it important that a study of its development be made. This thesis has attempted to examine alternative strategies, in particular that of industrial and agricultural integration. The petrochemical industry is chosen as the most promising option which could lead to integrating the crude oil sector with the rest of the economy. The thesis argues that this industry could increase the degree of interdependence of the oil sector with the industrial and the agricultural sectors by providing the latter with the necessary inputs and using the outputs of the former. A basic product of petrochemical is nitrogenous fertilizer - the focus of our strategy - and it is evident that this single input individually has as much effect on agricultural output as all other relevant inputs together. As over 30 per cent of total population of Iraq are directly dependant on agriculture for their livelihood, the importance of their standard of living is vital for economic development. Increasing the standard of living of the rural population could accelerate demand for consumer (industrial) goods and could generate savings for further investment. Also, because of the low productivity of the agricultural sector, imports of food have been increasing thus costing scarce foreign exchange. Increasing agricultural

output would therefore create import substitutes and provide the means for export diversification.

Demand for nitrogenous fertilizer has considerable potential for expansion. Investigations of this market has been limited to a small area of the country and have completely neglicted the possibility of export markets. My investigation has shown that scientifically most agricultural land in Iraq is suitable for the use of nitrogenous fertilizer, while other areas can be improved to similar levels of productivity with the help of draining systems. If the latter were to be completed the demand for this type of fertilizer can be more than doubled. Another important factor which was almost completely neglected by the planners was the technical and economic conditions of the Iraqi farmers. The survey showed that these farmers are willing to invest heavily in fertilizer if the government was to increase credits and direct and indirect subsidies for this type of input. In addition to the domestic market, export possibilities have also been found to be encourageable, particularly in the medium and long terms. The success of some oil exporting countries such as Saudi Arabia and Qatar in this field is seen as an example of how such developing countries can competitively enter the international market in petrochemicals.

The estimation of the size of the domestic market for nitrogenous fertilizer has provided the rational for a large scale fertilizer plant. This plant is found to be

feasible because it could utilise cost advantages. The associated gas plays a major role in reducing the production cost per unit to a level highly competitive with similar products in developed countries. Despite the high initial capital cost, Iraq's comparative advantage is very obvious even when the plant is working at a lower than planned capacity (the capacity examined was of 544,500 tonne per annum of urea). This suggests that if a rapid increase in demand is assured, a larger scale capacity can still be utilised. However, due to the scarcity of reliable data it should be noted that the results may be subjected to some degree of variation, but this should not significantly effect the comparative advantages of the country. This was tested by assuming that the cost of capital investment in Iraq is 50 per cent higher than in a developed country. Together with a rate of return on investment of 15 percent, the ex-factory price is still seen to be highly competitive with some developed countries. Due to such high comparative advantage Iraq's export prices (landed) to these countries are also found to be competitive.

This thesis also examined the use of oil (naphtha) as feedstock as well as gas. It argued that in the long term the dependance on gas alone for fertilizer production may raise some difficulties. Because gas in Iraq is associated with crude oil production, an expansion in plant capacity or a likely increase in other domestic uses of gas may lead

to increases in oil production itself. Such an oil production policy may not always be rational especially if international demand for crude oil happens to be stable. The use of naphtha was incorporated as a feedstock for the petrochemical industry long before gas was introduced as a cheaper alternative. This is evident today in both developed and developing countries. It is therefore suggested that in planning for large scale petrochemical plants Iraq should seriously consider the possibility of using naphtha in addition to its flared gas by designing these plants in a way that would allow the use of naphtha for feedstock in case of gas shortages.

I then investigated the impact of the fertilizer industry on the Iraqi economy. A major part of the investigation was directed to estimating the value of benefits regarding three main aspects; namely foreign trade (saving and earning of foreign exchange), total GDP and agriculture. Taking wheat as an experimental factor, it is found that with the minimum level of fertilizer use, the present productivity could be increased by an average of 30 percent. This rate could be maximised in many areas of the country where soils and suitable.

The use of four million hectares for wheat production, together with the application of 400,000 tonne of fertilizer p.a. would not just meet all the wheat requirements of the country but would also produce a total surplus of over two million tonne p.a. for export. Accordingly the country

would save about $154 million p.a. on import substitutes of wheat and would earn an estimated total of $438 million from wheat exports. This is in addition to the earning of foreign exchange resulting from exporting of fertilizer surpluses. These values, indeed, could be further increased by maximising the application of fertilizer per hectare, by increasing the area under cultivation for wheat production, or by a combination of both. The analysis of agriculture has demonstrated the potential of this sector for achieving such a target. It was observed that apart from the availability of massive water resources, the country has over 15 million hectares of fertile land of which only one quarter of this total has actually been utilized for agriculture. The exploitation of these natural resources are likely to prove Iraq's main opportunity for sustained growth in the future.

The balance of trade would then directly be effected. The activities above would increase the value of the balance of trade by $608,68 million p.a. In fact this would more than double the value of non-oil exports.

It is obvious that an increase in wheat production would expand the total value added of the agricultural sector and in turn its contribution to GDP. Similarly the fertilizer production would increase total value added of the industrial sector and its contribution to GDP. The investigation has shown that as a result of the above economic activities total value added of the agricultural and the industrial

sectors would be increased by estimated annual values of $400,86 million and $60,45 million respectively. This would increase the contribution of these sectors to GDP by 1.46% and 0.23% respectively.

The benefits of using local fertilizer to the farmer have been found to be significant. By using one tonne of urea, a farmer could increase final production of wheat by approximately 2.4 tonnes p.a. The farmer's final increase in income would be the difference between the market value of the extra output and input used for such increases in production. Accordingly a net increase in farm income of about $347 could be generated as a consuquence of using local fertilizer; this would decrease to $153 if the farmer used imported fertilizer. This meant that if wheat prices were to decline by a maximum 33%, no improvement in income would be derived from using imported fertilizer, yet farm income could still be improved by using local fertilizer even if the price of wheat was to fall by 70%.

The significance of the increase in agricultural productivity as a result of fertilizer application is that it provides economic benefits within one planting season. The advantage of this input is considerable since the benefit from other agricultural inputs may take years before the effects are seen. In a country like Iraq where farmers are poor the application of fertilizer could be a quick direct method of improving farm incomes. Also, increasing land productivity should direct great numbers of farmers who have already migrated, and those who may be thinking of

migrating to urban areas, to return to their land and to increase investment. This could help solve one of Iraq's main economic and social problems. Such an action could in addition help to increase general employment and decrease seasonal unemployment in the agricultural sector.

Undoubtedly economic development can always be influenced, or guided, by political factors. The investigation has shown that the unstable political condidtions of the country have influenced the pattern as well as the process of development. This has caused great damage in terms of financial and human resources. This suggests that any development strategy recommended for Iraq should incorporate this factor. Though it may seem applicalbe, a strategy under such conditions may fail to generate benefits and could lead to slowing down in the development process by misusing revenues which could be invested in more productive investment. In addition, the lack of domestic skilled labour may also effect industrial progress. Unless serious attempts are made to create a sufficient pool of skilled labour, the country will continue to depend on foreign labour. Apart from limiting the application of development projects, this situation could lead to higher production costs. It is recommended however that after the industry itself is constructed the country would then have a better chance of creating an efficient training programme with the assistance of both the industry and its foreign skilled workers.

In conclusion a successful petrochemical industry can play a dynamic role in accelerating economic development in Iraq. With its high linkage effects, it should be able to assist directly the integration of the crude oil sector with the rest of the economy. Apart from the direct impact on agricultural output, it has been regarded as a strategic factor for the inducement of future industrial development in the country. However, it is argued that unless suitable economic and political condidtions are made available, the development of such a capital intensive industry may not successfully take place; as a result the great benefits to the general economic growth of the country can not be realised.

A P P E N D I C E S

APPENDIX A

ANALYSIS OF DATA COLLECTION

Data used in this study is assembled from various sources, mainly Iraqi official data published by the government of Iraq. The handling of this data, however, was not without difficulties. The Appendix gives a brief analysis of the nature and problems of the data collection. It also discusses the methods which were used in order to obtain relevant and reliable data and information.

1, Compilation of Data

Up to 1960, data relating to the Iraqi economy was not officially available. However, a few estimations were made during the fifties by the IBRD and by Lord Salter and A. D. Little who were economic advisors to the Iraqi government (Chapter 3) during that period of time. The data which was presented by these advisors in their reports was very limited in terms of time and coverage of the economic sectors. Apart from being different from one source to another, the data only covered parts of the agricultural and industral sectors, neglecting the most important statistics which relate to the national accounts. In addition, these reports, which were presented for different purposes, did not explain the methods used and variables taken into account when estimating data.

The first detailed estimation and the one which indicates the method employed and the degree of reliability of each of the figures was carried out by Fenelon, who was a

statistical expert for the Iraqi government until 1958. Fenelon published his estimation of the national income, which covered the period 1950-56, in 1958.[1] Due to many difficulties, mainly related to the "underdeveloped structure of the economy" and the nature of the country, he himself qualified his data by using the term "caution".[2]

In 1961 another estimation of national income covering the period 1959-60 was published by the Soviet statistician Maniakin who was influenced by the Marxist concept of national income.[3] There is, however, very little information in the publication on how Maniakin estimated the figures or about his sources.

"To correct the shortcomings and lacunae in the Fenelon"[4] and Maniakin statistics, a more comprehensive study was carried out by Haseeb who also produced his data on the national income of the country.[5] This study was carried out in Cambridge University for the degree of PhD in 1961. The study first covered the period 1953-56, but was subsequently extended to cover the years 1953-61 and later 1962 and 1963.

While this study was ongoing, the Iraqi gcvernment appointed the UN expert in economic statistics, Dr Rasaputran, to estimate the national income of the country. In his report Rasaputran covered the period 1962-65.

The estimates presented by the four experts mentioned above differ, although Haseeb, Fenelon and Rasaputran used similar methods (Table 1).[7] The government, in order to eliminate any confusion resulting from the differences in data, adopted Haseeb's estimation and the data presented in

TABLE 1.

Comparison of Estimations of

National Income, 1953-65

(At Current Price, in I.D. Million)

Year	Fenelon	Maniakin	Haseeb	Rasaputran	Ministry of Planning
1953	259	-	245.9	-	-
1954	268	-	285.8	-	-
1955	289	-	291.2	-	-
1956	303	291.7	337.6	-	-
1957	-	298.0	355.4	-	-
1958	-	318.6	378.7	-	-
1959	-	379.8	396.1	-	-
1960	-	431.0	449.7	-	-
1961	-	-	485.7	-	-
1962	-	-	-	528.3	527.0
1963	-	-	-	525.3	525.1
1964	-	-	-	595.8	595.8
1965	-	-	-	632.4	684.4

Source: Haseeb p.31
W Rasaputran, p.11
Ministry of Planning, Statistical Pocket Book, (SPB) Central Organization of Statistics, Baghdad, 1970

his study was officially published by the Central Statistical Organization (CSO) which was established in 1964. There were two main reasons for choosing Haseeb's estimations rather than those of the other experts:

1. This data was estimated by an Iraqi economist who naturally know more details about the country than any other foreign experts.[8]

2. Haseeb's study was carried out in a highly regarded academic institute, namely Cambridge University, under close supervision. Thus, the government thought that more reliable results should have been presented.

It should be noted that the above studies only concentrated on data related to the national income of the country. Up to 1960, no reliable data on many sectors of the economy was available. It was not until the CSO was established and took over the direct responsibility for producing and publishing statistics related to the Iraqi economy that data covering specific sectors became available. Up to 1975, this organization had still not managed to cover every aspect of the economy. Accordingly many important details needed in any analysis of the Iraqi economy were not yet officially available. The Organization lacked experience, skills and equipment as well as independence. It therefore continued to depend on other government departments for both skills and data production, particularly the Central Bank of Iraq and the Ministry of Finance. Apart from being among the oldest institutes, these departments have always been better equipped with skilled personnel and recording facilities. These departments, however, only produced data

related to the national accounts and financial situation of the country. The argument, therefore, still stands that a comprehensive and effective development plan will not be achieved without the existence of reliable and detailed data that covers every aspect of the economy. Such data did not exist in the country during 1953-75.

2. Access to Data

Access to data and information related to the Iraqi economy is always frought with problems. In his report, Rasaputran said:

> "In a country like Iraq where the information regarding all....transactions is lacking it is not possible to have a comprehensive analysis of such transactions. Due to the underdeveloped nature of the country coupled with a low degree of literacy the collection of reliable information to cover the existing gaps in statistics pose several problems non of which can be solved in the short run. A considerable amount of effort is required to build up a series of statistics as raw material for development programming and economic policy formulation".(9)

Haseeb also pointed out many problems which prevented estimation of data. He stated:

> "There were cases where no information whatsoever was obtainable, and here it has been necessary to guess".(10)

Due to the scarcity of data and problems of accessibility to related information, Haseeb could only use limited statistics taken from a small number of areas of the country and his remaining data were extrapolated. He said:

> "To bring certain gaps in our data, which could not be filled by either published or unpublished data, special inquiries and interviews were made; these were in many cases confined to a few provinces, or to one province only as the resources available were too limited for longer-scale enquiries. Information obtained through these inquiries is not claimed to be a representative

sample of the relevant nation-wide data. Most of the special inquiries were made in Mosul province, although some information was obtained from Arbil, Baghdad, Diyalah, and Amarah provinces.(11)

According to this statement, over half of the Iraqi economy was not directly included in Haseeb's survey.

The above problems were also applicable for the period of the sixties and even worsened in the seventies, not with standing economic development. The DRI describe the situation by stating:

> Data for Iraq is so scarce that estimations of the level of economic activity, internal prices, trade volume and earnings are extremely difficult to make.(12)

The access to relevant data needed for this current study was a major problem that required considerable effort and proved to be extremely time consuming. Due to the non-availability of published data for various sectors of the economy, I had to contact some official sources in the country, mainly the Ministry of Finance, the Ministry of Planning and the Central Bank of Iraq (CBI). Unfortunately little response was obtained. The information which I did manage to obtain was limited and is of little benefit to the analysis. Most of the information contained data that was out of date, undetailed, and some of the sources did not provide the statistics asked for. Also, the response from these sources was very slow.

Help I was given by some friends in the country, proved to be far greater than that from official sources. This included the sending of published and unpublished data as well as supplying information by telephone. This method of obtaining information, however, still posed many problems

mainly related to legality as much of the information was not for publication inside or outside Iraq. This situation became worse after the outbreak of the Iraqi-Iranian war. Since then legislation has forbidded the supply and publication of any figures related to the economy. A good example is the withdrawal from publication of the CBI's bulletin since 1978. This was a great loss as it had always been the only official source of detailed data related to the national accounts, foreign trade and balance of payments.

The confidentiality of information related to many industries was another problem that prevented me from obtaining important data on production costs in the industrial sector. Special inquiries had to be carried out in order to obtain some of the relevant data. As the sources were very limited, I had to depend, in many cases, on only one source which was not directly involved in producing such information. Again the information released was strictly confidential. For this reason, therefore, direct reference to some sources of data has been avoided as much as possible.

Among the confidential data was that related to the petrochemical industry. I found that this data was so scarce and so confidential that it was impossible in many cases to obtain even rough estimations. An alternative source was the data related to similar projects in other countries of the Middle East, namely Kuwait, Qatar and Saudi Arabia. The majority of this data was obtained through non-official sources, namely the publications of the United Nations and the Gulf Organization for Industrial Development. Some information was collected, in addition, through Arabic

publications namely those of the OAPEC and also through personal contacts. Though the type of data obtained through this method varied from one source to another, in some cases, I had to accept the first source that became available. This was due to factors related to time, scarcity and cost. For example, it took the British Library over six months to supply me with the Second-World-Wide Study on petrochemical industry (U.N.). This valuable source of data and information, which was bought by the library on my request, however, did not contain any data related (directly) to petrochemical industry in Iraq.(13)

3. Reliability of Data

The question of how much of the data is reliable, can be answered by some of those who estimated data themselves. For example, Haseeb described the reliability of his final results of the estimation of the national income by giving a margin of error for each figure. He said:

> "For the national income as a whole, this margin lies between -7 and +9 per cent for the years 1953/4 and 1958/61. For 1955 it is between -7 and 8 per cent, for 1956 between -8 and +9 per cent, and for 1957 between -9 and +10 per cent. The margins of error of the regional distribution of the national income in 1956 lie between -12 and +13 per cent, and of the subsistence national income between -14 and +17 per cent".(14)

Haseeb also gave a margin of error concerning the value added figures for each sector of the economy. The most significant margin was seen in agricultural. In 1956, it was between -18 and +22 per cent compared to that for manufacturing of -12 and +10 in the same year.(15) Haseeb, blamed the inaccuracy of some of the information he used in

estimating the data for these errors, as there was no other alternative available. Where no information was available, he simply guessed relevant data.

Also, Rasaputran gave his judgement on the reliability of his data as follows:

> If details of sectoral balances and commodity balances are available the task of economic planning would be made easier. But is is difficult to get such details in a disaggregated system of sectoral accounts. In the alternative it is necessary to make the best use of available data and improve the existing series in a phased programme of statistical development. The national accounts of Iraq therefore may not strictly conform to all the layout of the accounts given in the System of National Accounts of the United Nations. Wherever possible a few accounts conforming to the UN classification of National Accounts had been attempted. In other cases it was necessary to follow a lower level of aggregation than that suggested by the SNA.(16)

These statements clearly indicate that all the data related to the national accounts between 1953-65 is not accurate as the level of error reaches 25% on some figures. But since no alternative was available the data had to be used in this study when needed (mainly Part One).

The task became harder after 1965 as no evaluation of data whatsoever existed. Neither the Ministry of Planning nor the CBI gave any explanation on methods used in estimating data. This made the evaluation of available data very difficult particularly in the cases where different values of data were available.

The reliability of data was even more questionable in the case of non-official sources. A great amount of data published by these sources is regarded as inaccurate since no explanation is given to method and sources of information used for estimating such figures. Some of these sources have

made it worse by referring to official non-published data. The result was seen in producing figures which are completely unacceptable. For example, a report on Iraq stated that in 1977 only 30% of total labour force (943,890 persons) were engaged in agriculture.(17) According to an Iraqi magazine, this percentage should have stood at about 50% (an estimated number of 1.6 million) in the same year.(18)

Because almost all petrochemical projects in the Middle East were carried out by different foreign companies, different estimations of capital and production costs were quoted. The data published on these projects was significant. A good example is the figures related to capital cost of fertilizer plants; this cost was estimated to be 20% to 100% higher than that of similar projects in developed countries.(19) Given the huge capital involved, the task of choosing data for estimating capital cost in Iraq was very difficult. In some cases therefore I completely ignored such data and used a theoratical rather than statistical approach of analysis.

Generally, in order to choose more reliable data, I applied the following methods:

(1) The comparison of relevant data with previous and subsequent period's data.

(2) In the case where no time series of figures was available, I relied on the reputation of the source.

(3) Personal consultations with official sources in the Ministry of Finance, the Ministry of Planning and the CBI. In fact, I was very fortunate to have a strong contact with a key person in the Research Department of the CBI. This

friend was, for 15 years, directly responsible for estimating data related to the Iraqi economy and also for editing the most important official source of statistics which is the CBI's bulletin.

4. The Survey

In order to obtain the information and data needed for the estimation of present and potential demand for nitrogenous fertilizer in the country, a survey was carried out. This survey was the only possible way of obtaining relevant information as no data whatsoever existed on this aspect. Due to the limitation of resources the survey had to be carried out in one area of the country, in the Diyala region. The survey was based on "face to face" interviews with 34 full-time farmers. These farmers were asked similar questions and their answers were recorded and then analysed.

The main reasons for choosing this area for the survey were: (1) The farmers in this area are land owners, (2) In comparison with the farmers in other areas of Iraq, the farmers in the Diyala region have higher incomes which makes them more able to invest in fertilizer than other farmers; (3) The farmers in this area are all full-time with two main seasonal production periods, the summer and winter. Thus more fertilizers could be used in this area.

The survey was very successful and the response of the sample was 100%. Vary valuable information and estimated figures were obtained and this directly assisted in the estimation of the size of the domestic market for fertilizer and indirectly served the analysis in many chapters of this thesis.

APPENDIX A

NOTES

1. K.G. Fenelon, "Iraq: National Income and Expenditure, 1950-56", Baghdad, 1958.

2. Ibid.

3. Moniakin used the production approach and divided the national income into two spheres; Firstly, "productive sphere"; this included industry, oil industry construction, agriculture and livestock, carriage of goods (road transport), trade and public food establishments, and other branches of the productive sphere (forestry, collecting metal scrap, handicrafts, gathering natural forest products, individual fishing and hunting); Secondly, "non-productive sphere"; this included services supplied to the community by municipalities and private persons, passenger transport (excluding railway transport), administration and national defence, science, education, health, etc., and finance.

   For more details, see, V. Maniakin, "Introduction to National Accounting in Iraq for 1956-60", Ministry of Planning, Baghdad, 1961.

4. Yusif A. Sayigh, "The Economics of The Arab World: Development since 1945", Croom Helm, London, 1978 p. 48.

5. K. Haseeb, "National Income of Iraq 1953-61", Oxford University Press, London, 1964.

6. W. Rasaputran "National income of Iraq 1962-65, Technical notes on the Estimation of National Income of the Republic of Iraq 1962-65", Baghdad, 1965.

7. Fenelon, Haseeb and Rasaputram used the rules and recommendations given in the System of National Accounts of the United Nations. However, they still differed from one to another depending on the data and informations which were available to them.

8. This economist (Haseeb) was given a key position in the Ministy of Planning. This put him in a position to recommend the data which was to be officially adopted by the government during the first half of the sixties.

9. Rasaputran, p. 5.

10. Haseeb, p. 10.

11. Ibid.

12. DRI, Data Resources, Inc., Middle East and African Economic News, August 1, 1984, p. 5.

13. This sources included only Qatar in the estimation of capital and production cost of petrochemicals in the Middle East area.

14. Haseeb, p. 29.

15. Ibid, Table 109, p. 183.

16. Rasaputram, pp. 5-6.

17. EIU Special Report No. 88, Iraq: "A New Market in a Region of Turmoil", The Economist Inteligence Unit Ltd, October 1980, P. 40.

18. Wa'ayilommal, Al-Etihad Al-A'm Linakabat Alommal, Baghdad - Iraq, July 1977.

19. The different estimations of capital cost of anmonia in the Middle East can be seen in the following examples:

Source	Estimation of Capital Cost
(a) Abdelaziz Alwattari, "Oil Downstream: Opportunities, Limitations, Polices", Lecture delivered by the Assistant Secretary General of OAPEC at Oxford Energy Seminar, held at Oxford University, September 3-14, 1979, Organization of Arab Petroleum Exporting Countries, Kuwait, 1980, p. 90.	
Ammonia production, 1979	25% higher than the capital cost of similar capacity in Europe.
(b) UNIDO (see Note 5, Chapter 11).	
Ammonia production, 1980	30% higher than the USA.
(c) The Gulf Organization for Industial Consultancy (GOLC), Doha, Qatar (see Note 6, Chapter 11).	
Ammonia production	50% higher than the USA.

(d) FAO Commission on Fertilizers, "Investment and Production costs for Fertilizers", (FERT/80/4), Rome, April 1980, pp. 6-7 and 25.

Ammonia production, 1980	100% higher than similar projects in any developed country.

All the data related to the National Income used in this Appendix are at current prices as no time series of relevant data at constant prices that cover all the period under investigation was available.

APPENDIX B

TABLE 1

Population, National Income, Per Capita Income
1953-1975

Year	Population (m)	Growth p.a. %	N.I. P	Growth p.a. %	Per Capita Income (I.D.)	Growth p.a. %
1953	5.676	-	243.9	-	43.0	-
1954	5.835	2.8	284.0	16.4	48.7	13.2
1955	6.002	2.8	289.3	1.8	48.2	(-)1.1
1956	6.175	2.8	334.6	15.7	54.2	12.4
1957	6.340	2.6	352.8	5.4	55.6	2.5
1958	6.553	3.3	373.9	5.9	57.1	2.7
1959	6.774	3.4	391.4	4.7	57.8	1.2
1960	6.929	2.3	437.2	11.7	63.1	9.2
1961	7.143	3.1	484.5	10.8	67.8	7.4
1962	7.367	3.1	527.0	8.8	71.5	5.4
1963	7.601	3.2	525.1	(-)0.4	69.1	(-)3.4
1964	7.846	3.2	595.8	13.5	75.9	9.8
1965	8.097	3.2	684.4	14.9	84.5	11.3
1966	8.360	3.2	741.7	8.4	88.7	4.9
1967	8.633	3.3	758.4	2.3	87.8	(-)1.0
1968	8.914	3.2	845.0	11.4	94.8	7.9
1969	9.205	3.3	885.1	4.7	96.2	1.5
1970	9.440	2.5	962.0	8.7	101.9	5.9
1971	9.750	3.3	1081.3	12.4	110.9	8.8
1972	10.074	3.3	1166.9	7.9	115.8	4.4
1973	10.413	3.4	1412.1	21.0	135.6	17.1
1974	10.765	3.4	3002.5	122.6	278.9	105.7
1975	11.124	3.3	3750.5	24.9	377.2	20.9

Source: Statistical Pocket Book (SPB) 1957-67, Central Statistical Organization, Baghdad, Iraq, 1968, pp.12 and 32.
SPB 1960-70, p.23.
Mahdi, 1974 p.434.
Table 3 of this Appendix.
Rasaputram, 1965, p.11.

TABLE 2

GROWTH OF EMPLOYMENT BY ECONOMIC SECTOR
1960-1974

Year	Agriculture	%	Mining	%	Manufacturing	%	Electricity Gas & Water	%	Construction	%	Trade	%
1960	733900	-	11000	-	130000	-	11800	-	58000	-	100000	-
1961	780500	6.3	11500	4.5	130000	0	11900	0.8	58000	0	105000	5.0
1962	827000	6.0	12000	4.3	130000	0	12000	0.8	50000	(-)16.0	110000	4.7
1963	873500	5.6	12500	4.2	130000	0	12000	0	43100	(-)16.0	115000	4.5
1964	920100	5.3	13000	4.0	130000	0	12000	0	47200	9.5	120000	4.3
1965	1009600	9.7	13500	3.8	135000	3.8	12200	1.6	61000	29.2	125000	4.1
1966	1103100	9.2	14000	3.7	140000	3.7	12400	1.6	70000	14.7	130000	4.0
1967	1177400	6.7	14500	3.5	140000	0	12600	1.6	59100	(-)18.4	135000	3.8
1968	1253600	6.5	15000	3.4	146000	4.2	12800	1.5	66000	11.6	140000	3.7
1969	1306400	4.2	15500	3.3	148000	1.3	12900	0.7	67000	1.5	145000	3.5
1970	1385700	6.0	16000	3.2	150000	1.3	13000	0.7	67000	0	150000	3.4
1971	1434700	3.5	16500	3.1	160000	6.6	13400	3.0	69000	2.9	155000	3.3
1972	1486200	3.5	17500	6.0	165000	3.1	13600	3.7	71000	2.8	160000	3.2
1973	1540400	3.6	18500	5.7	170000	3.0	14300	2.8	73000	2.8	164000	2.5
1974	1596600	3.6	19200	3.8	178000	4.7	14600	2.1	16600	2.7	166000	1.2

TABLE 2 (con.)

Transport	%	Services	%	Others	%	Total Employment	%	Unemployment	%	Labour Force	%
110000	-	245000	-	200000	-	1599700	-	31400	-	1631100	-
114000	3.6	250000	2.0	210000	5.0	1670900	4.4	63600	2.5	1734500	6.3
117000	2.6	255000	2.0	215000	2.3	1728000	3.4	109800	7.2	1837800	5.9
121000	3.4	260000	1.9	220000	2.3	1787100	3.4	154100	40.3	1941200	5.6
125000	3.3	265000	1.9	220000	0	1852100	3.6	192500	24.6	2044600	5.3
129000	3.2	270000	1.8	230000	4.5	1985300	7.1	162700	(-)18.3	2148000	5.0
133000	3.1	275000	1.8	230000	0	2107500	6.1	143800	(-)13.1	2251300	4.8
137000	3.0	285000	3.6	240000	4.3	2200600	4.4	154100	7.1	2354700	4.5
140000	2.1	290000	1.7	260000	8.3	2323400	5.5	134700	(-)14.4	2458100	4.3
143000	2.1	295000	1.7	270000	3.8	2402800	3.4	158700	17.8	2561500	4.2
150000	4.9	300000	1.6	275000	1.8	2506700	4.3	158200	(-) 0.3	2664900	4.0
154000	2.6	310000	3.3	280000	1.8	2592600	3.4	N.A.	-	-	-
158000	2.5	320000	3.2	285000	1.7	2676600	3.2	N.A.	-	-	-
162000	2.5	330000	3.1	290000	1.7	2762200	3.1	200100	-	2962300	-
167000	3.1	340000	3.0	295000	1.7	2851400	3.2	206400	3.1	3057800	3.2

Source: S.P.B., 1960-70, p.27.
U.N. - ECWA, Iraq, 1977, Table 3.
The Europa Year Book 1981, Vol, 2, P.563.
Dr Jawad Hashim, "Capital Formation in Iraq - 1957-1970", Al-Muaassaseh Al-Arabia Lildirasat wal-Nasher, 1975, p 19.

Year	(1) GDP	%	(2) Net Factor Income Abroad	
1953	322.9	-	57.6	
1954	374.3	15.9	67.6	
1955	386.9	3.4	71.4	
1956	428.8	10.8	65.5	(-
1957	430.1	0.3	46.4	(-
1958	484.6	12.7	78.5	
1959	509.5	5.1	85.8	
1960	565.4	10.9	95.3	
1961	615.3	8.8	94.2	(-
1962	658.4	7.0	93.3	(-
1963	670.6	1.9	108.3	
1964	761.2	13.5	123.7	
1965	867.6	13.9	129.5	
1966	938.0	8.1	138.6	
1967	941.9	0.4	122.6	(-
1968	1067.0	13.3	156.8	
1969	1109.7	4.0	154.7	(-
1970	1202.4	8.4	166.0	
1971	1375.0	14.4	214.9	
1972	1388.8	1.0	126.5	(-
1973	1587.5	14.3	83.0	(-
1974	3347.7	110.9	242.0	
1975	3970.5	18.6	115.0	(-

TABLE 3

ECONOMIC GROWTH

(3)

%	GNP	%	Capital Consumption	NI	%
-	265.3	-	21.4	243.9	-
17.4	306.7	15.6	22.7	284.0	16.4
5.6	315.5	2.9	26.2	289.3	1.8
-) 9.0	363.3	15.2	28.7	334.6	15.7
-) 41.1	383.7	5.6	30.9	352.8	5.4
69.2	406.1	5.9	32.2	373.9	6.9
9.3	423.7	4.3	32.3	391.4	4.7
11.1	470.1	10.9	32.9	437.2	11.7
-) 1.2	521.1	10.8	36.6	484.5	10.8
-) 0.9	565.1	8.4	38.1	527.0	8.8
16.1	562.3	(-) 0.5	37.2	525.1	(-)0.4
14.2	637.5	13.4	41.7	595.8	13.5
4.7	738.1	15.8	53.7	684.4	14.9
7.0	799.4	8.3	57.7	741.7	8.4
-) 13.1	819.3	2.5	60.9	758.4	2.3
27.9	910.2	11.1	65.2	845.0	11.4
-) 1.4	955.0	4.9	69.9	885.1	4.7
7.3	1036.4	8.5	74.4	962.0	8.7
29.5	1160.1	11.9	78.8	1081.3	12.4
-) 57.4	1252.3	7.9	85.4	1166.9	7.9
-) 66.5	1505.5	20.2	93.4	1412.1	21.0
195.1	1505.5	106.3	103.2	3002.5	112.6
-)110.4	3855.5	24.1	105.0	3750.5	24.9

Table 3

Source: Table 4.
SPB 1957-1967, 1968, p.45.
SPB 1960-1970, 1972, p.34.
SPB 1974, 1974, p. 76-77.
UN-ECWA, 1977, Tables 5 and 8.
Mahdi, 1974, p.442.
Haseeb, 1964, p.

(con.)

TABLE 4

GROWTH IN SECTOR OUTPUT OF GDP AT CURRENT PRICES, 1953-75 (MILLION I.D.'S)

Year	Agriculture.	%	Oil	%	Mining	%	Manufacturing	%	Construction	%	Electricity Water & Gas	%
1953	71.5	-	128.9	-	0.9	-	19.7	-	11.3	-	1.5	-
1954	84.7	18.5	149.5	15.9	0.9	0	21.9	11.2	17.2	52.2	1.8	20.0
1955	65.3	(-) 29.7	161.2	7.8	1.6	77.8	26.9	22.8	21.3	23.8	2.2	22.2
1956	89.2	36.6	152.4	(-) 5.8	1.6	0	32.1	19.3	24.8	16.4	2.5	13.6
1957	111.6	25.1	113.1	(-) 34.7	1.7	6.3	35.2	9.7	27.7	11.7	2.7	8.0
1958	92.8	(-) 20.3	175.4	55.1	1.8	5.9	36.8	4.5	29.8	7.6	2.8	3.7
1959	82.0	(-) 13.2	190.0	8.3	1.8	0	44.8	21.7	28.7	(-) 3.8	3.0	7.1
1960	97.8	19.3	208.1	9.5	1.7	(-) 5.9	54.4	21.4	23.1	(-) 24.2	3.6	20.0
1961	117.0	19.6	209.0	0.4	2.2	29.4	59.5	9.4	23.9	3.5	5.0	38.9
1962	140.0	19.7	210.2	0.6	1.9	(-) 5.8	65.1	9.4	19.6	(-) 21.9	5.5	10.0
1963	109.3	(-) 28.1	242.5	15.4	1.9	0	64.2	(-) 1.4	10.3	3.6	5.2	(-) 5.8
1964	148.1	35.5	266.9	10.1	1.9	0	63.4	(-) 1.3	18.7	(-) 8.6	7.7	48.1
1965	153.2	3.4	281.1	5.3	4.8	152.6	69.4	9.5	30.5	63.1	12.0	55.8
1966	163.4	6.7	298.5	6.2	5.7	18.8	74.7	7.6	34.5	13.1	12.6	5.0
1967	187.8	14.9	265.2	(-) 12.6	5.4	(-) 5.6	83.4	11.6	32.8	(-) 5.2	12.8	1.6
1968	196.0	4.4	334.6	26.2	6.4	18.5	94.6	13.4	36.8	12.2	14.9	16.4
1969	191.0	(-) 2.6	335.9	0.4	7.3	14.1	103.0	8.9	38.5	4.6	16.8	12.8
1970	206.9	8.3	362.6	7.9	7.9	8.2	116.0	12.6	40.6	5.5	17.8	5.9
1971	212.9	2.7	507.8	40.0	5.1	(-) 54.9	118.5	2.3	43.6	7.4	11.9	(-) 49.6
1972	269.4	26.8	500.0	(-) 26.9	7.3	43.1	140.0	18.1	45.2	3.7	13.7	15.1
1973	225.9	(-) 19.3	563.4	40.9	10.9	49.3	157.6	12.6	57.6	27.4	16.0	16.8
1974	232.1	2.7	2022.7	259.0	8.0	(-) 36.3	176.1	11.7	69.1	19.9	13.7	(-) 16.8
1975	297.3	28.1	2279.0	12.7	8.7	8.8	238.5	35.4	91.3	32.1	17.7	29.2

TABLE 4 (Con.)

Transport & Communication	%	Wholesale & Retail Trade	%	Banking, Insurance & Real Estate	%	Ownership of Dwellings	%	Public Administration & Defence	%	Other Services	%	GDP	%
21.4	-	17.8	-	3.2	-	11.6	-	18.3	-	16.8	-	322.9	-
22.1	2.3	20.7	16.3	3.6	12.5	11.9	2.6	20.8	13.7	19.2	14.3	374.3	15.9
24.6	11.3	21.5	3.9	4.5	25.0	12.2	2.5	24.3	16.8	21.3	10.9	386.9	3.4
27.6	12.2	26.9	25.1	6.3	40.0	12.5	2.5	28.1	15.6	24.8	16.4	428.8	10.8
29.9	8.3	29.7	10.5	6.6	4.8	12.8	2.4	32.1	14.2	27.0	8.9	430.1	0.3
30.6	2.3	27.5	(-) 8.0	7.4	12.1	12.5	(-) 2.4	37.6	17.1	29.6	9.6	484.6	12.7
34.3	12.1	26.2	(-) 4.9	8.2	10.8	11.6	(-) 7.8	45.6	21.3	33.3	12.5	509.5	5.1
39.7	15.7	32.6	24.5	8.7	6.1	11.9	2.6	45.7	0.2	38.1	14.4	565.4	10.9
46.0	15.9	36.6	12.3	11.1	27.6	12.1	1.8	51.5	12.7	41.4	8.7	615.3	8.8
47.0	2.1	38.6	5.5	11.4	2.7	12.4	2.5	59.8	16.1	46.5	12.3	658.4	7.0
48.8	3.8	35.9	9.3	12.8	12.3	12.4	0	67.4	12.7	49.9	7.3	670.6	1.9
54.9	12.5	44.5	23.9	7.7	(-) 66.2	14.8	19.4	81.2	20.5	51.4	3.0	761.2	13.6
58.2	6.0	69.8	58.9	9.5	23.4	30.2	104.1	89.0	9.6	59.9	16.5	867.6	13.9
63.2	8.6	74.7	7.0	12.4	30.5	39.0	29.1	94.1	5.7	65.2	8.8	938.0	8.1
64.0	1.3	79.7	6.7	12.3	(-) 0.8	32.4	(-) 20.4	98.2	4.4	67.9	4.1	941.9	0.4
65.8	2.8	86.9	9.0	13.1	6.5	37.9	16.9	104.6	6.5	75.4	11.0	1067.0	13.3
69.1	5.0	90.1	3.7	15.5	18.3	44.7	17.9	117.8	12.6	80.0	6.1	1109.7	4.0
77.2	3.0	98.6	9.4	18.6	20.0	51.0	14.1	124.3	5.5	86.9	8.6	1202.4	8.4
79.7	11.9	94.4	(-) 4.4	20.6	10.8	54.5	6.9	131.7	5.9	94.7	8.9	1375.0	14.4
85.9	7.5	102.6	8.7	20.0	(-) 3.0	36.3	(-) 50.1	136.0	3.3	112.4	18.7	1388.8	1.0
88.5	3.0	115.2	12.3	20.5	2.5	58.8	61.9	154.5	13.6	118.6	5.5	1587.5	14.3
124.1	40.2	168.9	46.6	44.2	115.6	74.7	27.0	261.4	69.2	152.7	28.8	3347.7	110.9
157.6	26.9	194.9	25.4	60.2	36.2	80.5	7.8	372.6	42.5	172.2	12.8	3970.5	18.6

Source: Iraq, CSO, Annual Abstact of Statistics 1970, 1974 and 1976.

TABLE 5

GROWTH IN EXPENDITURE ON GDP
(AT CURRENT PRICES IN MILLION OF I.D.'S)

Year	C^p	%	$+C^g$	%	$+I^p$	%	$+I^g$	%	+X
1953	171.3	-	48.7	-	41.9	-	40.3	-	158.2
1954	204.2	19.2	52.9	8.6	44.4	5.9	42.6	5.7	191.3
1955	228.8	12.0	54.9	3.8	46.8	5.4	45.0	5.6	207.8
1956	275.8	20.5	66.5	21.1	49.3	5.3	47.3	5.1	193.4
1957	290.1	5.2	72.9	9.6	47.5	(-) 3.8	58.8	24.3	156.2
1958	288.2	(-) 0.7	77.9	6.9	42.6	(-)11.5	55.2	(-)6.5	229.8
1959	296.9	3.0	94.9	21.8	51.2	20.2	52.4	(-)5.3	235.4
1960	342.5	15.4	110.8	16.8	68.4	33.6	51.9	(-)0.9	253.6
1961	377.6	10.2	117.9	6.4	77.6	13.5	59.6	14.8	253.4
1962	372.6	(-) 1.3	142.5	20.9	61.1	(-)27.0	58.1	(-)2.6	263.3
1963	326.4	(-)14.2	160.7	12.8	52.4	(-)16.6	67.5	16.2	299.3
1964	397.8	21.9	166.3	3.5	55.0	4.9	67.1	(-)0.6	328.3
1965	455.1	14.4	178.6	7.4	58.6	6.5	71.2	6.1	347.8
1966	496.8	9.2	189.1	5.9	73.4	25.3	76.2	7.0	370.2
1967	495.9	(-) 0.2	201.8	6.7	64.0	(-)14.7	79.6	4.5	329.7
1968	543.3	9.6	220.4	9.2	67.2	5.0	75.7	(-)5.2	407.5
1969	565.1	4.0	242.5	10.0	78.8	17.3	78.4	3.6	419.3
1970	609.9	7.9	268.9	10.9	84.0	6.6	101.1	28.9	445.7
1971	664.5	8.9	308.9	14.9	89.7	6.8	105.0	3.9	605.3
1972	657.4	(-) 1.1	332.8	7.7	102.4	14.2	114.6	9.1	515.5
1973	556.7	(-)18.1	410.4	23.3	69.7	(-)46.9	218.9	91.0	739.0
1974	727.5	30.7	796.2	94.0	N.A	-	N.A	-	2154.7
1975	1348.9	85.4	917.8	15.3	N.A	-	N.A	-	2023.5

Year	%	- M
1953	-	137.2
1954	20.9	159.1
1955	8.5	195.2
1956	(-) 7.4	204.3
1957	(-) 23.8	195.1
1958	47.1	210.4
1959	2.4	223.8
1960	7.7	260.9
1961	0.0	270.3
1962	3.9	252.1
1963	18.2	256.9
1964	9.7	317.6
1965	5.9	340.6
1966	6.4	363.7
1967	(-) 12.3	309.4
1968	23.6	353.7
1969	2.9	367.0
1970	6.3	410.7
1971	35.8	537.9
1972	(1) 17.4	440.5
1973	43.4	489.1
1974	191.6	1394.6
1975	9.4	1861.1

TABLE 5 (con.)

%	GDP
-	323.2
15.9	376.3
22.7	388.1
4.7	428.0
(-) 4.7	380.4
7.8	483.3
6.4	507.0
16.6	566.3
3.6	615.8
(-) 3.6	645.5
1.9	649.5
23.6	709.6
7.2	784.2
6.8	874.4
(-)17.5	875.7
14.3	972.0
3.8	1025.3
11.9	1116.6
30.9	1250.2
(-)22.1	1338.4
11.0	1575.8
185.1	3135.9
33.5	3418.5

Notes: (1) GDP of 1963-75 includes the following years 1953-62 is not available):

Year	I.D. Millions
1963	2.6
1964	12.7
1965	13.5
1966	9.3
1967	14.0
1968	11.5
1969	8.2
1970	17.7
1971	14.7
1972	56.2
1973	70.6
1974	320.2
1975	457.5

(2) GDP of 1974 and 1975 includes total investment (I) of I.D. 531.9 million and I.D 761.2 million and I.D. 761.2 million, respectively.

Sources: Mahdi, p.442
SPB 1968, p.50, and 1974, pp.78-79
UN. ECWA, 1977, Table 4
UN Year Book of National Accounts, 1974 -
KA Al-Eyd, p.90
Table 7

values of change in stock (data for the

- Vol. 1 and 1979 - Vol.1

TABLE 6

GROWTH IN GDFCF BY SECTOR AT CURRENT PRICES
1953-75 (IN MILLION OF I.D.'S)

Year	Agri-culture	%	Mining	%	Manufacturing	%	Const-ruction	%	Electricity Water & Gas	%	Transport	%
1953	10.2	-	9.2	-	10.2	-	1.4	-	4.5	-	18.3	-
1954	10.9	6.9	9.8	6.5	10.8	5.9	1.5	7.1	4.8	6.7	19.3	5.5
1955	11.4	4.6	10.3	5.1	11.3	4.6	1.6	6.7	5.1	6.3	20.4	5.7
1956	12.1	6.1	10.8	4.9	11.9	5.3	1.7	6.3	5.3	3.9	21.5	5.4
1957	18.4	52.1	5.0	(-)116.0	16.7	40.3	2.9	70.6	6.4	20.8	23.6	9.8
1958	15.6	(-)17.9	5.9	18.0	13.5	(-)23.7	2.1	(-)38.1	8.9	39.1	21.9	(-) 7.8
1959	12.5	(-)24.8	15.1	155.9	11.3	(-)19.5	1.8	(-)16.7	5.0	(-)78.0	20.7	(-) 5.8
1960	12.7	1.6	23.1	52.9	9.0	(-)25.6	1.3	(-)38.5	7.8	56.0	25.5	23.2
1961	14.9	17.3	22.8	(-) 1.3	12.8	42.2	1.9	46.2	5.0	(-)56.0	32.1	25.9
1962	11.2	(-)33.0	4.9	(-)365.3	20.9	63.3	1.7	(-)11.8	4.9	(-) 2.0	28.9	(-)11.1
1963	8.7	(-)28.7	1.8	(-)172.2	21.1	1.0	1.1	(-)54.5	7.3	48.9	27.1	(-) 6.6
1964	9.9	13.8	0.9	(-)100.0	22.4	6.2	1.3	18.2	11.6	58.9	26.6	(-) 1.6
1965	11.4	15.2	1.2	33.3	25.4	13.4	1.9	46.2	10.6	(-) 9.3	24.5	(-) 8.6
1966	15.8	38.6	1.5	25.0	30.6	20.5	2.4	26.3	11.5	8.5	31.0	26.5
1967	15.8	0	1.5	0	34.3	12.1	2.5	4.2	12.5	8.7	24.7	(-)25.5
1968	16.8	6.3	1.2	(-) 25.0	36.4	6.1	1.7	(-)47.1	8.7	(-)43.7	20.6	(-) 9.9
1969	22.5	33.9	1.1	(-) 9.1	40.1	10.2	4.0	135.3	8.5	(-) 2.3	18.2	(-)13.2
1970	23.0	2.2	7.6	590.9	42.5	6.0	3.9	(-) 2.6	12.1	42.3	26.8	47.3
1971	29.0	26.1	10.4	36.8	43.4	2.1	5.1	30.8	11.0	(-)10.0	27.7	3.4
1972	31.3	7.9	13.2	26.9	50.3	15.9	5.0	(-) 2.0	10.7	(-) 2.8	31.0	11.9
1973	33.9	8.3	30.7	132.6	69.1	37.4	7.8	56.0	9.8	(-) 9.2	32.5	4.8
1974	47.8	41.0	79.6	159.3	123.7	79.0	21.3	173.1	7.3	(-)34.2	94.8	160.9
1975	50.4	5.4	117.8	47.9	216.2	74.8	31.9	49.8	13.2	80.8	98.7	16.4

TABLE 6 (con.)

Wholesale & Retail Trade	%	Banking and Insurance	%	Ownership of Dwelling	%	Public Administration & Defence	%	Other Services	%	Total GDFCF	%
1.9	-	0.6	-	15.8	-	2.5	-	7.6	-	82.2	-
2.0	5.3	0.6	0	16.7	5.7	2.6	4.0	8.0	5.3	87.0	5.8
2.1	5.0	0.6	0	17.7	5.9	2.8	7.7	8.5	6.3	91.8	5.5
2.2	4.8	0.7	16.7	18.6	5.1	2.9	3.6	8.9	4.7	96.6	5.2
3.2	45.5	0.8	14.3	19.0	2.2	3.1	6.9	7.2	(-)23.6	106.3	10.0
2.1	(-)52.4	1.0	25.0	17.0	(-)11.8	2.4	(-)29.2	7.4	2.8	97.8	(-) 8.7
2.2	4.8	0.8	(-) 25.0	22.3	31.2	2.7	12.5	9.2	24.3	103.6	5.9
2.2	0	0.5	(-) 60.0	23.1	(-) 0.9	3.2	18.5	11.9	29.3	120.3	16.1
3.0	36.4	0.9	80.0	25.8	11.7	4.1	28.1	13.9	16.8	137.2	14.0
2.9	(-) 3.4	1.3	44.4	24.2	(-) 6.6	5.0	21.9	13.3	(-) 4.5	119.2	(-)15.1
3.0	3.4	0.7	(-) 85.7	21.7	(-)11.5	3.8	(-)31.6	11.1	(-) 9.8	107.4	(-)10.9
3.8	26.7	0.8	14.3	24.9	14.7	3.8	0	16.1	45.0	122.1	13.7
4.3	13.2	0.8	0	27.6	10.8	3.7	(-) 2.7	18.4	14.3	129.8	6.3
4.7	9.3	0.8	0	31.9	15.6	3.7	0	15.7	(-)17.2	149.6	15.2
4.7	0	1.0	15.0	24.1	(-)32.4	5.9	59.5	16.7	6.4	143.7	(-) 4.1
7.4	57.4	1.1	10.0	26.0	7.9	4.6	(-)28.3	18.5	10.8	143.0	(-) 0.5
5.4	(-)37.0	1.3	18.2	32.3	24.2	4.0	(-)15.0	19.8	7.0	157.2	9.9
7.9	46.3	1.5	15.4	32.8	1.5	5.2	30.0	21.8	10.1	185.1	17.7
6.3	(-)25.4	2.5	66.7	34.4	4.9	5.4	3.8	19.5	(-)11.8	194.7	5.2
7.0	11.1	1.3	(-) 92.3	39.2	13.9	5.9	9.3	22.1	13.3	217.0	11.5
22.6	222.9	6.1	369.2	45.1	15.1	12.3	108.5	18.7	(-)18.2	288.6	32.9
25.0	10.6	1.3	(-)369.2	45.3	0.4	41.1	234.1	54.7	195.5	531.9	84.3
42.5	70.0	2.4	84.6	67.5	49.0	57.5	40.1	63.1	15.4	761.2	43.1

Source: K.A.Al-Eyd, "Oil Revenues and Accelerated Growt"h, (Absorptive Capacity in Iraq), Praeger - 1979, pp.171-173.

TABLE 7

IRAQ'S BALANCE OF PAYMENTS 1953-65

Item	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
- CURRENT ACCOUNT												
1. Exports - Goods a. Oil	120.1	156.1	169.2	156.9	114.4	186.7	202.1	222.9	224.5	225.4	259.9	282.0
b. Other	23.0	20.7	16.2	13.7	14.0	15.7	14.3	10.7	11.8	21.7	18.9	17.9
Total	143.1	176.8	185.4	170.6	128.4	202.4	216.4	233.6	236.3	247.1	278.8	299.9
2. Exports - Services	15.1	14.5	22.3	23.3	27.8	27.4	19.0	20.0	17.1	16.2	20.5	28.4
Total 1 + 2	158.2	191.3	207.7	193.9	156.2	229.8	235.4	253.6	253.4	263.3	299.3	328.3
3. Imports - Goods a. Oil	-12.4	-5.8	-6.3	-7.4	-10.4	-10.0	-17.0	-14.6	-12.1	-1.8	-1.6	-0.7
b. Other	-56.9	-70.1	-90.9	-107.2	-112.0	-99.8	-99.4	-125.9	-138.2	-127.7	-111.0	-148.5
Total	-69.3	-75.9	-97.2	-114.6	-122.4	-109.8	-116.4	-140.5	-150.3	-129.5	-112.6	-149.2
4. Imports - Services	-67.9	-83.2	-98.0	-89.7	-72.7	-100.6	-107.4	-120.2	-120.0	-122.6	-114.3	-168.4
Total 3 + 4	-137.2	-159.1	-195.2	-204.3	-195.1	-210.4	-223.8	-260.7	-270.3	-252.1	-256.9	-317.6
Balance of Trade	73.8	100.9	88.2	56.0	6.0	92.6	100.0	93.1	86.0	117.6	166.2	150.7
5. Transfer Payments (Net)	-0.8	0.1	0.6	-0.1	-0.1	-	-2.9	-3.6	-2.4	-2.1	-0.1	-0.1
Balance of Current Account	20.2	32.3	13.1	-10.5	-30.0	19.4	8.7	-10.7	-19.3	9.1	42.3	10.6
- CAPITAL ACCOUNT												
1. Private Capital Movement	+3.5	-3.4	+7.1	+4.4	+7.1	+2.8	+6.1	+3.7	+0.1	-12.3	-21.2	-15.1
2. Loans & Long term obligations	-1.8	+0.1	-2.2	-	+9.1	+1.4	-1.8	-2.6	+0.8	+9.8	+38.9	+10.5
3. Other Long term	-2.1	-3.7	-3.0	-1.7	+5.6	+3.0	+20.8	-1.8	+9.9	+0.8	+3.3	+0.2
Balance of Capital Account	-0.4	-7.0	+1.9	+2.7	+21.8	+7.2	+25.1	-0.7	+10.8	-1.7	+21.0	-4.4
Balance of Current & Capital Accounts	+19.8	+25.3	+15.0	-7.8	-17.2	+26.6	+33.8	-11.4	-8.5	+7.4	+63.3	+6.2
- BALANCING ITEM	-0.2	-5.7	+2.0	+11.8	-2.0	-9.6	-11.1	-13.2	-0.7	-14.8	-22.4	-25.8
- MONETARY MOVEMENT												
1. Foreign Assets	-19.6	-19.6	-13.6	-2.2	+21.4	-11.8	-4.5	+29.4	+4.3	+12.5	-40.6	+24.5
2. Monetary Gold	-	-	-3.0	-2.0	-1.9	-5.0	-17.9	-4.6	+4.9	-5.1	-0.3	-5.0
3. Short-term Obligations & Bilateral Agreements	-	-	-0.4	+0.2	-0.3	-0.2	-0.3	-0.2	-	-	-	+0.1
Balance of Monetary Movement	-19.6	-19.6	-17.0	-4.0	+19.2	-17.0	-22.7	+24.6	+9.2	+7.4	-40.9	+19.6
Balance of Monetary Movement & Other Long Term												
Deficit	-	-	-	-	24.8	-	-	22.8	19.1	8.2	-	19.8
Surplus	21.7	23.3	20.0	5.7	-	14.0	1.9	-	-	-	37.6	-

Item	1965
CURRENT ACCOUNT	
1. Exports - Goods a. Oil	293.7
b. Other	21.2
Total	314.9
2. Exports - Services	32.9
Total 1 + 2	347.8
3. Imports - Goods a. Oil	-0.9
b. Other	-161.8
Total	-162.7
4. Imports - Services	-177.9
Total 3 + 4	-304.6
Balance of Trade Visible	152.2
5. Transfer Payments (Net)	-
Balance of Current Account	7.2
CAPITAL ACCOUNT	
1. Private Capital Movement	-17.7
2. Loans & Long term obligations	+2.7
3. Other Long term	+0.3
Balance of Capital Account	-14.7
Balance of Current & Capital Accounts	-7.5
BALANCING ITEM	+4.4
MONETARY MOVEMENT	
1. Foreign Assets	+8.4
2. Monetary Gold	-3.1
3. Short-term Obligations & Bilateral Agreements	-2.2
Balance of Monetary Movement	+3.1
Balance of Monetary Movement & Other Long Term	
Deficit	3.4
Surplus	-

ABLE 7 (cont'd)

Assets : Increase (-) Decrease (+)
Liabilities : Increase (+) Decrease (-)

Source: CBI Bulletin, Jan - March 1970, No. 1, Table 34.

TABLE 7 (cont'd)

IRAQ'S BALANCE OF PAYMENTS 1966 - 75

Item	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
- GOODS & SERVICES					(XX)					
1. Export - Goods a. Oil	308.9	272.0	345.0	347.4	378.1	526.2	421.5	625.5	1943.0	1820.0
b. Other	26.5	23.8	25.9	25.9	24.7	23.2	30.9	32.8	34.4	42.8
Total Exports - Goods	335.4	295.8	370.9	373.3	402.8	549.4	452.4	658.3	1977.4	1862.8
2. Imports - Goods a. Oil	-0.9	-0.8	-1.1	-1.3	-2.2	-2.6	-8.6	-22.3	-70.4	-122.0
b. Other	-175.3	-150.6	-144.0	-156.3	-80.7	-246.6	-234.5	-258.6	-835.3	-1247.2
Total Imports - Goods	-176.2	-151.4	-145.1	-157.6	-182.9	-249.2	-243.1	-280.9	-905.7	-1369.2
Balance of Trade	159.2	144.4	225.8	215.7	219.9	300.2	209.3	377.4	1071.7	493.6
3. Exports - Services	34.8	33.9	36.6	46.0	42.9	55.9	63.1	80.7	177.8	160.7
Imports - Services	-187.5	-158.0	-208.6	-209.4	-227.8	-288.7	-197.4	-202.2	-488.9	-491.9
Net Services	-152.7	-124.1	-172.0	-163.4	-184.9	-232.8	-134.3	-121.5	-311.6	-331.2
Net Goods & Services	6.5	20.3	53.8	52.3	35.0	67.4	75.0	255.9	760.1	162.4
- TRANSFER PAYMENTS										
Balance on Current Account (A + B)	-0.5	5.0	1.6	1.9	0.7	0.6	0.9	-2.6	-69.8	-78.0
- CAPITAL & MONETARY GOLD (1+2+3)	2.9	-1.9	-18.0	-9.0	-2.1	-36.3	-52.0	-175.8	-715.7	9.0
1. Non-Monetary Sector	26.8	6.8	15.7	-2.9	6.5	-11.5	-9.3	15.4	-149.0	-130.7
Private Long-term Capital	-7.8	-4.2	-2.8	-3.1	-19.0	-40.2	-54.1	77.2	-97.0	-30.6
Private Short-term Capital	-	0.1	0.1	0.1	-	0.1	-	-	-	-
Govt. Long-term Loans	1.6	3.7	-0.6	-4.4	8.4	28.5	44.8	5.0	-49.4	-84.7
Govt. Long-term Capital	-0.3	-0.5	-0.5	-0.1	-	0.1	-	-66.8	-15.2	-13.9
Govt. Short-term Liabilities	33.3	7.7	19.5	6.6	-	-	-	-	12.6	-1.5
2. Allocation of SDRs	-	-	-	-	-	4.2	4.1	-	-	-
3. Monetary Sector	-23.9	-8.7	-33.7	-6.2	-8.6	-29.0	-46.8	-190.7	-566.7	139.7
Central Bank	-27.4	-9.3	-30.8	-6.3	-8.8	-28.2	-47.3	-164.0	-499.7	116.2
Monetary Gold (Increase -)	-	-3.2	-35.0	-	5.3	-	-	-	-	-
Foreign Assets (Increase -)	-31.8	-11.8	4.8	-8.4	-19.7	-32.4	-56.4	-199.8	-531.5	187.4
Foreign Liabilities	4.4	5.7	-0.6	2.1	5.6	4.2	9.1	35.8	31.8	-71.2
Commercial Banks	3.5	0.6	-2.9	0.1	0.2	-0.8	0.5	-26.7	-67.0	23.5
Monetary Gold (Increase -)	0.5	-0.7	0.4	0.1	-	-	-0.3	0.3	-	-
Foreign Assets (Increase -)	3.1	1.2	-3.2	-0.3	0.4	-1.4	1.7	-27.4	-67.0	23.5
Foreign Liabilities	-0.1	0.1	-0.1	0.3	-0.2	0.6	-0.9	0.5	-	-
- NET ERRORS & OMMISSIONS	-8.9	-23.4	-37.4	-45.1	-33.6	-81.7	-23.9	-78.0	24.9	-93.4

(XX) Including adjustments related to differences in transportation charges amounting to I.D. 10.4 Million in 1970.

Source: SBI Bulletion, July - Sept 1977, No.3, Table 36.

TABLE 8

Average Income by Economic Sectors

(in I.D.)

Year	Civil Servants	Workers in Large Industrial Enterprises	Workers in Small Industrial Enterprises	Employees of the Oil Companies	Average per capita
1960	255.6	228.5	N.A.	N.A.	63.1
1961	300.7	237.1	N.A.	970.0	67.8
1962	305.6	244.5	68.7	667.1	71.5
1963	316.9	258.5	72.1	655.3	69.1
1964	337.4	263.3	76.4	703.4	75.9
1965	339.5	268.0	89.9	725.3	84.5
1966	363.8	269.2	81.3	733.1	88.7
1967	380.4	282.4	85.4	754.9	87.8
1968	400.0	297.9	89.0	890.6	94.8
1969	419.0	313.8	83.0	851.1	96.2
1970	N.A.	316.5	79.0	893.1	101.9
1971	N.A.	317.5	88.1	967.6	110.9
1972	463.0	310.0	98.0	N.A.	115.8
1973	496.1	329.6	92.3	N.A.	135.6
1974	839.8	421.7	94.9	N.A.	278.9
1975	722.0	562.9	N.A.	N.A.	337.2

NA = Not Available

Source: Mahdi, 1974, p.22
SPB, 1974
SPB, 1975
Table 1

APPENDIX C

TABLE 1

Share of Developing countries in world production and consumption of Nitrogenous Fertilizers (in percent)

Year	Production	Consumption
1955-56	7.0	17.3
1959-60	5.7	18.3
1965-66	10.1	19.3
1969-70	8.1	16.4
1972-73	10.2	17.6
1974-75	10.5	17.6
1976-77	11.7	18.3
1978-79	12.7	18.9

Source: Calculated from FAO, Fertilizers: An Annual Review of World Production, Consumption and Trade, 1956 and 1969.

FAO, Annual Fertilizer Review, 1975.

FAO, Fertilizer Yearbooks, 1978, 1980 and 1981.

TABLE 2

PRINCIPAL NITROGENOUS FERTILISERS

	PERCENTAGE OF N	CHEMICAL FORMULA	MAIN CHARACTERISTICS
Sodium nitrate	about 16	$NaNOH_3$	Natural deposits (Chile) or synthetic product N is highly soluble form, fast-working fertiliser, highly subject to leaching. Fertiliser of minor importance.
Calcium nitrate	16	$Ca(NO_3)_2$	Contains 34 per cent lime (CaO), excellent for acid soils or for plants which need much CaO, but is very hygroscopic and difficult to use in hot climates and highly subject to leaching.
Cyanamid	about 21	$CaCN_2$	Used as a fertiliser and as a herbicide, resistant to leaching.
Ammonium Sulphate	20.5 - 21	$(NH_4)_2SO_4$	Increases acidity of the soil, 23 per cent sulphur content, widely used, easy to handle and ship, does not set in bulk, used in compound fertiliser production.
Urea	45 - 46	$CO(NH_2)_2$	Has maximum N content, increases soil acidity slightly, used more and more in the world.
Ammonium nitrate	32.5 - 34	NH_4NO_3	Very soluble, highly resistant to leaching and directly assimilated by plants under the two forms, ammonia and nitrate, high percentage of N.

PRINCIPAL NITROGENOUS FERTILISERS (cont.)

Calcium Ammonium Nitrate ..	20.5 - 26	NH^4NO_3 + $CaCO3$	Readily soluble, resistant to leaching, excellent for acid soils, contains nitric (50%) as well as ammonical (50%) N, one of the important N fertilisers.
Ammonium Sulphate Nitrate .	26	NH_4NO_3 + $(NH_4)_2SO_4$	Readily soluble, resistant to leaching, slightly acid, contains nitric (25%) and ammoniacal. (75%) N. Widely used in developing countries.
Aqua ammonia	20 - 30	NH_4OH	More and more used in the developed world, transported in bulk by truck and introduced as aqua solution in irrigation pipes, used for compound fertiliser production, could be easily mixed up with nitrogenous solution, needs special equipment but this is less expensive than that for anhydrous ammonia.
Anhydrous ammonia	82	NH_3	Highest percentage of N and therefore provides the least expensive nitrogen unit, high profitability of the direct application, but requires specialised equipment to use and stock which is costly and needs specialised training.
Nitrogen solutions	8 - 50		Any one or more straight fertiliser may be dissolved in water and sold as a nitrogen solution for direct applications, as for example ammonia ammonium nitrate urea solutions.

Source: Development Centre Studies, Supply and Demand Prospects for Fertilizers in Developing Countries, Development Centre of the Organisation for Economic Co-operation and Development, Paris 1960, p. 125. For more details, see Appendix 1, pp. 123-28 of the same book.

TABLE 3

World Demand for Basic Petrochemical Products in 1970 and 1985 (millions of tonnes)

END PRODUCTS	1970	1985
Plastics	26,275	120,306
Man-made Fibres	8,146	22,033
Rubber	8,756	18,618
Synthetic Detergents	7,918	17,180
INTERMEDIATES		
Vinyl Chloride Monomer		24,625
Styrene Monomer		18,118
Acrylonitrile		5,460
DMT		6,402
TPA		4,079
Caprolactam		4,027
Ethylene Oxide		7,560

Source: UNIDO, First World-Wide Study on The Petrochemical Industry: 1975-2000. UNIDO/ICIS. 83, 12 December 1978, pp. 226-41.

APPENDIX D

Leaflet 803
Published 1982

Ministry of Agriculture, Fisheries and Food

SOIL NITROGEN INDEX

This leaflet explains the soil Nitrogen Index system which is used by the ADAS for estimating the soil reserves of nitrogen that are available for the growth of the next crop. The most important factors affecting the nitrogen supply are the nitrogen released from crop residues and the nitrogen remaining from previous manuring. The soil nitrogen availabe for the growth of the next crop cannot as yet be forecast satisfactorily by soil analysis.

There are three levels of soil Nitrogen Index. Fields in Index 0 have low nitrogen reserves and more nitrogen fertiliser is needed compared with fields in Index 1. Index 2 soils have the highest soil nitrogen reserves.

Usually it is only necessary to consider the last crop grown to determine a field's Nitrogen Index, but after crops of lucerne, long leys and permanent pasture it is necessary to consider cropping histories longer than one year.

To find the Nitrogen Index of a field first look up the last crop growth in Table A; then, if lucerne, long ley or permanent pasture have been grown during the last five years, look up the Index in Table B and use the higher figure of the two.

Table A. Nitrogen Index - based on last crop grown

Nitrogen Index 0	Nitrogen Index 1	Nitrogen Index 2
Cereals	Any crop receiving farm year manure or slurry	Any crop receiving large frequent dressings of farm-year manure or slurry
Forage crops removed	Beans	Long leys, high N**
Leys (1-2 year) cut	Forage crops grazed	Lucerne
Leys (1-2 year) grazed Low N*	Leys (1-2 year) grazed, high N**	Permanent pasture - average
Maize	Long leys, Low N*	Permanent pasture - high N**
Permanent pasture - poor quality, matted	Oilseed rope	
Sugar beet, tops removed	Peas	
Vegetables receiving less than 200 kg/ha N	Potatoes	
	Sugar beet, tops ploughed in,	
	Vegetables receiving more than 200 kg/ha N	

* Low N = less than 250 kg/ha N per year or low clover content.

** High N = more than 250 kg/ha N per year or high clover content.

EXAMPLE

A long ley with high clover content was ploughed up a year ago and peas were then grown. The Nitrogen Index after peas given in Table A is 1 and that in Table B after long ley is 2, so the Nitrogen Index is 2.

The optimum nitrogen application for a crop depends on the soil nitrogen reserves and so it is important to use the soil Nitrogen Index if you are to obtain the correct recommendation and make the best use of nitrogen fertiliser.

Table B. Nitrogen Index - based on past cropping with lucerne, long leys and permanent pasture

Crop	Years since 'ploughing out'			
	One	Two	Three	Four
Lucerne	2	1	0	0
Long leys, low N*	1	0	0	0
Long leys, high N**	2	1	0	0
Permanent pasture - poor quality, matted	0	0	0	0
Permanent pasture - average	2	1	1	1
Permanent pasture - high N**	2	2	1	1

* Low N = less than 250 kg/ha N per year or low clover content.

** High N = more than 250kg/ha N per year or high clover content.

APPENDIX E

TABLE 1

Production & Utilisation
of gas by fields during the years 1964-69
(in million standard cubic feet)

Year	Production (P) & Utilisation (U)	FIELDS Zubair	Rumaila	Mosul	Bai Hassan	Jambur	Kirkuk
1964	P	18720	82000	2808	9074	6715	68566
	U%	8.82	3.00	18.00	40.66	50.65	11.72
1965	P	22589	79827	2490	10250	8066	71542
	U%	8.81	3.34	21.35	37.13	48.71	8.24
1966	P	22810	105208	2064	9835	10048	68710
	U%	11.49	2.88	27.39	34.33	57.35	8.86
1967	P	23309	98875	2124	7804	6436	62771
	U%	7.99	2.69	20.58	34.90	65.27	10.10
1968	P	22257	74271	1920	11348	15969	87945
	U%	5.07	3.74	23.79	25.13	60.55	11.79
1969	P	20294	78611	1854	13250	16487	87104
	U%	5.66	3.95	25.77	31.41	52.41	16.17

Source: SPB 1974, Table 49, p.124.

TABLE 2

Production of Oil Products by the Iraqi Refineries - End 1978

Refinery	Unit	Doura		Basrah		Wand		Haditha		Kirkuk		Samawa		Baiji		Qayarah		Total
Items			% of Total		% of Total		% of Total		% of Total		% of Total		% of Total		% of Total		% of Total	
Benzene	Millions of Empire Gallons	200	77.0	30	11.5	30	11.5	-		-		-		-		-		260
Kerosene and A.T.K.	"	138	35.7	135	34.9	18	4.6	6	1.6	54	14.0	18	4.6	18	4.6	-		387
Gas Oil	"	210	44.7	135	28.7	12	2.6	23	4.9	54	11.5	18	3.8	18	3.8	-		470
Fuel Oils	"	175	19.6	360	40.2	55	6.1	30	3.4	165	18.5	55	6.1	55	6.1	-		895
Diesel Oil	"	76	61.3	30	24.2	-		-		-		-		-		18	14.5	124
L.N.G.	000 Tons	35	34.7	66	65.3	-		-		-		-		-		-		101
Asphalt	"	185	50.7	-		-		-		-		-		-		180	49.3	365
Lubricating Oils	"	120	100.0	-		-		-		-		-		-		-		120
Greases	"	4	100.0	-		-		-		-		-		-		-		4
Wax	"	6.5	100.0	-		-		-		-		-		-		-		6.5

Source: The State Enterprise for Oil Refining and Gas, Department of Statistics and Planning, Baghdad - Iraq, January 1979.

APPENDIX F

THE ECONOMICS OF A FERTILIZER INDUSTRY IN IRAQ

(Methodology)*

(1) Capital costs and Location Factors (load factors)

Location factors are used to estimate plant capital at different countries (locations). Several definitions were given to this factor, but the one used here is the ratio of fixed investment at a given location (^{1}DC) to that of the same production unit at a reference location which is, in this study, the United States (^{1}US).(1) Thus,

Location Factor of a Developing Country

$$L_{DC} = \frac{^{1}DC}{^{1}US}$$

This means if the location factor for a given area is known, plan costs can be estimated from those published for the United States.

Generally there are two methods of estimating location factor: the points system and the detailed analytical approach. In the first method, investment is subdivided into a number of components, each one which is influenced by a large number of factors being given a number of points

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* Generally, this methodology is based on the method used by the United Nations (UNIDO, second world-wide study on Petrochemical Industry, UNIDO, 1981). However, in some cases, different assumptions are made. This in turn affected the results in both USA and IRAQ, as we will see in the next pages.

1. "Location factors can compare total overnight construction costs, total fixed investment, inside battery limits (ISBL) or outside battery limits (OSBL) investment costs. Some sources also use location factors as a multiplier to go directly from ISBL costs in the United States to total fixed investment at another location." UNIDO, second world-wide study ..., 1981, p. 109, note13.

depending on the effects of these factors.[2] Each component then has to be weighted according to its importance in relation to the whole - in this case the total of 100 being taken as the overall construction cost in the United States. The same process is then used for different countries where different factors with possibly higher (or lower) effects may influence the same group of components; thus different points will be given. The points are then added up and the ratio of their total to that of the United States (100) will then be the location factor for that country. An example of this method is given in Table I which compares the location factor of the United States of 1.0 (100) with three different locations of developing countries.

The detailed analytical approach is no different from the points system except that it depends on full feasibility studies. Therefore, this method may seem more accurate than the first one. But, however, the ratio of a location may still vary even within one geographical area depending on the source which carries out the survey. Even though the same classification of components may be used by different sources to determine investment costs of one project in a country, different factors (which influence costs of the components) may be assumed, thus finally giving different investment costs for the same project.

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2. The factors here are many, e.g. transport, climate, the availability of infrastructure facilities, local services, social and political factors, contract conditions, etc.

Table 1 Points assigned to 14 cost components of fixed investment in the points weighting system for estimating location factors for petrochemical plants

Cost item	Points assigned							
	United States average weighting (total: 128.4)	Developing country conditions: most favoured (total: 173.5)		medium (total: 274.0)		least favoured (total: 420.5)	
		Points	Notes	Points	Notes	Points	Notes
Prefeasibility study	0	0.5	simple	1	several alternatives	1.5	several alternatives and locations
Feasibility study	0.5	1	simple	2	several markets	3	complex project, many markets
Site development	0	0	none	10	some infrastructure	30	much infrastructure
Machinery and equipment (incl. spare parts) delivered plant site	52	72	good access by sea, site near harbour	78	some transportation problems (inland)	82	transportation difficulties
Sales taxes, duties, fees	2	2	import duty	6	import duty	10	import duty
Installation a/	20	22	no restrictions on contractors	30	subcontractors mixed, local/foreign	38	specialised labour imported
Building, structural support b/	18	20	no restrictions on contractors	27	mixed local/foreign material, contractors	34	imposed use of local material and contractor little competition
Miscellaneous b/	2	4	low risk	17	medium risk	30	high risk
Engineering	6	9	well defined project, few special requirements	18	changes in design	27	project management difficulties, project ill-defined
Type of contract with engineering contractor	0	0	cost plus	2	lump sum engineering; procurement and construction on cost plus basis	10	lump sum
Streamfactor compared to United States	0	0	ratio to United States = 1	11	ratio to United States = 0.9	33	ratio to United States = 0.8
Cost escalation during construction c/	10	15	construction time as United States	26	construction time as United States + 1 year	45	construction time as United States + 2 years
Cost of construction financing	10	13	construction time as United States	26	construction time as United States + 1 year	47	construction time as United States + 2 years
Start-up cost incl. special training	8	15	trained staff available	20	lower staff new	30	all staff new
Total	128.5	173.5		274.0		420.5	
Location factor	1.00	1.36		2.13		3.27	

a/ as subcontract
b/ including commissions and goodwill
c/ United States = 2 years

Source: UNIDO, Second World-wide Study on Petrochemical Industry, 1981, p.112.

Variations in location factors can cost a country a great deal of funds. For example, a difference in the ratios 1.3 and 1.5 (for a fertilizer plant in Iraq) can increase investment cost by 15% which could raise ex-factory price by $10 to $30/tonne.[3] Countries should, therefore, ensure that accurate up-to-date data and official information are included in contracts' computation of location factors.

Capital costs

Location factors will directly influence capital costs in Iraq. This, in other words, means that production cost per unit of fertilizer will directly be affected. This is due to depreciation charges which are usually calculated as a percentage of fixed capital, and the return on investment.

Due to lack of relevant published data and because of the problems of communicating with, and obtaining information form, Iraq concerning the petrochemical industry, no full analytical sutdy for determining location factors could be undertaken. However, two location factors can be attained for the Middle East area (including Iraq) for 1980; the first one, which was estimated by the UNIDO stood at a rate of 1.3, while the second one of 1.5 was extracted by the "Gulf Organization For Industrial Consultancy" (GOLC).[4]

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3. See Table 11.3 in Chapter 11.

For the benefit of comparative analysis, both ratios above will be used in estimating Iraq's capital costs.

Captial costs are divided into two main groups:

1. Inside battery limits (ISBL): includes equipment and materials (including spare parts), site development,buildings, structural support, freight, labour, construction relatedinsurance cost, contingency, escalation, constitution, financing, start-up costs and royalties.

2. Outside battery limited (OSBL), or off sites: includes site preparation, auxiliary utilites (power transformers), land drainage, office, laboratory building, etc.

The results of calculating capital costs for Iraq and the developed site are given in Tables 2 and 3.

Working capital

The following assumptions [5] are used to calculate the components costs of working capital in both Iraq and

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4. See "The industrial uses of associated gas: a joint study by UNIDO in co-operation with GOIC", 30 April 1981 - UNIDO/OG.11 20 July 1981, p. 107. Also see UNIDO, second world-wide study ... 1981, p. 122.

5. UNIDO assumptions, second world-wide study ... 1981, Annex II.F, p. 35.

the developed location:

Cost components	
Stores	1% of fixed capital
Cash	0.5% of fixed captial
Raw material inventory	5 days at purchases value of production
Finished product inventory	30 days at direct cost plus plant overheads of production
Accounts receivable	40 days at direct cost plus plant overhead of production
Accounts payable	30 days raw material consumption plus 11 days labour.

The results according to the above assumptions are seen as follows:

Cost components	The developed location	(a) Iraq 1.3	(b) Iraq 1.5
Stores	2.05	2.66	3.08
Cash	1.02	1.33	1.54
Raw material inventory	0.87	0.12	0.12
Finished product inventory	9.60	5.82	5.82
Accounts receivable	11.10	6.54	6.54
Accounts payable	-5.39	-1.09	-1.09
Total ($ millions)	19.25	15.38	16.01

(a) Cost of raw material here is \$3 per 1000 ft^3.

(b) Assuming raw materials (gas) at cost \$0.57 per 1000 $ft.^3$.

(2) Fixed costs

Fixed costs are classified under the following components:

Cost	Estimation
Depreciation 12 years	(8.33% of fixed capital)[6]
Interest on working capital	6% p.a. on bank loan[7]
Plant overhead	60% of total labour[8]
Taxes and insurance	1% of fixed capital[9]

(3) Variable costs

(i) Raw Materials (gas):

For the benefit of the analysis, two different prices of gas for each location are assumed[10]:

$/1000 F^3

	Iraq	Developed Location
(1)	Zero (our estimation)	3.0 (FAO Estimation)
(2)	0.57 (UNIDO estimation)	5.0 (UNIDO Estimation)

The quantity of gas required for the production of one tonne of urea is estimated at 35,000 F^3 (FAO estimation). This includes feedstocks, energy, and gas for steam and power generators (for more details on this important component, see Chapter 11).

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6. FAO Estimation, "Investment and Production costs for Fertilizer", FAO, FERT 80/4, April 1980, p.9.

7. Actual rate (Central Bank of Iraq Bulletin, July-Sept. No. 111, 1977, p. 37).

8. Plant overhead cover joint services such as fire protection, security, canteens, cleaning, etc. They are estimated at 80% of operating labour for the developed site (UNIDO estimation). Because cost of labour is already high, and because such services can be locally supplied with lower costs, plant overheads in Iraq are assumed at 60% of labour.

9. It is assumed at 2% for the developed site (UNIDO estimation).

10. For reference and also more details see Chapter 11.

(ii) Labour

Labour is assumed at $15.40 per man/hour on the developed location,[11] and $19.25 in Iraq (assumed 25% higher in Iraq than that of the developed location).[12] 160 skilled workers annually is assumed (4 shifts/day).

(iii) Other variable costs

Other variable costs are illustrated with their cost assumptions in the following table:

Cost Component	Developed Location	Iraq
Cooling Water ($/ton)	1.0	1.0[13]
Chemical ($/ton)	2.0	2.0[13]
Maintenance materials	3% of ISBL	3% of ISBL[14]
Control laboratories	20% of labour	20% of labour[14]
Operating supplies	10% of labour	10% of labour[14]

(4) Production Costs

The calculation of production costs in both USA and Iraq are shown in Tables 2 and 3.

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11. UNIDO, "The Industrial Uses of Associate Gas", 1981, p. 108.

12. See Note 13, Chapter 11.

13. FAO Estimation. FAO, FERT/80/4, April 1980, p. 8.

14. UNIDO, "The Industrial Uses of Associated Gas", 1981, pp. 106 and 108.

TABLE 2

Estimation of Investment and Production Cost of Urea in a Developed Location (USA) in 1980

(in $ million)

Capacity Base = 544,500 t/y (1650 t/d)
Capacity Utilisation = 90%
Production = 490,050 t/y (1485 t/d)

A) Investment Cost	$ Million	
Battery Limits	164,00	
Offsites	41,00	
Fixed capital cost	205,00	
Working captial	19,25	
Total Investment	224,25	
B) Fixed Costs		
Depreciation	17,08	
Tax + insurance	4,10	
Plant overheads	3.90	
Interest on working capital	1,92	
Total Fixed Costs	27,00	
C) Variable Costs		
Raw materials (gas)	51,46	(85,76) (a)
Labour	4,88	
Maintenance materials	4,92	
Chemicals	0.98	
Cooling water	0.49	
Control laboratory	0.98	
Operating supplies	0.49	
Total Variable Costs	64,20	(98,50)
D) Total Production Cost (B + C)	91,20	(125,50)
Net Production cost in $ per tonne of urea (bulk)	186,10	(256,09)
+ bags	10,00	(10,00)
Total Production Cost in $ per tonne of bagged urea	196,10	(266,09)

(a) Figures in brackets includes raw materials valued at $5,00 per 1000 F^3.

TABLE 3

Estimation of Investment and Production Cost of Urea in Iraq in 1980

(in $ million)

Capacity base = 544,500 t/y (1650 t/d)
Capacity utilisation = 90%
Production = 490,500 t/y (1485 t/d)

		1.3		1.5	
A)	Investment Cost				
	Battery limits	213.20		246.00	
	Offsites	53.30		61.50	
	Fixed Capital Costs	266.50		307.50	
	Working Capital	15.38		16.01	
	Total Investment	281.88		323.51	
B)	Fixed Costs				
	Depreciation	22.21		25.62	
	Insurance	2.66		3.07	
	Plant overheads	3.66		3.66	
	Interest on Working Capital	0.92		0.96	
	Total Fixed Costs	29.45		33.31	
C)	Variable Costs				
	Raw materials (gas)	0.00	(9.77) [a]	0.00	(9.77) [a]
	Labour	6.10		6.10	
	Maintenance Materials	6.39		7.38	
	Chemicals	0.98		0.98	
	Cooling water	0.49		0.49	
	Control laboratory	1.22		1.22	
	Operating supplies	0.61		0.61	
	Total Variable Cost	15.79	(25.56)	16.78	(26.55)
D)	Total Production Cost (B + C)	45.24	(55.01)	50.09	(59.86)
	Net Production Cost in $ per tonne of urea (bulk)	92.32	(112.25)	102.21	(122.15)
	+ Bags	10.00	10.00	10.00	10.00
	Total Production Cost in $ per tonne of Bagged Urea	102.32	(122.25)	112.21	(132.15)

(a) Figures in brackets includes raw materials at $0.57 per 1000 F^3.

TABLE 4

Wheat production in Iraq 1970-80

Year	Area hectares	Production tonnes	Kg./hectare (average)
1970	1,959,000	1,236,000	703
1971	948,000	822,000	867
1972	1,700,000	2,625,000	1544
1973	1,156,000	959,000	828
1974	1,633,000	1,339,000	820
1975	1,408,000	845,000	601
1976	1,499,000	1,312,000	875
1977	800,000	696,000	870
1978	1,496,000	910,000	608
1979	1,750,000	880,000	503
1980	1,800,000	1,300,000	722
Average 1970-80	1,468,091	1,174,909	800
Average 1975-80	1,458,833	990,500	679

Source: FAO Production Yearbook's:
Vols. 26(1972), 28(1974), 30(1976), 31(1977)
32(1978) and 34(1980).

TABLE 5

Quantities and values of Iraq's imports of wheat, 1971-81

Year	Imports metric ton.	Value $ million	$ per tonne
1970	100,318	7.4	73.8
1971	955,008	75.2	78.7
1972	60,811	13.8	227.0
1973	154,113	21.5	139.5
1974	671,817	161.2	239.9
1975	567,581	134.2	236.3
1976	616,400	141.2	229.1
1977	723,000	145.0	200.6
1978	1,168,000	245.0	209.8
1979	1,805,780	371.0	205.5
1980	1,698,391	374.0	220.2
Average 1970-80	774,656	153.59	198.27
Average 1975-80	1,096,525	235,07	214,38

Source: FAO Trade Yearbook's Vol.s 27(1973), 28(1874), 30(1976), 32(1978), 33(1979) and 35(1981).

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