INRODUCTION

Iraq is an ancient country where the greatest civilization in human history has flourished. The civilization of the valley of twin rivers was an agricultural civilization which appeared on the banks of the rivers Tigris and Euphrates. That civilization remained in a flourishing state for a long period of time during the Sumarian, Accadian, Babylonian and Islamic times. Herodotus described the land of Iraq as fertile, and said "wherever you beat the soil of Iraq it will smile on you with flowers and fruits".

At present the area of Iraq is about 438,446 sq. divided into 18 administrative units called provinces (Fig. 1). The population of Iraq is about 12,171,480 as per latest census for the year 1977. The area suitable for cultivation is about 12 million hectares divided into 2 main regions i.e. the northern region which depends on rains for its cultivation and the southern region which depends on irrigation from the rivers Tigris and Euphrates and their tributaries for cultivation. The agricultural sector is considered the main economic sector contributing to the national income of Iraq after the oil sector. The agricultural sector employed 56.5 per cent of the population of the country in 1964-72. It also provides
IRAQ
ADMINISTRATIVE UNITS


Fig. 1
food and nutrition to the people. In addition, it also provides some of the basic agricultural raw materials for some industries. The agricultural goods contribute an important item in the exports of Iraq.

AGRICULTURE PROVIDES THE FOOD MATERIALS TO THE PEOPLE

Agricultural products from plantations and animal husbandry are the main source for the people's diet. The demand for agricultural products has increased to such an extent as it has became disproportionate to the local production. This has led to imports of agricultural materials from abroad (Table I).

It will be seen from Table I that the production in Iraq in wheat and rice is not sufficient for the needs of the people and as such the government has to import them. Barley, it seems, is sufficient to meet the needs of the local people but in the year 1980 a large quantity of barley was also imported which is estimated to be about 253,300 tonnes. The State imports several varieties of vegetables and fruits though their production during the recent years has increased considerably.

CONTRIBUTION OF AGRICULTURE TO NATIONAL INCOME

Per capita income and gross national income are the two main factors for assessing the progress of a
<table>
<thead>
<tr>
<th>Year</th>
<th>Tonnes</th>
<th>Production</th>
<th>Imports</th>
<th>Wheat</th>
<th>Rice</th>
<th>Barley</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>25300</td>
<td>682400</td>
<td>40600</td>
<td>100400</td>
<td>20189</td>
<td>975400</td>
</tr>
<tr>
<td>1972</td>
<td>679600</td>
<td>37100</td>
<td>160600</td>
<td>60700</td>
<td>252500</td>
<td>103200</td>
</tr>
<tr>
<td>1974</td>
<td>963200</td>
<td>166900</td>
<td>199400</td>
<td>5030</td>
<td>1980</td>
<td>21540</td>
</tr>
<tr>
<td>1975</td>
<td>164900</td>
<td>1695200</td>
<td>169400</td>
<td>169100</td>
<td>103740</td>
<td>14000</td>
</tr>
<tr>
<td>1976</td>
<td>194510</td>
<td>38700</td>
<td>69700</td>
<td>893700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE I
country. The contribution of an economic sector to the gross national income depends on the nature of the national economy on the one hand and on the progress of other economic sectors on the other hand. It might happen that at a particular stage agriculture might be contributing greatly to the economic progress of the nation, but with the passage of time other economic sectors might occupy a more important position in the national economy - as is the case with respect to oil in Iraq whose share in the national income is much greater compared to agriculture. But agriculture has contributed significantly to the development of other sectors as it provides the basic raw materials for the industry in addition to the food it provides to the people and thus makes no less significant contribution to the national economy. Previously agriculture played much more important role in the economy of the country. Even to-day, however, the role of agriculture in the national economy of Iraq cannot be minimized.

It will be seen from Table II that agricultural income has increased from 148 million Dinars\(^1\) in 1962 to

\(^1\) 1 Dinar = US $3.2.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.029</td>
<td>0.073</td>
<td>0.070</td>
<td>0.040</td>
<td>0.040</td>
<td>0.040</td>
<td>0.040</td>
<td>0.040</td>
<td>0.040</td>
</tr>
</tbody>
</table>

Table II

Income and per capita income
National Income and Agricultural Contribution to National Income

303.4 dinars in the year 1974. The agricultural income has doubled in a span of 12 years and the increase has been about 50 per cent in the last four years (1970-74), and the per capita income in the agricultural sector also increased in the same measure. But the percentage of the contribution of this sector in the national income has varied during that period and the contribution of the agricultural sector in Iraq for the period ending 1970 was rather low and has been declining, but this decline may be apparent rather than real in the sense that the revenue from it increased substantially reducing the relative contribution of agriculture.

Table III shows some interesting features relating to agriculture and its absolute and relative contribution to the national economy. During the period 1970-78, agricultural production in absolute terms has been increasing and from 288 million dinars in 1970, it rose to 360 million dinars - an increase of 25 per cent over a period of 9 years. The growth rate was about 2.8 per cent. The general economic growth rate was 120 per cent in 9 years - a growth rate of 13 per cent per year.
TABLE III

Relative Importance of Aggregate with and without Oil in the Total Production in Iraq during the Period 1970-78 at the 1975 prices

<table>
<thead>
<tr>
<th>Year</th>
<th>Aggregate Production (Million Dinars)</th>
<th>Aggregate Production without Oil (Million Dinars)</th>
<th>Agricultural Production (Million Dinars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>2618.8</td>
<td>1137.8</td>
<td>287.9</td>
</tr>
<tr>
<td>1971</td>
<td>2734.2</td>
<td>1128.6</td>
<td>278.3</td>
</tr>
<tr>
<td>1972</td>
<td>2667.1</td>
<td>1284.1</td>
<td>363.1</td>
</tr>
<tr>
<td>1973</td>
<td>3167.0</td>
<td>1250.9</td>
<td>273.5</td>
</tr>
<tr>
<td>1974</td>
<td>3394.7</td>
<td>1554.1</td>
<td>308.5</td>
</tr>
<tr>
<td>1975</td>
<td>3904.0</td>
<td>1861.2</td>
<td>281.5</td>
</tr>
<tr>
<td>1976</td>
<td>4376.4</td>
<td>2102.8</td>
<td>353.0</td>
</tr>
<tr>
<td>1977</td>
<td>5135.0</td>
<td>2128.6</td>
<td>294.3</td>
</tr>
<tr>
<td>1978</td>
<td>5762.7</td>
<td>2380.9</td>
<td>359.9</td>
</tr>
</tbody>
</table>

It may be emphasised here that oil is a non-renewable source of income, while agriculture constitutes a permanent source of income. With the availability of irrigation water, fertilizers, high yielding varieties of seeds, better land and water management, agricultural production can be substantially increased and may provide a permanent base of stable revenue. It is in this sense that the role of agriculture is of the highest importance in the national economy.

CONTRIBUTION OF AGRICULTURAL SECTOR IN FOREIGN TRADE

There is no doubt that the oil exports occupy the first place in the exports of Iraq, but agriculture is none the less important. The role of agriculture is considered to be great as Iraq exports annually large quantities of agricultural products. The percentage of exports of agricultural products is about 94 per cent of the total value of exports (excluding oil) in the year 1962, but it came down to 71 per cent in the year 1971 (Table IV). But the percentage of exports of agricultural products fell during the recent years. During the period between 1973-75 the value of goods that were exported were about 16.7 million dinars. The reason for this reduction lies in the nationalization policy of oil in
TABLE IV

Ratio of Agricultural Export to Agricultural Product and Total Export

<table>
<thead>
<tr>
<th>Year</th>
<th>Agricultural Exports per 1000 tonnes</th>
<th>Agricultural Production per Million Tonnes</th>
<th>Ratio of Agricultural Export to Agricultural Product</th>
<th>Total Export per 1000</th>
<th>Ratio of Agricultural Export to Total Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>12652</td>
<td>133</td>
<td>9.5</td>
<td>15.2</td>
<td>4.2</td>
</tr>
<tr>
<td>1967</td>
<td>12987</td>
<td>188</td>
<td>6.9</td>
<td>20.6</td>
<td>4.3</td>
</tr>
<tr>
<td>1970</td>
<td>16526</td>
<td>207</td>
<td>8.0</td>
<td>22.5</td>
<td>4.1</td>
</tr>
<tr>
<td>1973</td>
<td>17441</td>
<td>285</td>
<td>6.1</td>
<td>32.5</td>
<td>2.6</td>
</tr>
<tr>
<td>1974</td>
<td>NA</td>
<td>303</td>
<td>NA</td>
<td>28.1</td>
<td>NA</td>
</tr>
</tbody>
</table>

1 Aldahiri, A.M., Economics of Agricultural Sector in Iraq, University of Baghdad, 1976, p.11.

NA - Not available.
1972, which led to the growth of all other economic sectors to a great extent and also augmented the income of individuals which in turn raised the standard of living of the people and changed their consumption pattern. This increased the internal demand for agricultural production especially food materials.

AGRICULTURE PROVIDES THE BASIC MATERIALS FOR INDUSTRY

Most industries in Iraq depend on agricultural sector for their basic materials. The vegetable oil industry requires cotton seeds, sesamum and linseed. The spinning mills require cotton fibres and flax of the first order and the Cigarette Industry requires tobacco. The cotton spinning in Kut in the year 1970 needed about 48,720 tonnes\(^1\) of raw cotton most of which came from the local production of cotton. Similarly the sugar mills in Mosul depends wholly on what the sugar beet fields produce in the northern region and which meet about 6 per cent of the mill requirements. Similarly sugarcane is grown in Maisan province and a sugar mill has been constructed near the areas in which sugar is grown with a

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production capacity of about 1,00,000 tonnes of pure sugar and sugarcane meets about 32,500 tonnes of its requirements.¹

**Development of Agriculture**

Agriculture in Iraq was in a backward state until 1970. The farmer was poor and agricultural productivity was low. The farmers migrated to the towns to earn their livelihood.

The land use statistics for 1958-59 show that land suitable for cultivation was in the hands of 3,418 persons who constituted about 2 per cent of the total land owners, and who in turn owned 39,63,750 hectares i.e. about 68 per cent of the total agricultural land.

Dams and reservoirs on the banks of Tigris and Euphrates were constructed to prevent floods as there was a general belief that the country did not need them except to control floods. After the year 1958 the state felt that the obstacle which hinders agricultural development lay in the system of land ownership. The Government passed

The Agricultural Reform Act in the year 1958. The Act adopted the following basic principles.

1. To define limits of land ownership and confiscate the land which exceeded the defined limits after paying compensation.

2. Distribution of lands among farmers according to a certain percentage, provided the farmer paid the cost of land.

3. Maintaining system of shares and introducing amendments in the distribution of returns.

4. Establishment of agricultural cooperatives and fix minimum wages of agricultural labour.

5. The Agricultural Reform Act gave the right of choice of land to the person deprived of the land.

The state had to face several problems during the first few years of the implementation of the Agricultural Reform Act owing to the migration of farmers and owners of land to the city and also due to the lack of experience in the implementation of the agricultural reform operations. The progress of agriculture was hindered owing to the incorrect application of agricultural reform and the existence of Loopholes.
in its execution. Cultivators followed the old practices with faulty management of land and water resources.

Agriculture could not meet the needs of the growing population with increase in the standard of living of the people. The food requirement of the people increased which forced the state to import foodgrains from outside.

TABLE V

Value of Importing Food Materials and Tobacco and their Ratio to the Aggregate of Imports 'Thousand Dinars'\(^\d\)

<table>
<thead>
<tr>
<th>Year</th>
<th>1965</th>
<th>1966</th>
<th>1967</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>29,429</td>
<td>26,013</td>
<td>24,273</td>
<td>26,129</td>
</tr>
<tr>
<td>Percentage ratio</td>
<td>18.2</td>
<td>14.7</td>
<td>16.0</td>
<td>18.0</td>
</tr>
</tbody>
</table>

AGRICULTURE AFTER 1968

The main objective of Land Reform Act was to eliminate landless labourers and make a distribution of

land which may ensure social justice. Such a measure, it was presumed will not only increase the food production but also improve the nutritional intake of the people. Social justice in the distribution of incomes would be ensured and establish strong basic cooperatives in order to develop prosperity in the Iraqi villages. The Agricultural Reform Act (No. 117) passed in the year 1970 is considered to be an important step in the agricultural developments of Iraq.

1) The act introduced the principle of land distribution in keeping with soil fertility, availability of irrigation and the kinds of crops grown in it. It also accepted the 400 mm isohyet which divides the land into two categories — those which receive rainfall of above 400 mm and those which received below it.

2) It fixed the highest limit of land ownership at 500 hectares of land which depends on rains and which falls south of the 400 mm isohyet and 250 hectares of the fertile soil which falls north of the isohyet, and 150 hectares for lands of lesser fertility and which is irrigated by other means, and 100 hectares of land of less fertility and irrigated by means of flooding and 100 hectares for land in which tobacco is grown and irrigated by flow irrigation in the northern regions and
25 hectares for lands growing rice and irrigated by the flow method in areas other than the northern provinces.

3) The Act led to the establishment of the cooperative system among farmers taking into consideration the conditions of the regions.

4) The Act abolished the right to choose land granted to big owners and prohibited them from exploiting this right in choosing the best lands and controlling irrigation water.

5) The Act organised the farmers and guaranteed their rights. By applying the Agricultural Reform Act, No. 117 for the year 1970, the State was involved directly in the process of agricultural production through State Farms and it supervised the agricultural processes through cooperatives. Farmers were provided large sums for agriculture and the final expenditure of agricultural investment reached 2029.6 million Dinars for the period 1975-81. The value of the agricultural production jumped from 260.8 million Dinars in 1968 to 1280.1 million Dinars in the year 1981. New methods were introduced in agriculture e.g. covered agriculture and plastic and glass houses were established. The State ensured the
necessary service for agricultural production like improved seeds and chemical fertilizers, agricultural credit and services for the protection of crops and animal wealth. The State offered a big financial assistance to the farmers to help them to cultivate their lands and utilize it for other agricultural operations. The total of credits given to the farmers was 25.4 million Dinars for the period 1960-74. The total credit increased to 372.1 million Dinars for the period 1975-81.

The State not only introduced land reforms but also provided inputs to the farmers. Besides it undertook the building up of irrigation dams and projects so that areas under irrigation could be extended. However in spite of all these efforts by the State, area and agricultural production have not increased proportionately. Some of the reasons may be summarized as follows:

(1) Labour Shortage

Owing to the general rise in the standard of living of the people in Iraq as a result of increased income from oil, many farmers took up more lucrative jobs

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in foreign firms, private/public sector undertaking and left the agricultural profession in Iraq. This phenomenon led to labour shortage in agriculture and in consequence the state employed farmers from some Arab and foreign countries.

(ii) Slow Acceptability of Social Change

The villagers in Iraq are slow in accepting the social change and picking up the modern methods of cultivation. Perhaps one of the reasons of slow pace of social change is lack of education, but as education spreads, scientific temper will be strengthened, and agriculture will be put on more sound lines leading to increased agricultural production.

(iii) Lack of Managerial Supervision

Skilled members of the family who were employed by the State or other persons migrated with their families to the cities, and the family felt satisfied with the earnings in the city especially as most of the professions gave much higher and quicker remuneration than agriculture, and this had a direct impact on low agricultural productivity.
The development of irrigation and agriculture is one of the live subjects which should have occupied a prominent position in the geography of Iraq. However, adequate material in respect of agriculture and irrigation is not available. What is available does not go beyond Government Reports and some books which cover limited areas. A notable person who has written on this topic is Ahmad Sosa. However his book "Development of Irrigation in Iraq" is similar to a report. Ahmad Sosa has discussed the conditions of irrigation in Iraq from ancient times till 1958.

Methodology

The method of collecting data was very difficult for the candidate because of unsettled conditions in Iraq owing to the continuation of war with Iran. However, after doing the ground work in India, the candidate visited Iraq several times to obtain government reports and other relevant material, apart from doing some field work. It was not easy to obtain replies from farmers during the course of field work, but being a local person and speaking their language, it was not difficult to elicit facts in this regard.

Scheme of Work

Inspite of the above mentioned difficulties it was possible to complete this thesis 'Development of
Irrigation and Agriculture in Iraq for the period 1958-1980, which is spread over five parts and consists of twelve chapters. The first part 'physical setting' contains three chapters. Chapter I deals mainly with structure, relief and drainage, Chapter II deals with climate of Iraq. Chapter III deals with soil. Soil regions have been identified in this chapter. Measures for combating the soil salts have been suggested and also a detailed soil classification of Iraq is outlined.

Part II makes a detailed study of the systems of irrigation in Iraq. This part gives a brief summary of the historical background and the development of the irrigation system in Iraq from the Babylonian King Hamorabi and attempts to explain the then existing irrigation facilities and the efficiency of old irrigation system. This part contains three chapters: IV, V and VI. Chapter IV deals with the irrigation projects on the river Euphrates and Chapter V deals with irrigation projects on river Tigris. Chapter VI deals with minor irrigation projects and drainage system and examines small irrigation projects in the western desert of Iraq which the state has undertaken with the aim of utilizing the desert and making the 'Bedouins' to settle down and practise agriculture.
Part III deals with the agricultural production. Chapter VII examines the changing position of crop land use and structure of agriculture with reference to agricultural land reforms (1958 and Law No. 117 in 1970). The main thrust of this chapter is close look of agricultural production of Iraq and the factors which affect the production of crops particularly the physical factors, socio-economic factors, biological factors and the Government policy. This chapter highlights the revolution which has been brought about in agricultural production owing to healthy changes in agricultural structure and the establishment of cooperatives, collective and state farms by the Government.

Chapter VIII deals with the main agricultural crops in winter like wheat, barley, lentils, chick peas, flax, dry broad bean and sugar-beet. Comparative study of different years have been made in respect of acreage production and productivity.

Chapter IX deals with summer crops which include rice, cotton, sesameum, ground-nut, green gram, maize and millet. The summer crops were also studied in detail in respect of production acreage and productivity of different years and the changes in the cropping patterns have been explained.
Chapter X is devoted to vegetables and fruits. Vegetables are divided into summer and winter vegetable. The production of some vegetables has been explained in detail. This chapter also gives detailed explanation of the geographical distribution of fruits, their production and the problems they face along with suitable solutions. Special mention is made of dates in this chapter. This chapter concludes with a general assessment of the agricultural production in Iraq.

Part IV deals with agricultural productivity in Iraq and this part contains one chapter: Chapter XI. In this chapter the concept of agricultural productivity has been discussed and the various approaches relating to the measurement of agricultural productivity have also been examined. Four different methods, those of Eneyedi, Shafi, Bhatia and Kendall have been examined in respect of their comparative merits in the determination of agricultural productivity in Iraq. The author, on the basis of the study of agricultural productivity and the factors affecting agricultural productivity has made some suggestion to improve agricultural production in Iraq.

Part V 'Irrigation and Agricultural Development' has one chapter. Chapter XII deals mainly with the Impact of Irrigation on Agricultural Development in Iraq. This
chapter mainly contains a study of water resources in Iraq, methods of irrigation and changing cropping patterns. The relative position on various crops in 1958, 1968 and 1980 have been examined in relation to irrigation as well as the influence of irrigation on agricultural development.

The study concludes by making some suggestions in regard to better utilization of irrigation water for increasing agricultural production including vegetables and fruits in Iraq. The requirements of irrigation and drainage facilities, as the country enters 21st century, have also been visualised and suitable suggestions have been made.