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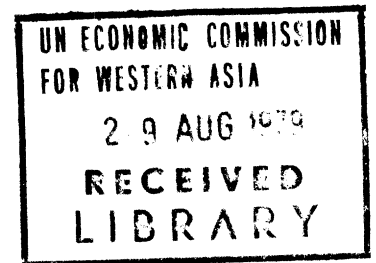
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THE REPUBLIC OF IRAQ

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail.

2. The second part of the document outlines the various methods used to collect and analyze data. These methods include direct observation, interviews, and the use of statistical techniques to identify trends and patterns in the data.

3. The third part of the document describes the results of the study and the conclusions drawn from the data. It highlights the key findings and discusses their implications for the field of research.

4. The final part of the document provides a summary of the study and offers recommendations for future research. It emphasizes the need for continued investigation into the issues identified in this study.

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bridges, military installations, flood control and irrigation schemes, agriculture

and certain industrial projects. The real responsibility for the formulation and implementation of these programmes was in the hands of foreign experts from countries with important economic, military and commercial interests in Iraq while the social groups and classes benefitting from these projects were members of the local feudal aristocracy, large merchant families and the administrative bureaucracy.

Stage II

Beginning with the revolution of 14 July 1958 which swept away the monarchical régime, abolished the Development Board, established in its place the Ministry of Planning and initiated Iraq's first economic plan in which a few budgetary allocations were made in the light of a series of general objectives and socio-economic indicators. In this stage legislation was passed for the abolition of feudalism and the reduction of the control exercised by foreign oil companies over Iraqi territory outside the areas in which crude oil was actually being produced. Iraq withdrew from its previous military alliances and disengaged itself from the sterling block. The most significant occurrence at the socio-economic level during this stage was the adoption of a national policy for industrialization, development and educational expansion.

Stage III

This is the present stage which began with the revolution of 17/30 July 1968 during which radical and important changes took place in national political and economic ideology which gave a considerable impetus to socio-economic development, liberated the national economy and linked it with the objectives of the country and of the Arab World in the field of socio-economic development. During this period the country has seen the formulation of two comprehensive development plans giving expression to the philosophy of the leading party, the Arab Socialist Ba'ath Party, aimed at the achievement of comprehensive and rapid development and the introduction of changes directly related to the task of meeting the requirements of building a socialist society. This Party regards planning as an instrument for

the direction of socio-economic activity which requires thorough scientific analysis of all aspects of life and the selection of the most appropriate solutions in the light of the available material and human resources in such a way as to ensure their optimum mobilization for the benefit of society.

In the political report to the Eighth National Congress of the Arab Socialist Ba'ath Party the following three principal considerations were stated as being those on which the revolution based its developmental strategy:

1. The identification and objective scientific study of the backward economic situation inherited by the revolution.
2. The complete liberation of the resources and economy of Iraq from all forms of foreign dependence.
3. The building of a solid economy capable of achieving continuous high growth rates in national income, raising the individual standard of living and narrowing the gap in incomes between social groups on the one hand and between urban and rural areas on the other.

The 1976-1980 Plan is currently being implemented. This Plan is characterized by its comprehensive and compulsory nature, its wide popular base and its objectives which are both extremely ambitious and realistic. The most important of these objectives are:

- (a) Achievement of a 16.8% rate of growth in national income;
- (b) Achievement of a 13.2% rate of growth in individual income;
- (c) Achievement of a 32.9% rate of growth in manufacturing;
- (d) Achievement of a 7.1% rate of growth in agriculture;
- (e) Achievement of a 16.9% rate of growth in the distribution sector.

During this stage the last vestiges of rural feudalism have been completely eliminated, Iraq has recovered all of its rights from the monopolistic oil companies and, for the first time, full and direct national sovereignty has been imposed on all phases of the mining industry in the country. The Government has also given special attention to educational and social services in accordance

with its basic principle of regarding the people as the object of development. The process began with the institution of compulsory primary education and university and applied studies (specialized training institutes and centres) were expanded as much as possible. The principle of comprehensive health insurance has been applied throughout the country and tangible measures have been taken towards Arab economic co-operation and co-ordination with a view to the achievement of full Arab unity which is the central objective of the Iraqi Government's policy. The direct role of the State in all economic sectors and activities has been expanded and the governmental sector has become the dominant sector in the economy. The Government is also planning to invest over 90% of its total future revenue and this proportion is expected to increase under the long-term plan up to the year 2000.

This is the general picture of the various stages of the socio-economic development process in Iraq together with the associated radical political changes which were the motive force behind them. These changes were accompanied by important modifications in the socio-economic structure of Iraq which can be illustrated as follows:

The structure of the Iraqi economy

It can clearly be seen that the structure of the Iraqi economy is largely dependent on the primary sector, especially mining, since in 1976 this sector contributed around 54% of the total Gross Domestic Product while manufacturing accounted for only 7% and agriculture for around 7.6% of the GDP. In other words the primary sector, mainly consisting of oil industry operations, contributed more than 60% of the GDP. Consequently, the first objective of the National Development Plan in Iraq was the reduction of dependence on the primary sector and the construction of a diversified and integrated economy. On this basis the majority of investments are being directed towards the development of the manufacturing industries, especially those in which the production cycle can be completed within the country through the use of local natural resources and within the context of integration with the economies of the Arab World. Investments are also made with a view to the development of agricultural resources in order to achieve the goal of food security not only for Iraq but also for the neighbouring Arab States lacking agricultural natural resources.

This structure also clearly shows the extremely important role played by the governmental sector in the Iraqi economy since its contribution towards the GDP amounted to around 74% in 1976 as against only 18.6% in 1960 and 11.7% in 1953.

Full State control over the country's main source of income, namely oil resources the greater part of which used to be under the control of transnational monopolistic oil companies, together with the opportunity to accurately determine the extent of these resources through State control over production and marketing created propitious circumstances for the formulation and implementation of comprehensive and balanced economic development plans. The continuous expansion of the governmental sector in the Iraqi economy has created favourable conditions for the implementation of the Government's philosophy as reflected in its economic policy aimed at building a socialist society, putting an end to manifestations of socio-economic exploitation and providing the highest possible rate of growth in individual living standards, not only through economic development but also through an integrated social development programme, especially in the fields of education, health, housing, transport, food and general cultural services. Foreign trade also plays a role in the Iraqi economy. In 1974 imports were structured as follows:

	<u>Thousands of Dinars</u>	<u>Percentage</u>
Food-stuffs and beverages	186546	26.7
Raw and semi-processed material	281861	40.3
Capital goods	168059	24.0
Consumer goods (excluding food-stuffs)	63612	9.0

Capital goods, together with raw and semi-processed material, accounted for around 64.3% of total imports. In the case of exports crude oil constituted the largest single item, accounting in 1974 for around 99% of the total exports. Through planning and full government control over foreign trade this important sector is being utilized to serve socio-economic development aims.

Level of technological development and sources of technology

In the Republic of Iraq modern sophisticated technologies can be seen alongside their traditional counterparts. However, due to the considerable expansion in economic development and the huge investment which this entails, the Government's general policy is to employ the most modern technology, especially in industry. One of the main justifications for this policy is the relative shortage of manpower, including unskilled labour. Hence, the choice between labour-intensive and capital-intensive technologies is normally made in favour of the latter since Iraq, in contrast to many developing countries, is suffering from a relative shortage of manpower and a relative abundance of capital. Owing to the weakness of the production industries, which form the basis for the creation of technology, Iraq is totally dependent on the outside world with regard to the acquisition of machinery, equipment, methodology and technical expertise.

Technology is normally acquired on an open competitive basis from its various foreign sources. The main consideration is the achievement of the objective for which such technology is imported.

In the field of technology Iraq's links with the outside world are not restricted to the importation of machinery, equipment and complete installations. In modern industries in particular these links often involve the importation of technical know-how, especially in the field of the detailed study, design and general supervision of the erection, installation and commissioning of entire plants. Comprehensive contracts are drawn up to cover the patents and licenses involved in the transferred technology. Technology transfer contracts are of many types but the usual procedure is for Iraq, through its advisory bodies, to announce the general conditions and specifications for the project and request the supplier/contractor to submit a detailed offer covering the method of production, technological processes, machinery, equipment, erection, installation, manner of implementation, commissioning etc. Whereby Iraq assumes responsibility for the supervision of project implementation. This method is applied to most industrial, transport and communications and complex agricultural projects and also to those relating to roads, bridges, large public air and sea ports and other projects involving modern technology.

The second type of transfer, which although only applied to a small number of projects is normally highly capital-intensive, is the turnkey project method under which Iraq only stipulates the general conditions and principle requirements while the contractor assumes full responsibility for implementation beginning with the designs and ending with the operation. Contracts for such projects are often extended to cover a period of operation and general management for the purpose of organizing production, the supply of material and training. The Iraqi Government resorted to this type of transfer in order to expedite the implementation of the ambitious plan in the mid-seventies but this method of implementation has now been discontinued.

The third method of transfer is for Iraqi institutions, either themselves or in conjunction with experts or consulting firms, to carry out integrated studies and prepare detailed designs for the project prior to putting it out to tender. In this case the foreign or Iraqi contractor assumes responsibility for procurement and implementation under the supervision of the governmental authority concerned. This is the usual method adopted for simple and recurrent works, especially in building and construction.

The fourth commonly applied method, which is being used to an increasing extent, is the method of direct implementation whereby the Iraqi authority concerned carries out the studies, design work and implementation, leaving only procurement or procurement and erection in foreign hands. This method is receiving constant support and encouragement from the Government and the National Development Plan provides for an increase in the proportion of contractual works carried out under this method to 40% in 1980 (as against only 8% in 1976).

The Iraqi Government is especially eager to create a national capability in all stages and types of technology in order to ensure a continuous absorption and development of imported technology by paying great attention to the technical, vocational and educational aspect of human resources. This is an important objective of the 1976-1980 Five-Year Plan and also a fundamental strategic objective of the 1976-2000 Long-Term Development Plan. Inter-Arab co-operation and co-ordination will play a significant role with regard to the achievement of this objective, in addition to co-operation with the developing countries which

constitutes one of the corner stones of the new international economic order endorsed by the Government of the Republic of Iraq. At the present time the process of establishing a national technological base can be seen in its full dimensions since institutions and specialized bodies are being set up for the preparation of economic and technical studies, the formulation of design schemes for various economic sectors and also for purposes of direct implementation. Institutes for applied research, research and development units, institutions for basic and specialized research, specialized centres for the training of scientific and intermediate staff and administrative and financial development centres etc. are also being established. Through this integrated concept, viewed within the context of a five-year and a long-term plan, and by availing itself of its bilateral and multilateral international economic and technical contacts, Iraq is progressing towards the establishment of a national base for the reception, absorption and development of technology imported from abroad and also for the creation of its own technology.

National resources

The Republic of Iraq enjoys a variety and abundance of natural resources. Its terrain varies from high mountains in the north and north east to desert plateau in the west and south west and undulating land in the Mesopotamian Basin between the rivers running from the north to the south. In ancient times this region was known as the "Bread Basket of the Middle East". Iraq produces the greater part of its food requirements such as cereals, meat, milk, fruit and vegetables. The area of land under cultivation is estimated at around 24 million dunums (dunum = 2500 m²) with a further 24 million dunums suitable for agriculture. One strategic objective of the long-term plan in Iraq is the utilization of all land suitable for agriculture at the highest possible level in order to achieve the other strategic objective, namely food security not only for Iraq but also for the Arab region in the Gulf and the Arabian Peninsula.

The second basic resource is manpower since, according to the preliminary results of the last census towards the end of 1977, the population of Iraq amounted to around 12.03 million persons thus giving a population density of 27.5 persons per square kilometre. The population growth rate in Iraq is estimated

at around 3.3%, which is one of the highest rates in the world. Hence the majority of its population consists of children and young people and in 1975 the proportion of the population in the under fifteen age group amounted to around 24.8%. The proportion of those beyond working age at the other end of the scale (65 years and above) amounted to only 3.3%. Thus 71.9% of the population was capable of working (15-64 years). In 1977-1978 there were 2.89 million students at all educational levels i.e. around 24.10% of the 1977 population. Of these around 80.2 thousand were attending higher educational institutions and 35.2 thousand were undergoing vocational training. In 1980 it is expected that around 20 thousand students will graduate from Iraqi Universities and 34 thousand from technical institutes as a result of the considerable expansion in investment in these two spheres and especially in the field of technical and vocational training.

Iraq possesses considerable mineral resources, of which the richest and most extensive are its oil and natural gas reserves. The daily production of crude oil amounts to over 2.3 million barrels and Iraq has the capacity to raise this to 3.2 million barrels per day. The production of associated natural gas is estimated at 12000 million cubic metres.

One of the principal mineral resources is natural sulphur, available in great abundance in the northern region of Iraq, which is currently being mined at the rate of around 800 thousand tons per year. National development of sulphur deposits in the Al Mishraq field began on 16 July 1969 and production commenced on 31 December 1970. Production capacity could be increased to 1.0 million tons by 1980. In addition to natural sulphur, sulphur is extracted from the natural gas associated with crude oil in the northern region at the rate of 100 thousand tons per year, which is expected to increase to more than 550 thousand tons by 1980 after completion of the projects for the exploitation of associated natural gas in this region. After conversion into sulphuric acid this sulphur is used in the chemical, textile and other industries although the greater part is exported through special ports and other means of transportation.

Raw phosphates can be found over a very wide area in the north western desert of Iraq in the Ukkashat region where a large project is under way to produce 3.4 million tons of raw phosphates to be used for the production of one million tons per year of phosphorus trioxide.

Iraq also possesses very large quantities of the mineral resources needed for the production of building materials such as limestone, gypsum, kaolin clays, sand and marble. In addition to their basic uses in the building and construction industries for cement, plaster, lime, bricks, ceramic pipes and tiles etc. these materials are also used in a number of chemical industries. Cement production in Iraq in 1975 was estimated at around 2.4 million tons and plans have been made to increase this to 8.0 million tons by 1980. Similarly the production of bricks, lime and plaster which in 1975 amounted to 1.6 thousand million bricks, 100 thousand and 1300 thousand tons respectively is expected to increase by 1980 to 5.0 thousand million bricks, 750 thousand tons and 4 million tons.

Iraq's abundant water resources are used for the generation of electricity by means of hydro-electric power stations built on barrages and regulator dams. In 1975 around 460 million kwh were generated in this fashion, representing around 12 per cent of the total power produced in Iraq, and it is estimated that hydro-electric power generation will amount to around 2400 million kwh in 1980, accounting for about 15.0 per cent of the total power produced.

The nationalization of oil on 1 June 1972 was the first step towards self reliance on national personnel under supervision of the central government in the technological management of exploration, drilling, production, transportation and marketing of crude oil and its by-products. This success gives an indication of Iraq's potential for the assimilation, development and re-export of technology.

Long-term national objectives (to the year 2000)

At the economic level the long-term national objectives can be defined as follows:

(a) The restructuring of the Iraqi economy and its transformation from a one-sided economy dependent on crude oil into a diversified and integrated economy in which the manufacturing sector will be a principal contributor to the Gross Domestic Product;

(b) The achievement of technological self-reliance and the elimination of technological dependence;

(c) The achievement of the highest level of individual income in a socialist society devoid of all aspects of socio-economic exploitation;

(d) The achievement of Arab economic unity as a material basis for fuel Arab unity;

(e) The achievement of food security by raising agricultural production to the level of self-sufficiency not only for the Republic of Iraq but also for the Arab World as a whole through Arab economic integration;

(f) The elimination of all manifestations of socio-economic backwardness by ensuring a high standard in the provision of all social and cultural services, eradicating illiteracy, providing higher and vocational education, health services and full social security and establishing cultural institutions;

(g) The development of backward regions and the elimination of disparities between urban and rural areas;

(h) The reduction of manual labour, increased reliance on modern technology and raising levels of production to the greatest possible extent;

(i) The development of the armaments industry in order to achieve self-reliance in national security for both Iraq and the Arab World.

Medium-term national objectives

In the light of the general long-term development strategy the medium-term objectives can be defined as follows:

(a) The conversion of the Iraqi economy from an agricultural to an agro-industrial economy in which the proportional contribution of the manufacturing sector by the end of the 1976 - 1980 Five-Year Plan will exceed the contribution of agriculture;

(b) The eradication of illiteracy and the introduction of universal compulsory education in the primary stage;

(c) The expansion of vocational and technical training to meet the demand created by development for intermediate staff and the establishment of a natural balance between the various levels of skilled manpower;

(d) The expansion of the building materials industry in order to eliminate bottlenecks and meet the requirements of rapid and extensive development;

(e) Increasing the capacity of the infrastructure (roads, bridges, ports, transport, electricity and administration etc.) in order to meet development requirements and remove bottlenecks;

(f) The completion of agrarian reform projects, the intensification of agriculture in order to raise the productivity of the land, increased agricultural mechanisation and wider use of fertilizers and pesticides;

(g) The integration of agriculture and industry in order to meet the needs of each from the production of the other sector;

(h) An increase in public and private consumption with a view to the achievement of the highest individual living standards and a redistribution of income in a manner conducive to social justice. Paying special attention to the development of backward rural areas and the expansion of services therein to the greatest possible extent in order to raise the living standard of rural dwellers;

(i) The development of economic management and promotion of the principles of democratic division of labour;

(j) The expansion of the socialist sector in all sectors and activities so as to enable it to play a leading role in directing both the economy and society. The above-mentioned target quantities were specified in the light of the general objectives of the plan.

Sources for the financing of science and technology

The importation of technology and the agreements concluded in this respect in Iraq are initiated by both the governmental and the private sector although, due to the high investments allocated by the Government for development purposes, the greater part of such imports are arranged by the State. This trend can clearly be seen from the figures on fixed domestic capital formation in various fields.

It can also be seen that the overall contribution of the private sector towards fixed capital formation dropped from 55.6 per cent in 1960 to only 16.2 per cent in 1974. In 1974 machinery and equipment accounted for 25.2 per cent of the total fixed capital formation while means of transportation, buildings and structures accounted for 15.6, 20.3 and 38.9 per cent respectively.

Gross fixed domestic capital formation distributed
between the socialist and private sectors

(in millions of Iraqi Dinars at current prices)

Year	Gross Domestic Product (1)	Fixed Capital Formation			(1) : (2) %
		Total (2)	Governmental Sector (3)	Private Sector (4)	
1957	430.1	106.3	53.8	74.5	24.7
1960	565.4	120.3	51.9	68.4	21.3
1965	835.1	129.8	71.2	58.6	15.5
1970	1152.4	185.1	101.1	84.0	16.1
1974	3337.7	531.9	446.0	85.9	15.9

It is the governmental (socialist) sector which almost monopolizes the use of science and technology for development and carries out applied scientific research.

Since the State-owned industrial institutions are the largest with regard to the number of their employees and the extent of their equipment some of them possess research and development units and engage in joint programmes with the scientific and technological departments of universities to this end. There are also private institutions and centres in some branches of industry which carry out applied and original research in their fields of specialization, such as the Petroleum Research Institute, the Building Research Centre, the Natural Resources Research Institute, the Center for Pollution Research, the Biological Research Centre, the Date Palm Research Centre etc. These centres may engage in joint programmes with universities or production enterprises in order to undertake research agreed upon by the parties concerned.

In addition to direct independent research the universities also carry out research work as part of their advanced study programmes for a Doctorate or Masters Degree. Engineering and managerial advice is also supplied by special offices in the universities.

Added Value Divided between the Governmental and Private Sectors,
at Current Prices (Millions of Dinars)

	1953		1956		1960		1965		1970		1974		1976	
	Governmental	Private	Governmental	Private	Governmental	Private	Governmental	Private	Governmental	Private	Governmental	Private	Governmental	Private
Mining	0.05	129.8	0.05	154.0	0.04	209.7	0.3	285.6	0.2	730.3	1710.5	320.2	2450.0	25.1
Agriculture	"	71.5	"	89.0	"	97.8	0.4	130.2	0.5	175.1	2.0	230.1	15.3	333.4
Transport, communications and storage	6.3	15.1	5.5	19.1	16.4	23.3	18.6	39.6	24.6	46.6	55.1	69.0	80.0	137.0
Manufacturing	2.3	17.4	3.7	20.3	8.7	45.8	26.2	38.5	50.6	51.8	88.5	87.6	165.0	159.7
Wholesale and retail trade	0.2	17.7	0.7	26.2	0.8	31.7	8.3	61.5	15.6	83.0	86.0	82.1	104.2	93.6
Banking and insurance	2.8	0.5	5.2	1.1	6.7	2.0	9.3	0.2	18.3	0.3	42.8	1.4	88.4	0.6
Construction	"	11.3	"	24.0	"	23.1	"	30.5	"	40.6	7.7	61.4	28.1	327.0
Services	7.1	9.7	12.5	12.3	23.2	14.9	42.8	17.1	63.2	23.7	124.7	29.0	"	43.7 ⁰
Water and electricity	0.9	0.6	2.5	"	3.6	"	12.0	"	17.8	"	13.7	"	22.5	"
House ownership	"	11.6	"	12.5	"	11.9	"	30.2	"	51.0	"	74.7	5.0	70.8
Public administration and defence	10.3	"	20.1	"	45.7	"	89.0	"	124.3	"	261.4	"	432.0 ⁰⁰	"
Total	37.9	285.0	61.3	367.6	105.2	460.2	206.9	628.2	315.1	837.3	2393.2	954.5	3392.3	1190.7

⁰ Covering only personal services

⁰⁰ Covering social and development services in addition to public administration and defence.

Foreign Trade and Gross Domestic Product in Iraq

Year	<u>Foreign trade in millions of Dinars</u>		Trade balance	Gross Domestic Product
	Exports	Imports		
1954	152.1	72.7	79.4	
1957	126.1	121.8	4.3	
1960	230.6	138.9	91.7	565.4
1965	311.7	162.6	149.1	835.1
1970	390.7	181.7	209.0	1152.4
1974	2353.8	700.1	1653.7	3347.7

CHAPTER II

THE INSTITUTIONAL STRUCTURE OF SCIENCE
AND TECHNOLOGY

The importance of science and technology in national development

Since 1951 the importance of science and technology in the economic structure of the country has been emphasized, either explicitly or indirectly, by development projects in varying degrees and at different levels of comprehension and assessment. However, after 17 July 1968 the revolutionary trend towards planning gave prominence to the role of science and technology as a basic element in the building of society, especially during the stage of socialist transformation. This was also clearly illustrated in the political report to the Eighth National Congress of the Arab Socialist Ba'ath Party (January 1974) which depicted central planning as a process embracing various aspects of communal and individual life within a context of national and pan-Arab objectives aimed at building socialism within the country with a view to the achievement of Arab ambitions regarding the establishment of a liberated Arab entity under the banner of full Arab socialist unity. The adoption of long-term planning as a basis for national development policy has given science and technology the chronological dimension without which it would be impossible to formulate an effective policy or plan for science and technology capable of achieving the strategic objective of strengthening the country's scientific and technological capabilities, of enabling scientific organizations, bodies and personnel to carry out the role of generating and utilizing national technologies, of opening the way for Arab co-operation and integration in the sphere of science and technology and of releasing and developing the latent potential and creative capabilities of the Arab people so that they can make an effective contribution towards the welfare and prosperity of their own society and of mankind as a whole.

In his address at the meeting of the Planning Board on 12 April 1977 the Vice-chairman of the Revolutionary Command Council defined the revolutionary programme, the strategic approach and the scientific analysis of the task in this field as follows:

1. With regard to question of science and technology, if we take a look at the industrial world today, and at the large industrial countries in particular, if we examine their policy and procedures in the field of science and economics in general and the industrial field in particular, and if we explore the trends in certain basic aspects of international politics, we would find that the industrial countries, including the large ones, are now convinced, I would imagine, that the erection of a " Great Wall of China " between their scientific and technical resources and expertise and the countries of the Third World is unfeasible.

As I see it, they will resort to the following:

(a) Side-tracking the countries of the Third World with certain aspects of the industrial question so that they will remain a partition between them and these countries in their present size and form;

(b) Taking on the form of monopolistic specialization or specialized monopolization.

2. Your revolution is the revolution of the new approach not an isolated approach but rather an approach characterized by its individuality as well as its responsiveness to the ideas, experiences and civilizations of the world as a whole and also to what human ingenuity can offer by way of science and technology.

3. Our search for a new approach, wherever we believe this to be essential for progress, does not make us isolationists since without such an approach we will remain backward and will be unable to attain the level that would give us a clearly defined and effective role in politics and in the building of a new society and we would thus be acquiescing in our transformation into a satellite revolving within the orbit of others who would thus be in a position to determine our progress, role and future destiny and this is something that we absolutely reject.

4. We should prepare ourselves well to handle and absorb science and technology. We must give attention to research centres and to the training of staff and must also study and familiarize ourselves with the latest scientific and technological innovations in order to become an industrially developed country in a manner consistent with our objectives. The first stage of our task is to master the art of living with science and technology developed by others.

5. With regard to the national adaptation of technology and the utilization of science, we are not obliged to adopt and put to use every scientific and technological innovation without modification. On the contrary, we adapt all or some of them in the light of our objectives and our political, social and economic circumstances.

6. Industrialization means the manufacture of goods in our own way in a manner consistent with our national objectives and our pan-Arab aspirations. We should not refrain from manufacturing an article merely because it can be purchased but neither should we imagine that everything that we need to use should be manufactured locally.

The National Development Plan for the years 1976-1980 embodies the national and pan-Arab policies and objectives which transcend the chronological duration of the plan by virtue of the fact that the plan emphasizes as its basic and immediate target the achievement of the following main aims:

(a) Rapid overall development, based on the concept of development as a revolutionary process aimed at the strengthening and consolidation of economic liberation and independence and the achievement of social progress, i.e. comprehensive socio-economic development geared to the transformation of society as a whole;

(b) Placing developmental methods and trends at the service of socialist reconstruction by strengthening and extending socialist contacts in production so as to eliminate all manifestations of economic exploitation with a view to achieving the long-term objectives of building a unified socialist society. The country's economic policy as defined in the National Development Plan for the years 1976-1980 clearly emphasizes the importance of a science and technology and calls for the continuation of efforts aimed at establishing a material and technical base for a balanced, modern economy, the development of manpower and human resources and the planned development of science and technology which should thus become a basic component of national development plans.

Scientific and technological policy in the country

The highest central planning body in the country is the Planning Board headed by the Vice-Chairman of the Revolutionary Command Council. The Scientific Research Authority attached to the Ministry of Higher Education and Scientific Research

undertakes the formulation of proposals for scientific and technological policy and the scientific and technological research plan, in addition to other functions such as the co-ordination, monitoring and direction of affiliated research centres which implement important strategic and intersectoral projects. Since the Chairman of the Authority is a member of both the Planning Board and the Council for Higher Education and Scientific Research, this gives the Authority the power to act through all the governmental institutions and provides it with the contacts needed to enable it to discharge its functions in the field of planning, co-ordination, monitoring and performance evaluation.

Iraq today possesses a sophisticated central planning body and is considered as one of the leading Arab countries in the field of long-term planning. The socialist sector is the recipient of the major part of the national investments and a large proportion of the investments in this sector are of a technological nature. The National Development Plan for the years 1976-1980 represents a definite swing away from preceding trends in so far as it embodies the importance of taking into consideration all aspects of national development requirements, including the human, technological, economic and social aspects. The political leadership in Iraq views development within the context of the following points specified by the Vice-Chairman of the Revolutionary Command Council on 9 May 1978 at his meeting with the delegations participating in the Pan-Arab conference on the Joint Arab Economic Action Strategy.

1. imperialism realizes that to convince the Arabs that development is not essential ... is impossible since, as long as the Arabs remain bent on development and as long as they possess the financial resources to pursue this objective ... the Arabs will possess a source of strength derived from their awareness of the importance of development for the improvement of living conditions how, then, could this source of strength be converted into a state of weakness in the body of the Arab nation? This could be achieved by channelling development towards certain basic objectives, primarily the depletion of Arab financial resources in such a way that this step does not take real procedural precedence within the context of substantive development. Secondly by turning development into a factor designed to increase the height of regional barriers and create friction between one country and another.

2. Development is not limited to the mere construction of a factory... development is a process of substantive change affecting not only man's situation but also his role in life.

3. Development is not the construction of a factory but rather a change in the norms of life and, firstly and above all, a change in man himself.
4. ... it would be a great triumph if the Arabs, and particularly the oil producing States, could help our brothers by allocating two-thirds of their oil wealth as lost expenditure for the purpose of changing human nature and raising their people to a scientific and technical level, similar to that of the developed nations, in which they will be willing and able to plan a life of progress. By "lost expenditure" I mean the money which a nation spends on science and development.
5. We do not consider development in any activity as being a separable part of the general overall picture of life.
6. The development of man cannot be achieved in a one-sided manner but requires integrated action in all spheres of life and the development of life in all its aspects. Only in this way can man's capability be increased.

Despite the serious attempts that have been made since the beginning of the seventies to utilize Iraqi and Arab personnel to carry out certain functions related to the process of selecting and transferring technology, which used to be undertaken by foreign consulting firms, and to assign the feasibility studies for a number of projects in the development plans for the years 1970-1974 and 1976-1980 to local staff, the task of assimilating and developing technology in a manner suited to local circumstances has not been given the attention that it deserves, nor has full use been made of the available opportunities for the training and development of staff at various levels by the exercise of these activities. One of the main reasons for the failure to provide staff with the proper training in the selection, absorption, adaptation and development of technology and in the generation of national technologies is possibly the adoption of the turnkey method for the implementation of numerous projects in which the participation of Iraqi nationals has been almost nil.

In spite of the increase in the number of scientific and technological institutions and the expansion of their organizations and staffing in recent years, they have been unable to achieve compatibility with the country's development needs, especially with regard to the adoption, dissemination and development of technologies. The role of science and technology in Iraq is not commensurate with the country's material and natural resources. This is mainly due to shortcomings in the adaptation

of technology, i.e. in the appropriate blending of imported technology with local technological inputs.

Consequently, the need was felt for a radical review of the objectives, functions and mechanisms of scientific and technological research in order to make them more consistent and responsive to the requirements of overall national development within a scientific and technological research plan that would form part of the National Development Plan.

The following points cover certain aspects of the country's technological strategy:

(a) The establishment of a national base for the development of technology and a reduction of the country's technological dependence by strengthening and developing the national capability to analyse problems in national projects, propose alternative methods of dealing with such problems and select and implement the most appropriate solution;

(b) The development of forms of technology that are compatible with the country's national aspirations, meet the essential needs of the people and further the process of socialist reconstruction;

(c) The strengthening of bargaining power in order to obtain the appropriate technology;

(d) The development of the country's potential to absorb, adopt, adapt and develop technology;

(e) The promotion of Arab co-operation in the establishment of joint programmes and projects and the establishment and consolidation of Arab scientific and technological centres and organizations.

Iraq is showing considerable concern for scientific conferences dealing with the subject of science and technology in development.

For example, the country hosted the Conference on Intellectual Property

from 5-10 March 1977 and this was followed by the Arab Seminar on Science and Technology in Development held from 17-21 March 1978 and attended by representatives of 14 Arab countries. This seminar was held under the auspices of the Federation of Arab Scientific Research Councils. An expanded national seminar on the role of science and technology in development was also held by the Scientific Research Organization as part of the preparations for the United Nations Conference to which this paper is a further contribution. The above are only a few examples of Iraq's concern with the subject of science and technology.

CHAPTER III

RESEARCH AND SCIENTIFIC PERSONNEL

Scientific Research

Scientific Research is a basic requirement for the acceleration of national development, the solution of social problems and the development of socio-economic production activities. In the developed countries scientific research is related to social needs and contributes to the solution of many of the problems facing society. This has not happened in the developing countries where scientific research has remained out of touch with social progress and has made no attempt to meet socio-economic needs for many reasons connected with the patterns of economic development adopted in certain developing countries in addition to various related international factors.

Until the beginning of the fifties Iraq lacked both scientific personnel and a fundamental base for scientific research. This was only natural in view of the backwardness of the economic structure since Iraq was dependent on agriculture which, in turn, was based on backward, feudal patterns of production. From the beginning of the fifties the Government began to initiate development projects in various sectors of the economy, especially the industrial sector, although most of these projects were undertaken by foreign experts. This new situation did not put any pressure on the educational or scientific research systems which were in the process of being established since the aim of education was to produce the administrative staff needed by the government. Hence, the growth of the arts colleges was more rapid than that of the scientific colleges and the number of graduates from the former was more than double the number of graduates in scientific disciplines. As a result of the July 1958 revolution the Government began to give attention to the establishment of certain industries and the expansion of higher educational and scientific research systems and it was decided to set up a National Centre for Scientific Research to be responsible for the planning and supervision of scientific research. This centre was officially opened in 1963. At the Iraqi universities only a few

scientists were engaged in basic research, mainly in the colleges, but this tendency was not very pronounced since the number of graduates from Iraqi colleges in the year 1960-1961 was around 1,600 of which most had specialized in arts' subjects and the budget for scientific research amounted to less than one million Iraqi Dinars.

After the July 1968 revolution the political leadership began to introduce basic changes in the economic and educational structure. The National Development Plan for 1970-1974 was formulated in order to promote rapid overall development in various economic and educational facilities and a start was made on the implementation of several major projects in the chemical, manufacturing and other industries.

This rapid development in all economic facilities necessitated a corresponding change in the structure of education and scientific research which, until the beginning of the 1970-1974 Development Plan, had been characterized by the unplanned growth of the secondary and higher education systems, the lack of co-ordination between the educational and national plans, the almost total absence of technicians and specialized professional staff and the concentration of most of the highly qualified scientific personnel in the educational and scientific research sector. These scientific staff represented more than 80 per cent of the total number of scientists in the country. Of the two thousand scientists in 1971 most were employed in higher education and only a few were engaged in scientific research. From this it can be seen that scientific research was proceeding at a very slow pace. No significant increase was made in the budgetary allocations for scientific research which continued to represent around 0.1 per cent of the national income while most of the research carried out in research centres and universities consisted of basic research remote from social needs and development plans.

The 1970-1974 Development Plan changed this situation. More technical and vocational institutes were opened and the number of their graduates increased towards the end of the plan. Several new research centres were established and attached to Iraqi universities or to the Scientific Research Organization and expenditure on scientific research was increased to around 0.3 per cent of the

national income at the end of the period of the Plan. A larger number of students were admitted into higher educational institutions and a start was made on the establishment of research and development units in the production sectors. Funds, equipment and staff were allocated to carry out applied and experimental studies in the production sector and a survey undertaken in 1974 on the distribution of research projects and research resources in the various sectors indicated that most of the research carried out in the higher educational sector consisted of basic research while only a small proportion was of the applied type. The survey also indicated that the financial resources allocated to industrial research were very limited, amounting to no more than 150 thousand Dinars, despite the importance of this sector, while most of the expenditure on research in the production sectors was concentrated in the agricultural sector to which 1.5 million Dinars was allocated. The statistics show that most of the research carried out in the agricultural and industrial sectors was of an experimental nature while the greater part of the research undertaken in the services sector was concentrated on the applied aspects (see table) and none of this research was integrated i.e. it was not put to actual use in the other production sectors. The reason for this was the weakness of the research and development units and the lack of experimental units to convert the results of this research into productive economic yields. The survey also indicated the small number of persons engaged in scientific research in all the governmental sectors since the majority of scientists were working in the educational sector and thus were unable to devote much time to scientific research. The survey showed that the number of highly qualified scientists working in industry was very limited inspite of the attention given to this sector in the Plan and it was shown that the scientist/technician ratio in research centres was 2:1 and in certain cases 3:1.

This period witnessed the beginnings of a new trend towards on-the-job training of technical and professional staff and the establishment of training centres at certain production locations. Scientific societies began to organize regular training courses and Iraqi universities attempted to establish relations with the production sectors by setting up university - industrial and university - agricultural teams which carried out surveys of problems affecting the production

sectors in an attempt to form university groups interested in solving these problems.

The 1976-1980 Plan was designed to create a balance between the rapid growth in the production and educational sectors and scientific research and also to increase the contribution of scientific research in speeding up the development process. This can be seen from the series of initiatives taken to establish more research centres linked to Iraqi universities and to the Scientific Research Organization, in addition to the endeavours made to promote the establishment of research and development units in all production facilities and to increase the efficiency of existing units which had not as yet been able to play a significant role in converting the results of applied and experimental research into economic yields. The Plan emphasized the increased admission of students into higher educational institutions to help to provide the scientific personnel needed by research centres and universities and to raise expenditure on scientific research from 0.4 per cent of the national income at the beginning of the Plan in 1976 to around to 0.9 per cent of the national income in the final year of the Plan with a further increase to 1.2 per cent of the national income by the end of 1985.

The Plan was also aimed at raising the number of scientists engaged in scientific research from two persons per ten thousand of the population at the beginning of the Plan to nine persons by the end of 1985, raising the proportion of technicians engaged in scientific research from 0.4 persons per ten thousand in 1975 to 9 persons per ten thousand in 1985 and increasing the scientist/technician ratio from 2:1 at the beginning of the Plan to 1:2 by 1985.

With regard to university graduates, the National Plan aims to increase the number of graduates in scientific disciplines to half the total number of all graduates and to increase the number of graduates from technical and vocational institutes and encourage them to contribute towards scientific research. The Plan is also aimed at the redistribution of highly qualified scientists in order to increase their numbers in the industrial and agricultural sectors and secure their recruitment into research and development units where they would help to convert the findings of scientific research into economic

results and contribute to the absorption and adaptation of foreign technology. The Plan also encourages scientists at universities to undertake research more closely linked to the needs and productive capacity of society and to relate their higher studies to these needs. The Plan also encourages scientific societies to organize regular training courses and to establish training centres in all production facilities in order to train increasing numbers of technicians and skilled workers. The Plan emphasizes the importance of utilizing international agreements for the exchange of expertise between scientists engaged in scientific research in Iraq and their foreign counterparts and of establishing scientific and technical information centres to supply the necessary data to those working in the production and scientific research fields.

Iraq's success in the achievement of these ambitious objectives will depend to a large extent on the formulation of a plan for science and technology, the establishment of a scientific policy for the redistribution of scientists and technicians engaged in scientific research and the provision of financial resources for research in keeping with the basic indicators of the 1976-1980 Development Plan and the Long-Term Plan.

Total expenditure on scientific research
by sectors in Iraqi Dinars during 1974

Sector	Current expenditure	Investment expenditure	Percentage of current expenditure		
			Basic research	Applied research	Experimental research
1. Higher educational sector	1,427,387	322,613	75	25	-
2. Production sector	1,695,298	1,589,876	-	25	75
3. Services sector	1,786,431	587,189	15	56	29
Total	4,909,116	2,499,680	27	36	37

Scientific Personnel

Human resources play a fundamental role in furthering the process of national development since they constitute the corner stone of scientific research. The production and services sectors need various scientific, technical and vocational specializations while the universities need special types of scientific personnel to engage in teaching and research. As a result of Iraq's former circumstances its scientific cadres were unevenly distributed among the various sectors. There was also an obvious shortage of intermediate, technical and vocational cadres which impeded progress in scientific research and had an adverse effect on the various economic sectors. The previous 1970-1974 Five-Year Plan, together with the current 1976-1980 National Plan stressed the importance of changing this situation by opening more technical and vocational centres and providing them with teaching staff in order to produce the large numbers of technical graduates required by the present and future national development plans. The Plan aims at the redistribution of the higher scientific cadres among the various economic and service sectors and research centres in accordance with their requirements and the linking of educational policy with the scientific and technological policy which will, in turn, form part of the future national development plans. The next table shows the development which has taken place at Iraqi universities and technical and vocational centres and also the increased proportion of post-graduates at Iraqi universities. This period has also witnessed a steady growth in the size of the teaching faculty at Iraqi universities whose members increased from 2074 in 1970/1971 to 2726 in 1975/1976.

The number of researchers in the Scientific Research Organization increased from 160 scientists in 1971-1972 to around 500 scientists in 1977-1978.

The number of graduates from engineering colleges in Iraq increased from 500 graduates in 1967-1968 to 2250 in 1977-1978 while the number of graduates from technical institutes rose from around 400 in 1967-1968 to over 5000 graduates in 1977-1978. Similarly the number of vocational trainees rose from 10 thousand in 1967-1968 to around 35 thousand in 1977-1978.

These figures illustrate the considerable concern shown by the State's political leadership for the modification of the structure of education and scientific research in order to bring it into line with development plan requirements and to provide technical and scientific cadres. It is expected that the number of graduates from technical institutes will increase from 2000 in 1975 - 1976 to around 30 thousand by 1980 and that the number of post-graduates will increase from around 420 in 1975-1976 to around 1000 by 1980. The number of highly qualified personnel actually engaged in scientific research is also expected to increase to around 3500 and the number of technologists to around nine thousand by 1980 so that the scientist technician ratio in scientific research institutions will become 1:3.

Increasing efforts are being made to enroll large numbers of vocational and technical trainees in courses organized by the training centres which are being established in ever increasing numbers at production locations and to increase the number of persons being trained both on-the-job and abroad in training courses of two ~~to~~ six months duration.

The main problem facing scientific research is the previous shortage of scientific and technical cadres and the need to make preparations for the utilization of the cadres which will eventually be available to scientific research bodies so that they can be distributed in a manner commensurate with the distribution of material resources, which will only be possible if a clear policy is formulated for scientific research institutions. The 1976-1980 Five-Year Plan showed the need for the bodies responsible for planning and implementation in the field of science and technology to formulate a plan for science and technology that would form part of the future national development plans and guarantee the direct and equal exploitation of human resources while ensuring their distribution in a proper and balanced manner. All of this depends on the effectiveness of the planning bodies in the field of science and technology and on the procurement of scientific managers with the ability to exploit these resources in a balanced manner. This is not an easy task, especially for the developing countries which have only recently begun to acquire experience in scientific planning and research, since these countries, for various reasons,

are exposed to a constant loss of their scientific and technical cadres through the brain drain to the developed countries. Effective measures should be taken by the United Nations in this respect.

Number of students graduating from Iraqi universities and institutes

Y e a r	Universities and technical institutes	Vocational institutes	Post-graduate studies
1960 - 1961	1612	633	-
1965 - 1966	3231	1046	-
1970 - 1971	7559	2443	135
1975 - 1976	17115	5629	421

CHAPTER IV

LINKS BETWEEN SCIENCE AND TECHNOLOGY

AND ECONOMIC POLICY

Having reviewed, in the first part of this report, the patterns of socio-economic development and the stages of their historical evolution in Iraq we can now turn our attention to the nature of the administrative and financial system and its linkage with the process of scientific and technological development. Administrative development in Iraq is controlled by a plan, known as the Administrative Development Plan, in keeping with the National Development Plan. Revolutionary Command Council Decision No. 333 of 24 May 1978 (regarded as an act of legislation) called for the preparation of an administrative development plan to form part of the National Development Plan and identified nine basic objectives for the development process, including: evaluation of the administrative structure of the Government in the light of the National Development Plan and the improvement of its standard of performance and efficiency, the improvement of the standard of performance and efficiency of economic institutions in order to increase their productivity, a review of financial and accounting procedures, the establishment and development of scientific administrative information systems to assist in planning and control, the establishment of basic public relations between Government departments and the public, the curtailment of administrative "red tape" formalities, the provision of an opportunity for workers to develop their individual capabilities, the preparation of a law and a code of conduct for the Civil Service, etc. This plan was designed to be implemented in stages on the basis of the following strategic objectives:

1. The transfer of modern administrative technology from the developed countries and its modification and adaptation to suit local circumstances.
2. The monitoring and attempted propagation of exemplary local and Arab administrative practices.
3. Efforts to further Iraq's administrative progress through the use of scientific methods for change and development, including:

(a) Training;

(b) Administrative systems;

(c) The replacement and modification of legislation and regulations impeding progress;

(d) The replacement and modification of the organizational structure of cumbrous administrative machinery;

(e) The establishment of organizational units in administrative departments to implement the Administrative Development Plan;

The National Centre for Consultation and Administrative Development, which is attached to the Planning Board, is responsible for the preparation and implementation of this Plan in addition to its other functions in the field of administrative development and the improvement of financial management.

This vital Centre, which was established in 1962, completed the following assignments during the period 1968-1977:

(a) The provision of advisory services in the field of accounting, finance, costing systems, organization and reorganization, job evaluation, records and archives, raising and developing performance efficiency, stores and stock keeping, control and planning, regulations and instructions, marketing and distribution, maintenance, mechanization and computers, work methods and procedures;

(b) The organization of training courses in the field of: organization and methods, organization and productivity, administrative work and job descriptions, communications and working relationships, training, office administration, store management, job evaluation, financial and cost accounting and auditing, personnel management, marketing, work instructions, purchasing, the development of managerial skills, administrative control, quality control, operational research, management and the identification of objectives, preparation and drafting of reports, governmental administration, records and archives, computers and programming, administrative procedures, production management, feasibility studies, maintenance, project planning, research.

In 1976 the Centre organized 25 training courses covering a period of 70 weeks in which 536 trainees participated.

A National Computer Centre was established under the terms of Law No. 100 promulgated in 1972. This law defined the main functions of the Centre as the provision of an adequate accounting capability to meet the requirements of administrative, accounting and engineering work, the organization of investments in the computer field and the provision of advisory services in connexion with computers for various public and private departments and institutions.

As a central planning instrument and a specialized advisory and executing agency in the field of computer technology, the Centre is responsible for the formulation of comprehensive and detailed plans for the elimination and future avoidance of the present bottlenecks in various sectors by introducing computerization into the work of these sectors.

Other functions of the centre include the setting-up of central information systems for use in planning and monitoring at various states and for channelling manpower engaged in routine work into productive occupations with a view to the furtherance of the overall development plans and the provision of the data needed to facilitate the taking of correct decisions at various managerial levels.

The appropriate methods adopted by the Centre for the discharge of its functions include providing technicians, managers and supervisors in various government institutions with theoretical and practical training in the use of computers in various fields, carrying out research and studies aimed at surveying and analysing the situation in all government institutions in preparation for the mechanization of their operations, studying the capacity and capability of computers in the country with a view to their optimum utilization, the procurement and operation of computers at the Centre for purposes of training and in order to provide access to computers for institutions the nature and extent of whose operations do not justify the acquisition of their own computer. These methods are applied at national level.

At the Arab and international levels the Centre is diligently endeavouring to promote inter-Arab co-operation in the field of computer technology with a view to making plans for the establishment of an Arab computer component industry to be based in Iraq. The Centre is also endeavouring to obtain for Iraq a place among the world's more advanced countries in this field.

There are also non-centralized bodies in ministries and larger institutions which organize training courses and provide administrative and financial advisory services. Arab regional and international organizations normally help with the organization of special courses in this respect.

Specialized institutes and centres and scientific (non-governmental) societies also organize specialized development courses and government employees are entitled to complete their higher education at universities without losing any of their benefits. Extensive use is made of courses, seminars and conferences held abroad for purposes of higher specialization.

There is an incentive scheme for participants in training and development courses under which these courses are added to the length of service for promotion purposes and the participants are also given extra consideration when applying for higher posts.

The universities and higher institutes train graduates in the economic, administrative and legal sciences in accordance with a special plan for admission into various scientific faculties and these institutions also organize special courses for this purpose, in addition to the various institutes of administration, and in all the disciplines in which they undertake to graduate intermediate cadres for public administration.

The private sector also benefits from these cadres although its needs are generally very limited in comparison with the needs of the governmental sector.

Local creativity and inventiveness

In the field of science and technology no exciting discoveries or inventions are made which could be compared with what is taking place in the advanced industrial countries.

Since 1968 legislation has been promulgated, bodies have been established and a number of measures have been taken to encourage scientists, inventors and researchers and to promote scientific and technological development. These measures are not restricted to scientific and research organizations but also include, in particular, the popular and public spheres since scientific institutions are provided with moral and financial support and wide authority to purchase instruments and equipment, enter into beneficial contact with foreign organizations and institutions and attend scientific and technological gatherings abroad.

In addition to this governmental support, professional organizations and, in particular, trade unions encourage inventive and creative workers by providing them with medals and material incentives and organizing public exhibitions of their inventions.

There is a private institution which helps young inventors by providing youth centres with various instruments and equipment and even small laboratories in order to develop their creative proclivity and encourage them to persevere in their scientific hobbies. There is also a permanent exhibition of the creative work done by young people in addition to the annual exhibitions organized in the capital and the other principal towns and there are weekly television programmes which deal with scientific and technological subjects at the popular level in addition to the special scientific programmes which are broadcast daily.

Many endeavours initiated by ordinary skilled workers lead to tangible economic results in the production process although the effects of these inventions and innovations at the general economic level remain limited and are mere beginnings. Their significance, however, is steadily increasing.

These measures and incentives to promote the scientific application of locally produced science and technology in production and management are an indication of the predilection for locally produced rather than imported science and technology in keeping with the State's general policy of furthering national capabilities and reducing reliance on foreign countries.

The link between productivity and technological education

There are no field studies on the effect of education in general, and technological education in particular, on productivity although the present post 1974 stage of rapid and extensive development, together with its attendant bottlenecks in skilled labour, has clearly shown the adverse repercussions associated with the shortage of skilled labour, particularly with regard to the intermediate cadres. For this reason the current trend in long-term planning is towards the maximum possible expansion in multi-disciplinary technological education in order to increase the number of technologists per 10,000 of the population from 23.2 in 1975 to 145 by the year 1990.

In view of the direct influence exercised by technological know-how on the level of productivity, every State production enterprise is obliged to organize training courses for its employees and to make an attempt to avoid engaging personnel for production jobs before they have received the requisite training.

The 1976-1980 National Development Plan emphasizes the need for the establishment and expansion of a vocational education system capable of dealing with bottlenecks and increasing the technical efficiency of staff employed in the fields related to the national economy. This is to be done by increasing the number of trainees admitted to vocational schools from 7,745 in 1975-1976 to 50,000 by 1980. This figure represents 25% of the total expected student intake in the preparatory stage. The number of graduates from universities will increase from 7,865 in 1976-1977 to around 15,000 in 1979-1980.

Imported technology

Imported technology is used wherever required in most of the modern production sectors and this is particularly the case with the industrial sector in all its branches, especially the manufacture of machinery and equipment, with the exception of one branch of industry (construction materials), in which production still uses time-honoured local techniques, and certain traditional handicrafts such as the carpet industry, local textiles and ceramics which the responsible authorities are endeavouring to protect.

The selection of imported technology takes place in accordance with the general and detailed conditions specified for projects as we have already mentioned. When drawing up the general terms of contract and the technological specifications, consideration is given to local circumstances and conditions at the proposed project site such as the climate and the type of primary and secondary materials to be used in the production or services operation. This technology, which is basically designed for different environmental conditions, becomes more expensive when it has to be adapted to local conditions.

Production and management procedures in most of the larger projects, which are State owned, are distinguished by their modern scientific character and endeavours are being made to increase their production in a manner compatible with their designed production capacities. The senior Government officials are eager to achieve the highest levels of productivity and the National Development Plan for 1976-1980 has stipulated an increase in the utilization of production capacity in the socialist (governmental) industrial sector from 73 per cent in 1975 to around 104 per cent in 1980. Full (100%) production capacity is calculated on the basis of the output achieved under a two-shift (16 hours per day) working system. The medium-term plans are designed to absorb and assimilate imported technology as a first and necessary step towards its development and the creation of the requisite material and human base for its generation in the future.

The National Development Plan is aiming to produce certain indicators for the establishment of a balance between the flow of imported technology and the extent and variety of local technology since continuous studies and attempts are being made to generate national technology in various fields, particularly in industry and agriculture, even though the results of these attempts have not as yet made a tangible impression on the economic accounts.

The necessary steps have not been taken for the regular utilization of registered patents in Iraq with a view to the furtherance of the process of scientific and technological innovation and creativity within the country but arrangements will be made to assign this task to the Scientific and Technological Research Organization in accordance with its proposed new statutes.

The State is encouraging Iraqi nationals to produce local inventions and innovations by offering material incentives to outstanding inventors and innovators in specific fields and also by protecting their rights with regard to the economic benefits arising out of the use of these patents. At the present time consideration is being given to the question of protecting the rights of patent holders in the event of their patents being used in the governmental (socialist) sector by awarding them either a percentage of the economic benefits accruing from such use or lump sums or both.

Industrial information

Several institutions are engaged in industrial documentation and information to assist production and service organizations in addition to scientific institutions. There is a specialized Scientific Documentation Centre which publishes special bulletins on data which it possesses and there is a specialized Institute for the Engineering Industries which currently supplies industrial information and publishes a periodic bulletin. There is also a private magazine published by the Iraqi Industrial Federation in co-operation with the Ministry of Industry and Mines. Industrial institutions, research centres and other specialized governmental centres also publish periodic and annual brochures. The Technological University publishes a periodic magazine and similar publications are also issued by other universities. The Association of Iraqi Engineers and other professional societies and syndicates (for chemists, geologists and agricultural engineers, etc.) also publish periodic scientific and technological bulletins.

National consulting and engineering firms

There are a considerable number of consulting and engineering firms in both the governmental and the private sector which specialize in preliminary surveys and economic and technical feasibility studies for various engineering projects. These firms are almost sufficient to meet local needs in the field of civil engineering and architecture although they do operate in conjunction with foreign consulting firms in this respect. In other more complex engineering fields connected with industry, electricity, dams, and major bridges, etc., the possibilities of national firms are limited and use is normally made of foreign consulting firms. The State is making special efforts to develop and expand these local firms. The main institutions currently engaged in such activities are:

(a) In the oil industry where there is a large institution which carries out study and design work for smaller projects. In the case of complex projects such as refineries and gas processing plants the work is carried out by international firms either individually or as joint ventures but always under the supervision of the governmental institution;

(b) In the various manufacturing industries where there is a large central industrial institution attached to the Ministry of Industry and Mines. Similar activities are also carried out by specialized production institutions

in the construction, engineering, chemical, food, weaving and textile industries and also in the field of mineral resources, geological operations (excluding crude oil) and services related to general industrial development. Similar large institutions also engage in work connected with housing, roads, bridges, large structures, railways, electricity, irrigation and soil, etc.

Institutions operating in the private sector specialize in civil engineering works, especially building and general construction, and in certain consulting services in the field of electricity, air conditioning and various manufacturing industries. Some private firms also undertake consultancy work outside Iraq, particularly in the Arabian Gulf region.

Foreign consulting firms wishing to obtain work in Iraq are required to register their offices locally but these firms do not have large regular offices in Iraq since most of their work is conducted outside Iraq in their offices in their home country unless they carry out such work in conjunction with private Iraqi firms. This latter formula is the most prevalent since the consulting firms undertake their basic operations such as design work in their offices abroad while the preliminary or supplementary work, or a considerable part thereof, is carried out by private national firms.

Governmental institutions and foreign consulting firms also co-operate under the terms of special contracts concluded between the two parties for this purpose. These contracts are drawn up on the basis of full participation in the work either in the Iraqi institutions themselves or in the head offices of the foreign consulting firms abroad.

In this field there is a new trend towards the adoption of complete consultancy contracts based on a sharing of responsibility between Iraqi and foreign institutions. Such consultancy work embraces the studies, designs, supervision of procurement, manufacture and project execution. This formula, which represents the latest trend in such business dealings, affords an opportunity to participate effectively in all stages of the technology transfer process and to "unwrap" the technological package, in addition to its other advantages with regard to the reduction of costs and enabling Iraqi national institutions to participate as far as possible in project execution work.

CHAPTER V

THE TRADE IN TECHNOLOGY

The importation of technology is subject to central Government control at several stages beginning with the importer's obligation to obtain a permit for the establishment of the project for which the technology is to be imported and also an import permit granted by the Council for the Regulation of Trade on the recommendation of the private bodies to which the project pertains. At this stage the application is recorded in the annual import schedule and the necessary funds are allocated. Finally, the approval of the Central Bank of Iraq is required before the import licence is issued. Similar procedures have to be followed in the case of imports required for both the private sector and governmental institutions. There are no specific bodies responsible for ascertaining the quality or specifying the origin of the imported technology apart from certain evaluation departments in the socialist sector (the various governmental organizations).

There is also no specific procedure for the registration of agreements relating to the transfer of technology since this transfer takes place in accordance with private contracts entered into by the importing and exporting parties. In the case of the socialist sector there are standard conditions applicable to agreements in general although each transaction is subject to special conditions, particularly in connexion with the confidentiality, duration and stipulations regarding patents, etc.

Under the terms of the proposed statutes for the Scientific Research Organization one of the functions of the Organization will be the registration and certification of technology transfer agreements and also their analysis with a view to formulating general principles for the proper regulation of the technology transfer process.

Until now no regular study has been undertaken with the aim of scientifically classifying and analysing the contents of technology transfer contracts in order to shed some light on their merits and shortcomings.

Certain long-term contracts do, however, normally require the approval of the central authority which makes its recommendations after a study of each contract on an individual basis since there are no standard universal stipulations in this respect.

The prevailing trend at the moment is towards the tightening of State control over foreign trade, including the trade in technology, particularly in regard to recurrent imports of widely used material and equipment since specialized governmental institutions are responsible for organizing the importation of such goods whether for general use or in accordance with specifications requested by the recipients. For example, there is a government institution responsible for importing machinery and production equipment, an institution responsible for instruments and precision equipment, another institution specializing in electrical and consumer goods, etc.

In the case of integral projects or projects of a very special nature, the bodies directly concerned arrange importation in accordance with the above-mentioned procedure. In order to facilitate and expedite such imports the recipients normally prefer to import their requirements directly.

Standards

A national organization responsible for standards and specifications was established in 1963 and has so far drafted 1615 standard Iraqi specifications of which 782 have been adopted although legislation has been passed to make only four of these standard specifications compulsory.

In 1978 this body is planning to draft 230 new Iraqi specifications and to review and update 150 others. In addition to the establishment of specifications, this body verifies and checks weights and measures and carries out analytical and physical laboratory tests on various commodities in order to ascertain their compliance with standard specifications.

It can be seen from the small number of specifications which have become compulsory that such standardization is still in its early stages in Iraq although the National Development Plan, together with governmental directives and various acts of legislation, are constantly stressing the necessity and importance of standardization from the economic and production view points. In general, progressive governmental control over production and imports will facilitate the enforcement of compliance with basic standards in as many fields as possible.

Iraq has not yet begun to export technology to the developing countries on a very large scale although there are many instances in which technical expertise has been exported to Arab countries and also to certain other developing countries in the field of construction, agriculture, industry, oil, archeology and education, etc. Examples of this include the building of schools in certain Arab countries, port construction and development, road construction, setting up agricultural projects, commissioning refineries and factories, administrative and financial expertise, expert advisory services, planning advice, the despatch of a number of teachers to Arab and African countries to teach in their schools and giving protection and preference to the products of Arab countries in order to enable them to compete with foreign goods in Iraqi markets. Such transfers take place on very easy terms as part of the technical and economic assistance provided by the Republic of Iraq to Arab and other needy developing countries.

Since Iraq only allows a very limited amount of foreign investment in a restricted number of fields, foreign investment in Iraq has been almost non-existent since the nationalization of the foreign oil companies.

Iraq is fully aware of the possible effects of the trade in imported technology on its economy and society. Consequently, this trade is the constant target of directives from the political leadership, forms the subject of long discussions, and is not merely left in the hands of technical and economic bodies. A very careful watch is kept on the repercussions of technology by a special governmental department which takes the strictest measures to prevent the short or long-term pollution of the natural environment and charges the cost of such measures to the project evaluation study.

Since the transfer of technology involves the relocation of the product of a particular culture into another cultural environment, the social effects of this relocation are also studied and precautions are taken to avert any adverse repercussions on national and Arab cultural, progressive, and socialist values. The strategic political consequences of the importation of technology are also taken into consideration with a view to the achievement of the basic strategic objective in this respect, namely the avoidance of foreign technological hegemony by establishing technological relations free from exploitation and based on the principle of reciprocal benefits and respect for national sovereignty.

CHAPTER VI

FOREIGN CO-OPERATION

There are many many ways in which foreign scientific and technological co-operation can be channelled but the principal method is through free foreign trade in technology offered on the world market at internationally competitive prices set by the exporters of technology. As already explained, this takes place through open tenders, direct and limited invitation to bid or by direct contractual arrangement although the latter method is extremely rare.

Another method to which the Iraqi Government resorts for the transfer and development of technology takes the form of technical and economic co-operation agreements concluded bilaterally between the Government of the Republic of Iraq and other countries. Iraq has concluded such agreements with most of the socialist countries and also with the countries of Western Europe, Japan, and certain developing countries. These agreements cover numerous aspects of scientific and technical co-operation in specific projects, the exchange of expertise, the setting up of projects, the exchange of documentation and information and other relevant matters. Iraq has also entered into a scientific and technical co-operation agreement with the Council for Mutual Economic Aid (CMEA). The duration of these agreements ranges from 3-10 years with the possibility of renewal. They relate to specific programmes agreed upon at the time of signing the agreements and are monitored on an annual basis by joint committees constituted by both parties for this purpose. These meetings decide on the deletion or addition of projects in these agreements and such decisions are subsequently ratified by the governments of both parties.

A third method of channelling co-operation in this field is through agreements concluded with international and regional organizations for the implementation of specific programmes once agreement has been reached on the method of financing such programmes. Such agreements have been concluded between scientific and research institutions and UNESCO, between industrial

institutes and UNIDO, between labour institutions and the ILO, between agricultural institutions and FAO etc. A large number of specialized Arab organizations, either independent or attached to the League of Arab States, are also co-operating in various fields.

Bilateral agreements are concluded within the context of cultural agreements between universities, for example, between research institutions in various countries and their Iraqi counterparts and also between private and public foreign institutions and their Iraqi counterparts.

Economic agreements between various Iraqi and foreign institutions fall within the purview of the relevant ministries after they are duly approved in accordance with the powers vested in these ministries.

Certain general criteria, deriving from the declared policy of the Republic of Iraq, are applied when deciding on the acceptance and approval of foreign co-operation. The most important of these criteria are the furtherance of the joint and mutual interests of both parties, full mutual respect for national sovereignty, similarity of views regarding international issues, the possibility of deriving real benefit from such agreements, that the agreement should not be of excessively long-term duration, that no political or economic strings should be attached thereto, that the agreement should be periodically reviewed, and that certain clauses in the agreement should be open to modification by addition or deletion with the approval of both parties. A specialized technical committee, on which all parties concerned in the agreement are represented, is always set up before the negotiation and conclusion of any contract.

Once agreements have been approved their implementation is the responsibility of the bodies concluding them and these bodies have full authority in matters pertaining to implementation within the limits of the funds allocated thereto.

The joint committees which implement these agreements are constantly endeavouring to raise the level of foreign co-operation and to remove potential obstacles which might impede it. The scale, scope, and number of these agreements are expanded as the Republic of Iraq establishes closer and more extensive relations with other countries and the present trend is towards the expansion of such relations with other developing countries.

Iraq's position with regard to the declaration made by the General Assembly of the United Nations at its sixth special session on 1 May 1974 concerning the establishment of a new international order is one of support for a new economic order that would be based on justice and equality between all sovereign nations and on the association and co-operation of these nations irrespective of their economic and social systems in such a way as to bridge the wide gap separating the developed and the developing countries and secure economic and social growth, peace and justice for the present and future generations.

SUMMARY OF THE PRINCIPAL LEGISLATIVE MEASURES TAKEN IN THE COUNTRY
DURING RECENT YEARS

<u>D A T E</u>	<u>E V E N T</u>
10/7/1969	Beginning of the national development of oil in the Rumailah fields.
16/7/1969	National exploitation of sulphur in the Al Mishraq field.
1/4/1970	Announcement of the first post-revolutionary National Development Plan for the years 1970-1974. Plan aimed at achieving a 7.1 per cent rate of growth in national income.
12/7/1970	Promulgation of Labour Law No. 151 aimed at building a better future for the working classes.
31/12/1970	Beginning of production in the Al Mishraq sulphur field.
12/3/1971	Promulgation of new legislation regarding retirement and social security benefits for workers.
7/1/1972	Beginning of production of Iraqi oil in the Rumailah fields in the south of the country.
1/3/1973	Triumph of the revolution in the nationalization battle against the monopolistic oil companies operating in Iraq.
6/4/1973	The President of the Republic calls upon the responsible officials in universities and the educational sector to give a socialist and unitarian orientation to their teaching.
8/1/1974	Promulgation of the law concerning the implementation of major development projects aimed at expediting the achievement of development goals.
8/2/1974	Announcement of revolutionary decisions to raise the standard of living of all citizens.

SUMMARY OF THE PRINCIPAL LEGISLATIVE MEASURES TAKEN IN THE COUNTRY
DURING RECENT YEARS

<u>D A T E</u>	<u>E V E N T</u>
20/4/1974	Iraq establishes an oil refinery in the Somali region of the Arab World.
5/11/1974	Promulgation of legislation to promote the return of qualified personnel to the Arab World in order to contribute to the overall development of the country.
27/8/1975	Iraq calls for the investment of Arab funds in the Arab World.
30/9/1975	Promulgation of the Law on State Farms to help to achieve the socialist transformation.
14/6/1976	The President of the Republic calls for the mobilization of all material and human resources for development purposes.
8/8/1976	Sources in the Ministry of Planning confirm that the national income in Iraq increased by 346% in the period 1965-1975.
20/10/1976	Inauguration of the earth satellite station and international telephone communications project.
6/1/1977	Wage increase for large sectors of the Iraqi population.
17/10/1977	Iraq witnesses the complete success of the largest general population census operation in its history.
21/12/1977	Announcement of the annual plan for 1978, for which 2800 million Dinars are allocated, with the declared aim of providing citizens with the widest possible range of services.
22/5/1978	Promulgation of Law 92 inaugurating the country-wide campaign for the compulsory eradication of illiteracy. The President of the Republic personally leads this cultural campaign.