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THE AGRICULTURAL ECONOMY OF



IRAQ

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IRAQ IN BRIEF

General Economy

- Government:** This cradle of civilizations and empires has been an independent republic since 1958.
- Geography:** Iraq is a somewhat triangular shaped area of 169,284 square miles located in the center of West Asia, brodering on Saudi Arabia, Jordan, Syria, Turkey, Iran, and Kuwait. Nearly half of the country is desert. Two great rivers, the Tigris and Euphrates, are Iraq's outstanding features.
- Population:** Approximately 7 million: 75 percent Arab, 15 percent Kurdish, 10 percent other. Labor force totals about 2.4 million; around 75 percent are engaged in agriculture.
- Urban Centers:** Baghdad, 1.5 million; Mosul; Basra (chief port); Kirkuk; Karbala; Amarah and Sulaymaniya.
- Industry:** Petroleum industry is dominant. Light industry is increasing.

Agricultural Economy

- Importance of Agriculture:** Contributes 20 percent of national income; accounts for only a small portion of the country's foreign exchange earnings.
- Principal Crops:** Wheat, barley, rice, corn, beans and peas, dates, cotton, and tobacco.
- Cropland:** About 18.5 million acres--17 percent of land area of country. Half of this lies fallow in any given year.
- Main Agricultural Exports:** Dates, barley, wool, hides and skins, and cotton.
- Main Agricultural Imports:** Wheat, tea, sugar, rice, oilseeds, and vegetable oils.
- Leading Agricultural Supplier:** Since 1960 United Kingdom has been the leading supplier with United States second.
- Potential Market:** Continuing need for grains, increasing market for poultry, dairy products, vegetable oils, and tobacco.
- Agricultural Problems:** Soil salinity, water control, need for better livestock management practices and cultural techniques.
- Future:** Outlook for agriculture is relatively favorable, given political stability.
- System of Measurement:** Metric system is official.
- Land measurement: meshara or donum.
1 meshara (or donum) - .62 acres.
4 meshara (or donum) - 1 hectare - 2.471 acres.
- Money:** 1 Iraqi dinar - 1,000 fils - U.S. \$2.80

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Washington, D. C.	

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SUMMARY

Iraq is primarily an agricultural country with a considerable number of people engaged in pastoral activity. However, petroleum dominates its export trade, and light industry is increasing in growing urban centers.

The outstanding features of Iraq are its two great rivers, the Tigris and the Euphrates. Both these rivers rise in the highlands of eastern Turkey and flow southeastward through Iraq. They join in the southeast and form the Shatt-al-Arab River, which flows south into the Persian Gulf. The lower portion of the country is delta and alluvial plains that slowly rise in the west and northwest to broad desert plains and a belt of hills and rugged mountains to the north and northeast. About 47 percent of the country can be classified as desert and desert steppe. Two seasons, summer and winter, predominate. The summers are long, hot, and very dry. Winters are usually mild but at times can be quite cold. What precipitation there is falls between November and June and varies considerably between adequate rainfall for unirrigated agriculture in the north to practically no rainfall in the southwest. There are also great variations in rainfall from year to year. The rivers rise to flood stage in the spring. In recent years many millions of dollars have been spent in water control systems to prevent devastation from spring floods.

A population of over 7 million is mostly concentrated in the central plain between the two rivers and in the foothills of the northeast. A great majority of this population and about two-thirds of the labor force derive their livelihood from agricultural pursuits. Agriculture has contributed about 20 percent to the national product. Petroleum accounts for over 90 percent of Iraq's foreign exchange and is by far the outstanding industry. However, oil companies directly employ less than 1 percent of the country's labor force. On the other hand, oil has made it possible to implement ambitious development programs that are having a considerable impact, both directly and indirectly, on agriculture.

The origin of the land tenure system in Iraq has been quite complex. By the end of the Ottoman period a feudalistic structure and tribal groupings familiar in the Middle East had developed. As a result, the system culminated in large holdings, absentee landlords, and great tracts of land falling to State ownership.

In October 1958, the present agrarian reform program was launched, which, when carried to completion, reduces all individual holdings to a maximum of about 1,200 acres of rain-fed land and only half as much irrigated land.

About three-fifths of Iraq's agricultural output by value comes from crops and two-fifths from livestock products. The country is an exporter of livestock products, fruit, cotton, and in some years, barley, but an importer of several other agricultural products, especially sugar, tea, fats and oils, and, in recent years, grain. Grains are by far the most important crops in Iraq. They occupy over 80 percent of the area reported in crops and account for well over half the calories in the average diet. Livestock products are next in importance to the diet, generally contributing about 20 percent of the calories.

Livestock are raised throughout the country and are an important, or the only, source of income for a large share of the population of Iraq. Most of the livestock of Iraq, even those owned by settled farmers, are migratory and depend chiefly on grazing for their feed.

The agricultural crops of Iraq may be divided between the rain-fed and the irrigated lands and classified as winter or summer crops. Some crops such as barley are both dry farmed and irrigated. The principal crops in the rain-fed zone of the north are wheat and barley, the main winter crops. Cotton, rice, and tobacco are also grown wherever there is sufficient moisture to allow the cultivation of summer crops. Wheat ranks high in the Iraqi diet, accounting for about a fourth of the total calories. The irrigated areas of Iraq raise a variety of crops. Barley is the leading winter crop, while rice and cotton are the main summer crops. Much citrus and other fruits are grown for local consumption while Iraq is one of the world's leading producers of dates; and, in turn, dates are usually the first or second most important agricultural export, competing with barley for first place. Other important exports are wool, hides and skins, and cotton.

In recent years the United States has been an active trader in agricultural products. In 1962, a year before the first PL 480 Title IV agreement was signed, the U.S. was the second largest purchaser and the second largest supplier of farm products.

Agricultural products in 1962 accounted for 95 percent of the value of all Iraqi exports, excluding oil, and over 22 percent of total imports.



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Figure 1.--Iraq - physical features

THE AGRICULTURAL ECONOMY OF IRAQ

By

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INTRODUCTION

Iraq is unique in West Asia in that it is relatively rich in both oil and water. However, water is its most valuable resource. The climate and topography are such that only about 17 percent of the total area is cultivable, and of this, only about half is currently cropped in any one year. An additional 27 percent of the country's total area is considered potentially cultivable. This land can be brought under cultivation only by extensive irrigation and drainage. Work on this is now in progress or planned for the near future. Irrigation of one type or another already is used to produce crops on about 48 percent of the cultivable land. Much of the land that is now watered only by rainfall would be much more productive if it could be irrigated. In the irrigated areas the land is reasonably fertile, but in many areas extreme care with drainage is required to keep down salinization. Throughout history to the present, large tracts have become exhausted or saline, and have had to be abandoned, often for generations. Some once fertile areas still lie glistening with salt.

FACTORS AFFECTING THE AGRICULTURAL ECONOMY

Political Setting

On July 14, 1958 a military coup in Iraq overthrew the constitutional monarchy that had been established in 1924 under a British mandate and continued in power when the mandate ended in 1932. Following the 1958 revolution, Brigadier 'Abd al Karim Qasim became Prime Minister of the Republic of Iraq. Under his administration a far-reaching agrarian reform program was launched. However, considerable political instability continued, and conditions were aggravated by, among other things, the Kurdish rebellion in the spring of 1961, and by a continuing dispute with oil companies over profits and concessions. A successful coup d'etat February 8, 1963, brought a new Government into power that was dominated by the Baath Party.

This change in power led to somewhat improved foreign relations with the Western Countries but still political turmoil and agitations hindered agriculture. Economic conditions did not improve throughout 1963 and continued military action against the Kurdish minority in the north proved expensive and socially disruptive to the country. Therefore, after about 9 months of Baath rule, the Army again took over the Government on November 18, 1963, and Salam Arif, who had been a President with little power under the Baath, was reestablished as President.

When Premier Qasim was removed in the February 1963 action a union with Syria and the United Arab Republic was considered, but this never came into being as the Baath could not agree with the United Arab Republic on political points. Later an Iraqi-Syrian union was planned and carried forward to the extent that Syrian troops were sent to the north of Iraq for action against the Kurds. After President Arif was reestablished more firmly in power, there was again mention of a form of federation, but nothing definite was established.

Following the Iraqi-Kurd truce in February 1964 the new Government made plans for the special benefit of agriculture. These plans include the construction of roads, schools, and hospitals, the development of industrial projects dependent upon raw materials of the area, and an improvement and modernization of agricultural techniques. A number of irrigation and drainage projects have been planned.

As the country becomes more stable politically, more of the idle cultivable land will likely be cropped and there should be an increase in crop production and also improved yields in some areas. Thus the outlook for agriculture appears to be favorable, given continued peace with the Kurds, and political stability within the country as well as in the Arab world.

Other Influencing Aspects

Iraq has a number of unusual physical features and existing conditions which have influenced its economy and agriculture. Some of these phenomena have presented serious obstacles while others have been uniquely beneficial. Climate is a limiting feature. About half of Iraq is desert or semi-desert. Rainfall is scanty except in the north, and what there is falls during the winter and early spring, flooding rivers already full of melted mountain snow. Flood waters have regularly been unmanageable in the late spring and cause loss of life, property, and crops. Other climatic restricting features are long, overwhelmingly hot summers. Winters are surprisingly cold; frost can appear anywhere; and the northern areas have snow and bitter cold.

The population is not ethnically homogeneous. Strongly-marked divergencies between groups such as the Bedouin, Arab land owners, tenant farmers, Kurds, various religious sects, and others have involved endemic conflicts that have resulted in poor communications and misunderstanding of national goals. It appears from the record of recent decades that to a great extent, the complex of ethnic, linguistic, social, religious, and political factors has been the greatest deterrent to overall development.

Balancing the obstacles, Iraq is endowed with compensating features. Water is available for irrigation and power. The land is sufficiently productive to supply food for the people and for export. A variety of crops can be grown. The area of the lower delta is so well suited for date production that it gives Iraq a comparative advantage over most other producers. Among Iraq's major assets are her oil reserves which provide revenue for irrigation and other development.

PHYSICAL FEATURES

Topography

Iraq forms a rough triangle with its apex at the Persian Gulf and its base at the border of The Syrian-Arab Republic and Turkey to the northwest. Iran lies to the east, Kuwait, Saudi Arabia, and Jordan to the south and southwest (fig. 1).

The country is dominated by the Tigris and Euphrates River systems. The Euphrates rises in the mountains of Turkey, flows through Syria and into Iraq from the west. The Tigris also begins in Turkey and enters Iraq from the north. The Great Zab, Lesser Zab, Uzaym, and Diyala Rivers are important tributaries. From Ramadi on the Euphrates and Baghdad (the capital city) on the Tigris, the rivers form a single low-lying alluvial valley. Farther south the rivers are almost lost in marshes and lakes; the remaining waters unite at Qurnah and flow 115 miles as the Shatt-al-Arab into the Persian Gulf.

By far the greater part of the country consists of plains, largely desert or semi-arid, sloping gently toward the two rivers and the southeast. Vast deserts on the west and south continue into Syria, Jordan, Saudi Arabia, and Kuwait. A rhomboidal shaped "neutral zone" in the desert was designed to facilitate migrations of nomads.

Only about one-tenth of the country is mountainous, mainly in the northeast. The country's highest peak rises over 12,200 feet and is located just south of Rayat.

Climate

The summer and winter seasons dominate the climate of Iraq. Summer is relatively long (May through October), extremely hot, and very dry. Winters seem to arrive quite suddenly. They are usually mild, but can be unexpectedly cold for the latitude. There is a well-defined spring but it, like autumn, is of very short duration.

Climatic conditions, however, do vary somewhat according to the geographic location. The northern third of Iraq normally receives moderate rainfall as indicated by an annual precipitation of 15 inches at Mosul and Kirkuk, and 13 inches at Khanaqin, about all of which falls between November and June. Winters in these northern parts of the country can be quite severe, and during December, January, and February, temperatures often drop well below freezing.

In the northern and northeastern mountains precipitation increases to between 24 inches and 55 inches per year. Snow is quite common at the higher altitudes up until March. Frosts are frequent all winter and the mean winter temperature for the area lies close to freezing. Summers in the mountains are cooler than other parts of the country, but in the foothills and on the northern plains, summers are quite hot. Summer temperatures and relative humidity for Mosul and Kirkuk are similar to those of Baghdad.

In the central alluvial plain and the delta flood plains, the climate is similar to the desert areas but summers are somewhat hotter. Baghdad's temperature may reach 120° F. but the relative humidity at that temperature is about 12 percent. Basra has the same temperature but the humidity is almost three times as great. The summer skies are clear but a prevailing wind--the "Shimal"--blows from the northwest and often brings sand and dust storms which may last from 3 hours to 3 days. The temperatures at night are 20 to 30 degrees below those of the day. There is seldom a trace of rain in the summer and the annual rainfall is about 6 inches.

During the winter months, the northwest winds prevail but are weaker, frequently being interrupted by sudden hot spells. A southwest wind--the "Shargi"--brings cloudy skies, rain, and cold in the winter. The temperatures for Baghdad and Basra can drop below freezing. At times ice forms on the Shatt-al-Arab; however, snow in the southern part of Iraq is very rare.

The relative humidity of Baghdad rises sharply in the winter months and varies considerably. Basra's humidity varies far less and remains quite high, averaging 44 percent for the year. Fog is normal on winter mornings.

In the desert area, summers are long and hot, exceeding 90° F. throughout the season. Winters in this area are cool to cold with temperatures reaching freezing or a few degrees below. Average annual precipitation is less than 8 inches and in many parts of the desert it is well under half that amount. For example, the weather station of Ar Rutbah in the western desert

reported rainfall of only 3.6 inches in 1960. Whatever surface soils remain are beaten and sealed by the pounding rain, making the desert run-off so rapid that very little water is absorbed. Even in the nearly level steppes, where there is slightly more rainfall than in the desert, the run-off is considerable. Some of the wadies (intermittent streams), which receive the collected waters of the storms consequently have moderately good spring forage cover of a quick-growing, short-lived type. However, most of the slopes and many basins are barren because of the rapid run-off and because the basins do not drain but are evaporated, piling up layers of soil salts. The desert areas also suffer from wind erosion which scours the hard surfaces and piles up dunes of sand and clay (table 1).

Soils

The following information on soils was compiled by the Soil Conservation Service of the U. S. Department of Agriculture.

The principal soils of Iraq are: (1) Reddish Brown, (2) Alluvial, (3) Sierozem (gray) and Red Desert, (4) Solonchak (saline), (5) Desert, and (6) Lithosols.

Approximately three-fourths of the soils of Iraq, the Solonchak, the Desert, and the Lithosols, are generally nonarable. About one-sixth of the soils are used for crops; these soils include parts of the Reddish Brown, Alluvial, Sierozem, and Red Desert. Most of the remaining parts of these last three types of soil are potentially arable, lack of dependable moisture being the main restriction.

Reddish Brown soils occur on undulating to hilly land in the North; they are among the most important soils for agricultural use, especially grazing, in the country. The dominant texture of these deep heavy soils is clay loam, silty clay loam, and clay; on some hills and steep slopes, they may be sandy or even gravelly. In many places, they have calcareous subsoils and, in general, a good supply of plant nutrients, except nitrogen.

Alluvial soils occur mainly on the extensive plains of the Euphrates and Tigris Rivers in the central part of the country. These Alluvial soils are generally well drained silty clay loams, silt loams, and silt; however, there are small scattered areas of very sandy soils and poorly drained saline soils. The soils contain lime and, in addition, appreciable amounts of salts--mainly sulfates and chlorides. Much of the agriculture of central and southeastern Iraq is on these soils. Large bodies are irrigated for the production of dates which are the main crop, but some wheat, barley, and vegetables are also grown; other large bodies are not irrigated and they furnish only poor grazing land.

Sierozem and Red Desert soils occur on level to undulating plains mainly in the southeast, east, and northwest. Soil texture ranges from clayey to sandy, but sandy soils, low in nutrients, especially nitrogen, are dominant. The coarse texture of the soils and low rainfall limit their agricultural use. At present, irrigated crops of wheat, barley, and cotton are grown in several small places on these soils.

The remaining soils of Iraq are generally nonarable--the Solonchak soils because of high salt content; the Desert soils because of coarse textures and extreme aridity; and the Lithosols because of shallowness, stoniness, and steep slopes.

Table 1.--IRAQ: Temperature and rainfall at selected meteorological stations, 1962

	Location of Stations									
	Mosul	Baghdad	Rutbah	Basra	Khanaqin	Kirkuk	Diwaniyah	Nasiriya	Hai	
Temperature:	Degrees F.									
High	122.0	120.0	119.0	117.5	119.0	119.0	119.5	121.0	117.5	
Low	28.0	30.0	29.5	37.0	28.0	31.5	35.0	31.0	35.0	
Rainfall:	Inches									
January	2.59	1.02	.63	1.11	2.48	2.39	.81	.70	.90	
February	2.74	1.12	.63	.67	2.21	2.55	.57	.56	.83	
March	2.30	1.10	.73	.96	2.81	3.25	.82	.74	.97	
April	1.98	.67	.75	.86	1.64	1.89	.79	.80	.49	
May	.65	.26	.35	.28	.81	.63	.32	.20	.26	
June	.02	0.	T	0.	.02	.01	0.	0.	0.	
July	.01	0.	0.	T	.02	0.	.01	0.	0.	
August	0.	0.	0.	0.	T	0.	0.	0.	0.	
September	.02	T	.02	0.	0.	.01	0.	0.	0.	
October	.30	.11	.19	.03	.23	.14	.05	T	.07	
November	1.80	.83	.67	1.11	1.61	1.66	.65	.81	.70	
December	2.35	1.01	.80	1.33	2.23	2.46	.93	.94	1.09	
Total	14.76	6.12	4.77	6.35	14.06	14.99	4.95	4.75	5.31	

Note: Highest recorded temperature is 124° F, at Mosul in 39 years of official record.
 Lowest recorded temperature is 6° F. at Rutbah in 32 years of official record.

T= Trace.

Selected references (16).

Solonchak soils occur in several large areas on the plains of the Tigris and Euphrates Rivers and in many scattered bodies. These soils have developed from deep alluvial deposits and texture ranges from clays to sandy loams; sulfates and chlorides are present in most places. They have a relatively high water table and in places are intermittently inundated. Some areas are permanent marsh, a type which supports reeds and other saline-tolerant marsh vegetation. When dry, a white salt crust a few inches thick forms on the surface of these soils. Although these soils in their natural state are too saline for most agricultural uses, certain crops, such as date palms and salt tolerant grasses, can be grown on the fringes of these areas.

Desert soils occur on very dry level to undulating plains in the west. They are generally sandy and gravelly but in some places sandy loams are present; numerous small bodies of stony rock outcrop and deep sand, commonly in dunes, occur with the Desert soils. These soils support only poor, unimproved seasonal grazing.

Lithosols are the most extensive soils in Iraq; they occur on level desert plains in the west and southwest and to a lesser extent on the mountains in the north. The soils are shallow to bedrock and in most places they are either sandy, gravelly, or stony; some places are nearly devoid of soil. On the desert plains, these soils support only unimproved seasonal pasture and they are used mainly for semi-nomadic and nomadic herding. On the mountains in the north they support some tree growth.

Agricultural Regions

The foregoing physical features affect four agricultural regions in Iraq: (1) The north-eastern plains and ridges, often referred to as the "rain-fed" zone; (2) The Tigris-Euphrates Delta; (3) Al Jazirah; and (4) The southwestern deserts. Crop cultivation is, practically speaking, confined to the first two regions, and the major part of the country's livestock is also produced there.

The region of the northeastern plains and ridges takes in the four northern provinces (Iwas)--Al Mosul, Irbil, As Sulaymaniya, and Kirkuk--as well as northern Diyala. This region receives enough rain to support grazing and cultivation, and the greatest concentration of Kurds live in this area. The main cultivated areas are the southern foothills and broad valleys and lower slopes. Wheat and barley are the principal crops. On the fertile soil of the lower, once-wooded slopes, terraced cultivation also produces grapes, a variety of other fruits, tobacco, pulses, and vegetables.

Livestock in this region depend on the grazing afforded by the thinly forested slopes above the cultivated land and the still higher alpine pastures, as well as fallow land, stubble, and other forage resources of the cultivated areas. Overgrazing of the wooded slopes has drastically reduced the available forage, damaged trees, and exposed the land to erosion; erosion has also taken a heavy toll where cultivation has been attempted on steeper slopes.

The Tigris-Euphrates Delta region, which includes the rest of the provinces in the center and the southern part of the country contains fertile areas but crop growth is almost entirely dependent upon irrigation. Ample water for irrigation is provided by the rivers. Winter rains and melting snows in mountain headwaters maintain a high water level downstream during November-March and floods during April-June. Irrigation water can be readily drawn off since the rivers are raised above the surrounding country on great levees or banks of silt and mud deposited over the years.

Until recently, floods have reached destructive stages once every 3 to 4 years, destroying new plantings, preventing the planting of crops, and taking a toll of life and property. Further damage has resulted from accumulated salts from evaporated floodwaters. These salts, added to those from evaporated irrigation water, have ruined much cropland.

In the last few years, dams and barrages have been built, or are under construction, which the Iraqis hope will prevent these devastations and provide additional water for irrigation, as well as waterpower for hydroelectric plants. The Wadi Tharthar project on the Tigris and the Ramadi Barrage on the Euphrates are estimated to have cost less than the damage done by the 1954 flood alone.

Floodwaters have cut new channels in the lower delta, leaving many old channels to form lakes and marshes. Inhabitants of the marshes, the Ma' dan, travel about in boats and rafts, live in dwellings made of reeds, grow rice as a staple, keep many water buffaloes, and raise other livestock (fig. 2).

This lower delta produces most of the country's rice and dates; the upper delta, much of the wheat, barley, cotton, and other crops. Date palms, which do well in soil too saline for many other crops, border the delta streams, especially Shatt al Arab and others around Basra.

The Al Jazirah area (the name meaning island between the rivers) is a dry steppe, or rocky upland rolling plain, sparsely inhabited, mainly by pastoral Bedouins, who bring their flocks to graze the spring grasses. Some settled farming is carried on in the northern part. Only where the rivers have deposited alluvium over the hard rock can the land be cultivated.



Figure 2.--A canal in the date groves near Basra. Here near the Shatt al Arab the date trees are watered by the rise and fall of the tides. The canals are also used as transportation waterways.

Now included as part of neighboring liwas (provinces), Iraq's deserts, until recent years were divided into desert administrations. These desert lands contribute little to agriculture. There is much wasteland underlain with limestone or sandstone that has a monotonous surface strewn with gravel, rocks, and wind-blown sand. In places, the surface is broken by low escarpments, dissected here and there by a wadi. What little rain falls on the hard surface runs off quickly to collect in winter waterholes, or rushes briefly down a wadi toward the Euphrates. Enough water remains in places, especially in wadis, to generate a short-lived growth of grasses pastured by roving flocks and camels. Many basins, however, are too saline for grass.

Through Iraq's desert area northwest of Kuwait, the flat wadi bottoms and intervening ridges provide some grazing for longer periods than many other desert areas. Where gypsum lies near the surface, however, the land is barren. This area contains a number of wells. It is customary to allow animals to graze everything edible.

The area of least rainfall in the desert region has so far escaped overgrazing because it has few wells or other sources of water. New wells being drilled may soon lead to overuse of its exceedingly scant pasture.

LAND AND THE PEOPLE

Land Use

Iraq has a total of 169,284 square miles. By comparison, this is somewhat bigger than the State of California. About 47 percent of Iraq is desert.

Based on the 1958 census, which covered all land in farms in the 14 provinces but omitted the Desert Administrations, about 18 percent of the total area of the country consisted of land in farms. Over nine-tenths of the land in farms was cropland, including orchards and vineyards, but 44 percent of the cropland was in fallow. Nearly 48 percent of the cropland was provided with irrigation facilities.

The area classified as permanent meadows and pasture was only about 1 percent of the land in farms. The greater part of the land used for grazing in Iraq lies outside the land in farms. Much of the land within the area of the 14 provinces but not classified as farms or forests is, in fact, used for grazing, if only seasonally. A substantial part of this area could be used for crops if irrigation were available. Table 2 shows distribution of land in farm holdings, and land utilization.

Land Tenure

The origins of the land tenure system are extremely complex and have developed out of chaotic growth for over a thousand years. Up until the end of the Ottoman period, the basis of land ownership was the tribal dirah, a large area over which a tribe exercised a customary right to occupy. The system that evolved led to a feudalistic structure with much absentee landlordism. Great tribal holdings were appropriated by the sheikhs. These tribal lands, which had no legal basis, were regarded as state lands with the tribal occupants as tenants-at-will.

Under the tribal system, cultivation was partly communal and partly individual. Functions such as organizing canal clearance, irrigating, allotting seed, and fixing the dates of sowing,

harvesting, and threshing, were managed by certain lower tribal authorities; the sheik had primarily political functions. Only a small proportion of the total area of the dirah was cropped, and cultivation shifted as canals silted full and land was exhausted or became saline. For the most part, there was no individual ownership, since occupancy of a specific plot of land for a long period was not usual. Livestock grazing was a more important occupation to the tribesman than crop production.

In 1932 when it was economically and politically favorable to the Government, these lands were transferred to the sheikhs, who became the legal owners. The sheikhs' representatives, the sirkals, then became the estate managers and agents, and the tribesmen who were settled became sharecroppers, without rights or status, but legally tied to the land. This was to have been an improvement, but as stated in the FAO Country Report of 1959, there was probably no single cause of abject poverty greater than this system which divided the agricultural land into large holdings, which were subdivided into pitifully small operational units.

Table 2.--IRAQ: Land utilization

Category	Area	Percent of total
	1,000 acres	Percent
Land in farm holdings <u>1/</u>		
Field crops	9,858.2	9.1
Fallow	8,200.7	7.5
Orchards, groves, and vineyards	463.3	.4
Perennial forage, meadow and other pasture	175.9	.2
Woodland and woodlots	11.3	---
Built-on and other cultivable land <u>2/</u>	1,154.2	1.1
Total	<u>19,863.6</u>	<u>18.3</u>
Land outside farm holdings <u>3/</u>		
Natural woodlands and forests <u>4/</u>	4,810.8	4.4
Seasonal and other grazing land	10,360.4	9.6
Non-farm land, deserts, wasteland and other <u>5/</u>	73,307.0	67.7
Total	<u>88,478.2</u>	<u>81.7</u>
Total area of Iraq <u>6/</u>	108,341.8	100.0

1/ The 1958/59 Agricultural and Livestock Census figures were used for the area of land in agricultural holdings and units for the 14 Liwa (Provinces).

2/ A residual figure. The Census figure of 1,241,186 acres for uncultivable land included 87,026 acres of meadow and woodland.

3/ Area figures for these categories were not reported by the Census; figures were derived from Statistical Abstracts (1952-61), and the 1962 FAO Production Yearbook.

4/ Much of the natural forest areas are to some extent grazed.

5/ Some areas of this category are at times grazed, but they do not provide regular, dependable seasonal grazing.

6/ The figure for the total area of Iraq includes one half of the Neutral Zone and the territorial waters, as reported in the Statistical Abstract for 1961.

Thus, just as the Ottoman Land Law of 1857 failed to correct the land distribution problem, the Land Settlement Law of 1932 also failed. It was, however, the beginning of a cadastral survey, and set up a land classification system still in use. This classification recognized four basic categories: mulk, land which is held in absolute private ownership; matruka, land reserved for public purposes, i.e., roads, unsettled public pasture, threshing floors, etc.; waquf, land held in trust for religious or charitable purposes; and miri, land which is state-owned and broken into three subcategories. These subdivisions are: miri-tapu, land held in permanent tenure from the state, with the holder able to sell, mortgage, or will his right to this land to others; miri-lazma, land similar in tenure to miri-tapu land, except the state may veto any transferrals; and miri-sirf, land which belongs absolutely to the state and under its effective right of disposal.

In 1958 relative importance of the above classes of land in agricultural units was as follows:

<u>Land Class</u>	<u>1,000 Acres</u>	<u>Percent</u>
Mulk	159	.80
Matruka	2,288	11.52
Waquf	271	1.37
Miri-tapu	7,711	38.82
Miri-lazma	6,541	32.92
Miri-sirf	<u>2,894</u>	<u>14.57</u>
Total	19,864	100.00

Size of Holdings

An analysis of size of holdings reported by the 1958-59 Census shows that 57 percent of the farms in Iraq had less than 12.5 acres and included slightly over 2 percent of total area in farms; 81 percent of the farms had less than 50 acres each and included 10 percent of the area in farms (table 3). At the other extreme, 1 percent of the farms had 1,235 acres or more each and included over 55 percent of the area in farms. These figures do not separate the plots of land operated by sharecroppers reported in the census but include them with the landlords' holdings.

Large holdings were most common in the south and central parts of the country and least in the north. The lower concentration of large holdings in the northern provinces is said to be partly a result of inheritance laws, carried over from the Ottoman Land Code, which provided equal division between heirs. In the south, tribal custom prescribes inheritance by the oldest son.

Since the agrarian reform program was launched in 1958 the proportion of the total land in large holdings has been reduced while the number of small holdings has increased. However, recent figures are not available which show the extent of these changes. As of June 30, 1964 the Ministry of Agrarian Reform reported that about 4.3 million acres had been expropriated, and although no report was released on redistribution, it is known that large areas remained undistributed at that time.

Table 3.--IRAQ: Number and area of agricultural holdings, by size groups, 1958

Size group	Number of holdings	Share of total number	Area covered	Share of total area
<u>Acres</u>	<u>Thousand</u>	<u>Percent</u>	<u>1,000 acres</u>	<u>Percent</u>
Under 2.5	73.1	28.9	64	.3
2.5 - 12.4	70.9	28.0	405	2.0
12.5 - 24.7	30.9	12.2	521	2.6
24.8 - 49.4	30.9	12.2	1,063	5.4
49.5 - 123.6	29.7	11.7	2,187	11.0
123.7 - 247.1	9.0	3.6	1,458	7.3
247.2 - 494.2	3.7	1.4	1,223	6.2
494.3 - 1,235.4	2.6	1.0	1,992	10.0
1,235.5 - 2,471.0	1.3	.5	2,214	11.2
2,471.1 - 12,354.0	1.1	.4	4,939	24.9
12,355 and over1	.1	3,798	19.1
Total	253.3	100.0	19,864	100.0

Selected references (19).

Agrarian Reform

Economic and social problems associated with land ownership and land tenure conditions have been important to Iraq. Large feudal holdings and pitifully small operational units may not have extracted the most from available cultivable land and water. For centuries, landlords imposed harsh sharecropping conditions on the peasant farmers and production in general remained close to the subsistence level. Also, the land tenure system of Iraq has resulted in an accumulation of large holdings by the Government. Redistribution through legal means has been so complex that peasants have been discouraged from trying to acquire this (miri sirf) land from the Government. Mobility of the share tenant was further reduced by laws favorable to the landlord. Legislation forbade the peasant to leave the land he cultivated while indebted to the landowner, and most peasants were in debt.

History shows that land tenure and land ownership in Iraq have been complicated. The land problem has gained the attention of government officials, both before and since the fall of the Ottoman Empire, and various plans for land redistribution were devised. The governments, however, were quite slow to implement the plans or systems they adopted.

Although land classification law was passed in 1932, it was not until 1951, under the Miri Sirf Land Development Law that there was much distribution. After 1951, some state lands were distributed freely to new settlers but the pace of the new settlement was too slow to affect significantly the agrarian structure as a whole. Out of perhaps a million families directly engaged in agriculture, some 20,000 were settled on miri sirf projects.

Soon after the revolution of July 1958, the new Republic of Iraq revised the earlier programs of land reform and transferred all administrative organizations and properties to the High Agrarian Reform Committee. Lands distributed under the Development Law were subjected to the provision of the new Agrarian Reform Law.

The Agrarian Reform Law, effective September 30, 1958, banned feudalism and stated as policy an intention to raise the standard of living of the farmer as well as to improve agricultural production. The law limited existing ownership to a maximum of 1,000 donums (one donum equals 0.6 acres) of irrigated land, or 2,000 donums of rain-fed lands. Land owned in excess of these amounts is subject to expropriation by the Government. If the land is expropriated, the Government agrees to compensate the former owners with Government bonds paying 3-percent interest and redeemable within 20 years. The distribution is effected to create holdings of 30 to 60 donums for irrigated land and double these limits for rain-fed lands. The law provides for setting up cooperatives for the new owners to join and instructs appointees of the Ministry of Agriculture to supervise the obtaining of loans, the supplying of materials and implements, the regulation of cultivation, marketing, and the performance of certain welfare functions. The law regulates relations between owner and sharecropper, sets minimum wages for the farm laborer, and insures him the right to organize trade unions.

As of March 31, 1962, sequestration of land totaled 1,465,303 acres and distribution of expropriated and State-owned lands totaled 1,342,371 acres. These figures are far behind the original targets of almost 7 million acres in the first 5 years of the revolution. The Ministry of Agrarian Reform has recently adopted a policy of slowing down both the acquisition and distribution phases of the Agrarian Reform Program. This is to allow sufficient time to organize the farmers and to complete preparations, such as survey and irrigation rights, before turning over title deeds.

Iraq's People and Agriculture's Share of the Labor Force

It is estimated that Iraq's population has now passed 7 million and is growing at an annual rate of 2.5 percent. On an area basis there are about 40 persons per square mile, which is less than the population density of the United States. However, vast areas of Iraq are practically uninhabited and the people, for the most part, are concentrated in the central plain area and the foothill country of the northeast. In recent years some of the increase of the urban population has been due to a movement from the rural areas which appears to have been accelerated by political instability.

About 75 percent of the population is Arab and Arabic is the chief language. Another 15 percent of the people are Kurds, the next largest ethnic group. They are concentrated in the northeastern part of the country although found elsewhere. The Kurds speak their own language and maintain their individuality. The remainder of Iraq's people are divided among a number of minority groups that include Yezidis, Iranians, and Turks. About 94 percent of the inhabitants follow the Muslim religion which is divided within itself among various divisions of the orthodox Sunni and the schismatic Shiah sects. Followers of other faiths include some 200,000 Christians.

Education in Iraq is free for children 6 to 12 and is nominally compulsory but not strictly enforced. Literacy is estimated above 20 percent and increasing as more young people attend schools. Both national and international attention to literacy and health are improving the level of living.

The predominantly subsistence type of agriculture employs roughly 75 percent of a total labor force of about 2.4 million. In 1960 government sources listed some 1.6 million persons engaged on holdings (privately owned farm units), most of whom were members of family groups.

Only 40,486 were reported as earning money wages. In addition to these almost 170,000 were reported to be working for a share in the produce. The estimate omitted the nomads and semi-nomads who contribute to agriculture's output and those who work at agricultural pursuits in the marsh lands.

As in many other countries women, children, and old persons are actively engaged in the family enterprise. Most of the small children and the very old people have jobs such as minding the family flock or driving a work animal around the threshing floor. Virtually all the agricultural laborers and many of the nonagricultural are not literate; most are underemployed. The underemployment results from seasonal concentration of operations and a combination of antiquated methods, the feudal system (which, although beginning to disappear still leaves its mark), the lack of management, and an inefficient use of water and land. Labor distribution and hence underemployment are apparently worst in the rain-fed grain producing areas where there is a tremendous pile-up of labor demand through the harvest and fall planting periods, followed by periods of underemployment or virtual unemployment. In the irrigated areas there is work at all seasons and therefore a somewhat better distribution of labor. The typical Iraqi farmer is employed only about one-third to one-half of the year.

Lack of opportunities in the rural areas, and Iraq's first efforts at industrialization have resulted in a drift of rural labor from the countryside to the cities--thus crowding urban centers with unskilled laborers well in excess of the demand. One of the goals of extension workers has been greater diversification for settled farmers, especially in the expansion of row crops. Such diversification has been successful in two areas: In the Basra area, a combination of date, citrus, vegetable, and melon production has greatly improved the distribution of agricultural labor. Also, near Baghdad, grain growing is being combined with vegetable, date, citrus, and livestock production.

Part IV of the Agrarian Reform Law No. 30 of September 1958 specifically treats the rights of agricultural laborers. This part of the law charges a Committee of the Ministry of Agriculture with the job of fixing minimum wages, authorizes unions, and repeals earlier laws concerning the division of crops between landlords and tenants. However, this Part IV does not spell out any detailed body of law for the agricultural worker as does the labor legislation relating to industry.

PRODUCTION PRACTICES AND MEANS OF PRODUCTION

Production Practices

Important improvements in agricultural practices have been introduced during the past 15 years on experimental farms. However, they are not yet extensively practiced by the peasants.

The Iraq Country Report, 1959, by the FAO estimated that although there had been many significant changes in tillage and other farming operations they affected hardly a tenth of the land.

Many peasants have no draft animals or equipment. Of those who possess some, most of them still use tillage methods that are little different from those that were used centuries ago. Little or no animal manure or commercial fertilizer is used and soil-building crop rotations are not practiced.

Farm Machinery and Equipment

The only statistics regularly published on farm machinery in Iraq are of sales. In recent years sales have accelerated. Numbers of some major types sold in Iraq during 1952-62 period are shown in table 4.

About two-thirds of the tractors and most of the combines are in the northern rain-fed areas. Natural terrain there is favorable for the use of heavy equipment; also since Iraq's settlements are of the village type, there are large stretches of land with virtually no obstructions. Combines and threshers produce a cleaner grain than traditional methods and mechanization facilitates the expansion of grain farming (fig. 3).

In the irrigated area, the numerous ditches make the use of combines difficult but some can be used. Tractor plowing is quite feasible and more tillage implements are being used.

A recent Iraqi-Soviet economic agreement provided for 4 Soviet-type machinery rental stations. The first opened at Abu Ghuraib (25 kilometers west of Baghdad) in July 1962. These 4, and 9 additional stations, are included in the Government's current 5-year economic plan. Table 5 shows sales of machinery and equipment for the years 1960 and 1961 by liwa, and table 6 shows major items held by the Ministry of Agrarian Reform at the end of 1962.

Undoubtedly mechanization will become increasingly important, though hampered by several difficulties, such as the need to train persons to operate and maintain the equipment.

Table 4.--IRAQ: Agricultural machinery and equipment sold, 1952-62

Type	1952:	1953:	1954:	1955:	1956:	1957:	1958:	1959:	1960:	1961:	1962
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Tractors	105	343	333	263	381	378	254	129	<u>1/526</u>	743	1,096
Plows	74	187	185	186	280	222	201	99	299	529	552
Disc harrows	31	48	58	27	77	53	40	42	49	75	58
Grain drills	9	8	2	---	10	12	12	4	5	6	3
Cultivators	45	109	184	96	107	138	62	62	162	323	446
Combines	96	421	154	70	213	335	82	181	62	343	253
Threshers	2	1	---	---	6	---	9	---	10	---	---
Mowers	---	NR	NR	1	1	1	4	---	---	NR	NR
Automobile trailors	NR	21	7	30	31	55	23	20	49	51	43
Blade scrapers	NR	11	10	12	21	16	16	9	13	17	34
Ditchers	3	6	6	14	15	16	13	3	14	23	28
Water pumps and irri- gation equipment	NR	NR	NR	NR	NR	NR	NR	NR	NR	208	187
Other agr. machinery	1	10	9	11	25	51	39	24	101	57	34

NR - Not separately reported.

1/ Includes 104 tractors imported from the USSR by the Agrarian Reform Ministry in accordance with the Technical and Economic Agreement between Iraq and the USSR.

Selected references (16).

Table 5.--IRAQ: Agricultural machinery and equipment sold or distributed, by province, 1960-61

Liwa (Province) and year	Tractors	Plows	Harrows	Grain drills	Cultivators	Combines		Threshers	Auto tractors	Blade scrapers	Ditchers	Water pumps	Irrig. equip.	Other equip.
						Power	Horse							
						Number								
Al Amarah														
1960	2				2									3
1961	3	3			5							5	6	
Irbil														
1960	14	6	2		10		13		1					1
1961	36	10	3		14		27		3				4	
Baghdad														
1960	208	158	22	2	82				31	7	12			53
1961	333	245	18	2	161	30	5		23	8	16	30	22	20
Al Basra														
1960	2	1												2
1961	13	7							2			3	12	1
Diyala														
1960	18	17	2		17					1	1			3
1961	60	51	2		37		2		3		1	2	2	
Ad Diwaniyah														
1960	3	2												6
1961	8	10			1							2		
Al Hilleh														
1960	35	29			14					2				3
1961	48	53	1		17				4	5	3	1		
Karbala														
1960	3	2	1						2					1
1961	12	12			1							2	1	
Kirkuk														
1960	8				6		7							
1961	63	2	11		29	2	76		4	1				12
Al Kut														
1960	3	2	7			2								
1961	11	10	12		2	7						35	36	
Al Mosul														
1960	66	31	14	3	6	12	24	10	1	1	1			3
1961	93	60	38	4	41	54	135			1	1	3	31	20
An Nasiriyah														
1960														2
1961					1							2	4	
Ar Ramadi														
1960	39	29	1		22				4	2				1
1961	49	49			12				5	2				4
As Sulaymaniya														
1960	21	22			3		3		10					1
1961	14	17			2		2		7			1	4	
Total	422	299	49	5	162	15	47	10	49	13	14			101
1960	529	529	75	6	323	96	247		51	17	23	86	122	57
1961														

(-) none reported

Selected references (16).



Figure 3.--A grain drill in operation on a large farm.
Government of Iraq

According to the 1958 agricultural census, 27 percent of the farms had neither farm animals nor machinery and 67 percent had farm animals but no mechanized equipment (fig. 4). Transition to mechanized farming throughout Iraq will take many years. In the meantime the use of handtools and horse-drawn machinery better suited to Iraq's conditions could greatly benefit agriculture. The traditional tillage implements are a small steel-pointed plow, drawn by a small animal, and the shovel. The plow is very light but is constructed so as to get maximum penetration. It does not invert the soil, but simply loosens it--usually to a depth of 4 to 6 inches, shattering the surface and leaving it very cloddy. The surface soil structure is extremely unstable and without a cloddy surface the infiltration of water would be very slow. Preparation of fine seed beds is not recommended. Although the present plowing techniques are satisfactory under saline conditions since they leave enough deep-rooted weeds to dry the soil in fallow years, they will not be adequate under more intensive cultivation of reclaimed land.

For winter crops the dry land is generally plowed in the fall. The seed are sown by hand. The land may be plowed again in the opposite direction to give a better job of plowing and to cover the seed. For summer crops, many farmers simply broadcast the seed and irrigate. Some

Table 6.--IRAQ: Agricultural machinery and equipment used by the Ministry of Agrarian Reform - end of year listing, 1962

Type	Number
Tractors	427
Combines	137
Water pumps	655
Cars	399
Bulldozers	24
Other agricultural machinery	545

Selected references (16).

of the farmers plow their land before sowing the seed. A few progressive ones irrigate before plowing, both for summer and winter crops. This latter method prepares a much better seed bed, and generally results in a better stand.

In Iraq a fallow system is in use in which a crop one year is alternated with a year of rest for the land. This system is traditional in all of the Middle East. Iraqi agriculture is characterized by three different fallowing systems, each peculiar to a different situation. In the northern part of the country about half of the cropland is left fallow to restore soil fertility and store moisture. In the southern areas, irrigating cropped land raises the water table and salt would accumulate if the land is not left idle a year to allow natural drainage. In various places cropland is left fallow simply because there is not enough water. The fallow system no doubt will be continued in most areas for years to come.

If the fallow system were abandoned the canals in many areas would need to be increased in size, and drainage facilities greatly increased. Some work of this nature is included in the planning projects, but this will have to be a long-term program that is dependent upon many other factors.

Irrigation and Water Control

Approximately 8,858,000 acres had irrigation available according to the 1958/59 agricultural census; however, only about 56 percent is cropped each year; the remainder is left fallow. The irrigated cropland, which makes up almost half (about 48 percent) of the country's cultivated land, has water diverted to it by systems using both flow and lift methods (table 7). About 58 percent



Figure 4.--Single row cultivators for use on irrigated fields where large tractor drawn equipment would be difficult to use and uneconomic.

Table 7.--IRAQ: Cropland on farm holdings watered by rainfall and by various methods of irrigation by province

Liwa (Province)	By	By	By	By	By	By	By	Total
	rainfall	flow	water pumps	water wheels/na	oor2/	other means	cropland	
	Acres							
Al Amarah	241,923	385,328	388,491	3,128	---	99	1,018,969	
Irbil	1,421,631	55,390	1,428	128	---	259	1,478,836	
Baghdad	312,231	263,233	791,409	1,111	647	---	1,368,631	
Al Basra	3,002	148,292	45,822	2,051	---	2,540	201,707	
Ad Diwaniyah	7,428	531,087	798,207	30,853	---	5	1,367,580	
Diyala	959,976	780,035	57,391	16,837	---	40	1,814,279	
Al Hillah	4,005	784,644	42,234	31,839	---	91	862,813	
Karbala	18,221	83,663	6,402	4,749	---	657	113,692	
Kirkuk	1,834,283	319,266	929	126	---	---	2,154,604	
Al Kut	30,628	420,112	1,037,879	1,584	---	---	1,490,203	
Al Mosul	4,247,170	56,443	25,555	4,586	---	17	4,333,771	
An Nasiriyah	24,327	1,018,423	211,567	25,108	---	2,711	1,282,136	
Ar Ramadi	65,279	23,796	172,602	1,688	16,805	1,806	281,976	
As Sulaymaniye	592,659	259,836	175	598	---	---	853,268	
Total	9,762,763	5,129,548	3,580,091	124,386	17,452	8,225	18,622,465	
Total irrigated	---	---	---	---	---	---	8,859,702	
Percent of total	52.42	27.55	19.22	.67	.09	.05	100	
Percent of irrigated	---	57.90	40.40	1.40	.20	.10	100	

1/ Animal powered wheels.

2/ Water wheels driven by the river current.

Selected references (19).

of the area irrigated is watered by seasonal and gravity flow irrigation, while approximately 40 percent is irrigated by mechanical pumps. The remainder of the area has water diverted to it by water wheels, na-oors (water wheels driven by the currents of the river), and many home-made lifts powered by draft animals (fig. 5).

Approximately 5,560,000 additional acres can be irrigated when full utilization is made of the water supplied by the dams, wells, pumps, reservoirs already completed, under construction, or under consideration. However, the proper operation of so complex a water system is dependent upon the integration of a great many factors and the correction of inefficient practices.

New drainage systems will help reduce the necessity for so much land to lie fallow, because proper drainage will prevent the build-up of soil salts and allow more intensive cropping. Adequate drainage will also make it possible to reclaim some of the once productive areas by washing and leaching out the collected soluble salts (fig. 6).

Irrigation by diversion of river water has been practiced in Iraq for thousands of years but flood control by barrage, water storage, and drainage is relatively recent. Irrigation by modern methods began in 1908, when the Hindiyah Barrage was started. Other works followed, but not until the Development Board was created in 1950 were plans made for an extensive system of water control. The leading irrigation systems in operation are the Hindiyah Barrage system on the Euphrates (which serves around 1,727,000 acres), the Kut Barrage system on the Tigris (over 1,000,000 acres), and the Diyala Weir system (nearly 834,000 acres).

Four dams or barrages for flood control and irrigation have been completed recently. The Samarra Barrage (completed in 1956) diverts water from the Tigris into Wadi Tharthar, a vast natural basin with a storage capacity of 30 billion cubic meters. Habbaniyah reservoir (also 1956) stores 2 billion cubic meters of water diverted from the Euphrates by the Ramadi Barrage. Dokan Dam on the Little Zab (1959) has storage capacity of 6.3 million cubic meters. Derbendi-Khan Dam on the Diyala River (1961), with storage capacity of 3 billion cubic meters, is the largest rock-filled dam in the world. These dams and barrages are expected to provide adequate protection from flood damage and bring about increased crop production from new lands opened for cultivation, higher yields in areas already cultivated, and double cropping.

Though less important than flow irrigation, pump irrigation served nearly two-fifths of the irrigated land in 1958. Since then a number of new irrigation areas have been completed. As of January 1962, water pumps (not including pumps for drawing water from artesian wells) numbered



Figure 5.--Euphrates waterwheels of ancient design lifting water for irrigation. Iraqi Government.



Figure 6.--Diyala irrigation canal. Note deposit of salt on banks. Iraqi Government.

nearly 6,400, supplying 321,000 hp., compared with 5,650 pumps, supplying 213,000 hp. in 1958-59. These data indicate some increase in pump-irrigation area since 1958, and perhaps more adequate irrigation of the older area as well (fig. 7).

In the 5-year economic plan, begun in 1961, over ID90 million (US \$253 million) was allotted to various water-control projects including wells; this represented 80 percent of the total allotted to agricultural development (16 percent of the total expenditures for all purposes). Though about one-sixth of the total funds for water projects was to be spent on dams and barrages, the major part was allotted for other work on improvement of irrigation and drainage systems. The projects undertaken were to be completed in 15 years; when completed, they are to regulate irrigation and drainage of 6,078,660 acres in the Tigris Basin (including 1,420,825 acres previously uncultivated) and 3,706,500 acres in the Euphrates Basin (including 617,750 acres previously uncultivated).

The recent increased emphasis on drainage is a favorable development. Most of the Tigris-Euphrates Delta lies only a few meters above sea level, and has a very low gradient with inadequate natural drainage. Small areas in the north have a similar problem. In the past, little or no artificial drainage was installed; lack of drainage, together with misuse of irrigation water, has caused excessive soil salinity in large areas, and outright abandonment of the land. The present system of controlling salinity is to fallow the land every second year, so that the deep-rooted weeds allowed to grow in the fallow will dry out the subsoil, lowering the water table. The first irrigation of the next crop is supposed to flush any salt near the surface deeper into the subsoil, where it will not interfere with the more shallow crop roots. This system, however, often fails to serve its purpose. Improved drainage systems could substantially increase the area in crops by reducing the need of fallowing for desalinization.



Figure 7.--Aerial view of irrigated farmland near Kirkuk. Straw stacks can be seen near the center of the picture.

In recent years the Government has employed geologists to make comprehensive surveys of the ground-water potential; the latest 5-year development plan allotted ID5.8 million (US \$16.2 million) for artesian wells. By the end of 1961, 767 artesian wells had been drilled, most of them in the northwest, but 91 in the desert areas. Some wells were drilled to provide water for nomadic tribes and their flocks and for growing crops, in an effort to induce them to establish permanent settlements. A few of them have done so. Additional families are expected to settle as more wells are drilled and cultivable land becomes available.

Tests have been successful in locating subterranean water and hundreds of points have been discovered where artesian wells will be drilled in the future.

Irrigation is increasing, where in the past, local reservoirs and tube wells have been used to supplement the rain in the north. At present the main systems providing flow irrigation are the following:

	<u>1,000 Acres</u>
(1) Watered by the Euphrates -	
(a) Hindiyah Barrage System:	
The Hillah canal and distributaries serve	1,381
The Hashimiyah, Neni Hassan distributaries serve	346
(b) Left bank Euphrates canals serve.	519

(2) Watered by the Diyala - The Diyala Weir System serves	834
(3) Watered by the Lesser Zab - The Hawija System serves	111
(4) Watered by the Tigris - The Kut Barrage System serves	1,050

Subordinate systems divert water to about 889,560 additional acres (fig. 8).

Water and Health

A water supply is the greatest necessity for both rural and urban existence. When it is not pure it often brings disaster. There are numerous villages, in addition to municipalities, where the problem of obtaining water is critical. In fact, domestic water has always been a major problem to the herdsmen and villagers in arid Iraq. Rural villages are necessarily located near a source of water, by a canal in the irrigated zone, by a stream, or a well in the north. When used for drinking or bathing, water that is not piped, purified, and handled in such manner as to take sanitary precautions may transmit many debilitating diseases such as bilharzia, or if allowed to stagnate, become a spawning-place for mosquitoes that transmit malaria. All water sources are suspect, but canals in the irrigated zone can become heavily polluted. Special attention, through the Ministry of Health, has been directed toward such unhealthy conditions and toward the general improvement of rural health. Efforts are being made to provide additional preventive and curative services. Village health teams consisting of a physician, a health officer, a nurse or aide for vaccinating, and a health visitor have been organized. However, a lack of trained personnel limits the program (fig. 9).

Fertilizer

Little commercial fertilizer or animal manure is used in Iraq for crop production. Farmers and landowners may not be fully aware of the potential for increasing output through the application of fertilizer. No commercial fertilizer is produced in Iraq, and imports during 1958-61 averaged only 4,400 metric tons a year; this almost doubled in 1962 (table 8). At present, experiment stations and a few modern farms are the only users of commercial fertilizer. Some natural fertilizer is added to the soils by animals grazing on stubble, but most of the manure is dried and burned as fuel.

Under an Iraqi-Soviet economic agreement, the Soviet Union was to construct an ammonium nitrate and ammonium sulfate plant for the Iraqi Government at Basra. This plant, utilizing natural gas from the Rumaylah oilfields, was to have an annual output of 60,000 metric tons of ammonia. It was not to begin production before 1965, but delays in construction may extend this date.

The Qasim Government also announced intention to subscribe capital for a potash plant in Jordan which could supply both countries at some future date.

Since the February 1963 coup a new look has been taken at many projected plans. New studies have been made of the proposed plants and if plans are carried out, the use of fertilizer



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Figure 8.--Irrigation dams and barrages, existing and proposed.



Figure 9.--Drainage regulators such as this one near Abu Ghraib drain off water carrying salt from the land. Iraqi Government.

in Iraq is likely to increase in the next decade. Removing salt robs the soil of much of its natural plant nutrients, which need to be replaced with chemical or organic fertilizers.

Pest Control

Iraq has a fairly active program of pest control. Generally speaking, more attention has been directed toward control of insects than of diseases.

Herbicides are used very little, although extensive areas of cropland have been forced out of production and yields have been reduced as a result of the rapid spread of Bermuda and Johnson grasses and other hardy volunteers.

A Regional Insect Control Project was begun in 1952 by the U.S. Department of Agriculture and ICA (International Cooperation Administration -- now AID, Agency for International Development), in cooperation with the Iraqi Ministry of Agriculture and the ministries of agriculture of other countries of the Middle East, North Africa, and South Asia. Other countries included in these programs were India, Afghanistan, Lebanon, Iran, Pakistan, Jordan, Ethiopia, Libya, Egypt, Turkey, Morocco, and Tunisia. In Iraq during the first 4 years of the pest control program, over 60 tons of insecticides, 426 hand sprayers, 28 power sprayers, 10 trucks, and 6 spray planes were imported. Much of the work involved control of the locust, senn pest, spiny bollworm, date leafhopper, strawberry (red) spider mite, and wooly apple aphid. By 1956, Iraq was self-sufficient in locust and bollworm control. Technicians had been trained and the Government purchased planes and other spraying equipment.

The Ministry of Agriculture has continued to maintain a number of spray planes and give demonstrations to farmers on the use of insecticides. Some 825 tons of pesticides were used by the Ministry of Agriculture in 1962, chiefly benzene hexachloride, DDT, and phosphorous compounds. Sulfur dusts, TEPP (tetraethyl phosphophate), and malathion sprays have been used successfully by extension workers for control of spider mite. To control damage by the most

Table 8.--IRAQ: Imports of fertilizer and pesticides, 1954-62

	1954	1955	1956	1957	1958	1959	1960	1961	1962
----- Metric tons -----									
Fertilizer (gross weight)									
Guana and natural fertilizers. . .	---	---	6	104	0	0	26	300	0
Nitrogenous . . .	---	---	328	952	1,236	727	2,905	3,995	6,787
Phosphates. . . .	---	---	225	321	2,705	666	1,606	2,147	1,090
Potash.	---	---	238	90	412	250	350	251	625
Mixes and pellets	---	---	10	0	0	0	0	1	3
Total fertilizer. . . .	<u>1/</u> 279	<u>1/</u> 1,012	807	1,467	4,353	1,643	4,887	6,694	8,505
Pesticides.	956	1,829	1,224	1,408	1,114	1,728	1,184	1,144	825

1/ Not listed by type.

Selected references (17).

serious insect pest, the yellow migratory desert locust, poison bait is distributed by planes. Chlordane and toxaphene are used as spray or dust, to control the locust as well as the large brown grasshopper.

Pests.--Of all agricultural branches, livestock appears to be most severely affected by pests and parasites which not only do great damage themselves but transmit disease. Ticks are probably the worst on cattle.

Iraq's crops are somewhat more fortunate than its livestock, since not so many pests and diseases attack them. Over the years one of the worst insect pests has been the yellow migratory desert locust (Schistocerca perezfrina and S. gregaria) which arrives in plague numbers and presents a periodic menace to all growing things. Another voracious pest, the large brown grasshopper (Decticus albifrons), causes considerable loss of maturing grain. This insect attacks the grain when it is hardening; it also feeds on the fully ripened grain.

Another insect that reduces the quality of grain crops is the Senn pest (Eurygaster integriceps). This sucking insect does great damage to the ripening grains in several Middle East countries. Iraq has reported losses of 30 to 50 percent, and in some areas almost total loss. The eggs of the Senn pest hatch on the young plants in the spring and the pests feed on plant juices until they are nearly mature. At this stage they move to the heads of the grain and cause the individual grains to shrivel or be of poor quality. The damages of this pest have been reduced by planting early varieties of grain and by the use of sprays.

A number of other troublesome insects cause, in the aggregate, sufficient damage to merit vigorous control measures. One of these, the red spider mite (Tetranychus atlanticus), damages cotton, tree fruits, and a number of other crops. Sulfur dusts, TEPP, and malathion sprays have been successfully used by extension workers as a control. Other pests such as leaf hoppers, aphids, cut worms, and beetles take a sizable toll among the growing crops. Stored grain pests also present a serious problem, and are reported to have destroyed from 10 to 20 percent of the harvested grains. These pests, such as the rice weevil (Sitophilus oryzae), are being controlled by chemicals that are applied directly to the grain in the storage bins without damaging the taste, odor, or food value. However, the residual effect has sometimes been short and reinfestation soon reoccurs. Better methods of storage in the form of new large-sized grain silos have been built, but much loss is still sustained by the small farmer. Various cotton bollworms cause considerable damage and in recent years the Ministry of Agriculture has given this much attention.

A number of insect pests attack dates and are costly to date production, which is the most highly modernized and commercialized of all agricultural activities in Iraq. Some harm the trees and fruit before harvest, while others infest the fruit during and after harvest. Before dates ripen the trees are attacked by the date fulgorid "Dubas" bug (Ommatissus binotatus), which is controlled with malathion spray applied just after the fruit sets, and the date fruit borer (Batrachedra anydraula), which can be controlled with DDT in two applications. A species of the red date spider (Paratetranychus afraasiaticus) responds to control with sulfur dust and wettable sulfur spray. Sulfur, the residue of which does not prevent consumption, is applied directly to the fruit a month prior to its ripening.

A serious problem in harvested dates is created when moths lay eggs on the ripe dates. The eggs hatch and the worms feast on the fruit. To prevent this, dates are picked as rapidly as possible after they are ripe, and are taken to a fumigation center before they are packed. After they are packed they are again fumigated. These fumigations are supposed to control all insects in stored dates which include the date moths (Ephestia cautella and Spermatophora hornigil) and the weevil or dried fruit beetle (Carpophilus hemipterus).

Plant diseases.--According to Dr. J. L. Allison, Plant Pathologist for an FAO Mission to Iraq, plant diseases are less numerous in Iraq than in most other countries of the world. And, singly and collectively, those prevalent cause relatively less damage. Fortunately for Iraq, its natural boundaries and the hot dry summers keep plant diseases in check. The vast deserts of the south and west and the high mountains to the north and east completely surround the cultivated areas and tend to isolate them from other agricultural regions. However, crops are attacked by a number of pathogens, and their damage counts, when added to the damage done by insects and other parasites, wind, drought, heat, salt, and floods.

Most plant diseases are endemic; that is, once introduced they continue to survive and perpetuate themselves. A few, however, like black stem rust (Puccinia graminia) of wheat, cannot survive and apparently are reintroduced by wind-blown spores. Barberry plants, the alternate host of this fungus, do not grow in Iraq. Losses are light in some cases because the high mean temperature and meager rainfall inhibits their growth sufficiently to allow crops to be harvested before great damage is done.

A number of plant diseases are of economic importance. The more troublesome are: Powdery mildews, 10 or more different kinds which attack tobacco, vegetables, fruit and other trees, flax, and grain; native (endemic) rusts found on wheat, barley, grasses, the peach and

relatives, alfalfa, berries, willows, and poplar; smuts, common on barley, wheat, giant millet, and grasses. These lower the yields as well as the quality of grain. Brown rot of citrus (Phytophthora citrophthora) occurs commonly and causes considerable loss. In the winter, severe damage can result from white rust (Albugo candida) which attacks vegetables. Wilt caused by Fusarium oxysporum, a soil inhibiting fungus, damages a number of crops under irrigation, in particular, tomatoes and melons. Boll rot of cotton caused by secondary invaders, black mold (Aspergillus niger) and soft rot (Rhizopus nigricans), follows boll punctures of the spiny bollworm (Earias insulana). Mosaic and other viruses occur throughout the country and reduce the yield of tobacco and many vegetables. At times, conditions favoring the development and spread of a disease such as inflorescence rot (Mauginiella scaetiae) of the date palm build up and the disease does serious damage. This is also true of many of the endemic plant diseases. Zineb, maneb, and sulfur sprays, and ferbam, dichlone, and thiram dusts have been used effectively at experiment stations in the control of many rots, mildews, rusts, wilts, blights, leaf curls and other fungal type diseases that reduce output.

Orchard practices in general use favor disease development. Fruit trees of all kinds are planted together and are quite closely spaced, while the trees are not pruned at all or are pruned improperly. Very few chemical dusts and sprays are used as controls, and spray equipment cannot be moved about in many older orchards because of the tree spacing and irrigation ditches. For crops, some sulfur dusting is practiced to control mildew but only in a limited manner.

Livestock diseases--Future improvement and expansion of animal production in Iraq depend on reduction of loss from disease and parasites, as well as provision of adequate grazing and feed.

The greatest losses of Iraqi cattle result from parasites. The urgency of control measures is recognized by the Government and foreign technical assistance groups, but the development of a program is hindered by lack of veterinary and auxiliary personnel; the ratio of veterinarians to livestock in Iraq is said to be one of the poorest in Asia or the Middle East. In March 1962, the Higher Committee for Agrarian Reform included in its 10-year development plan the construction of veterinary clinics in villages throughout the country.

The most serious diseases in cattle are the tick-borne blood protozoan diseases--anaplasmosis, and theileriosis. These diseases preclude the use of European stock except under strict tick control, and are the major causes of low productivity of the indigenous cattle. The liver fluke is another debilitating cattle pest; control depends on elimination of a fresh-water snail, the intermediate host. Such control would be equally helpful to humans, for species of fresh-water snails are also the intermediate hosts for blood flukes causing bilharzia or schistosomiasis of man. This, next to malaria, is the most serious infestation of humans. In some areas the use of copper sulfate in the water has been moderately successful in controlling the snails, but control is a task of staggering proportions in a country where expanding irrigation provides ideal conditions for the snails.

Foot-and-mouth disease has been enzootic in the Middle East for a number of years. Death rates from this disease are low, but livestock production is seriously reduced. Loss of cattle from anthrax is a continuing problem, and the veterinary services can immunize only a small proportion of the susceptible animals. Hemorrhagic septicemia also causes heavy losses, particularly where cattle and buffaloes are associated; fortunately, in these areas there is a

regular immunization program. Echinococcosis and a number of gastrointestinal parasitic infestations are frequently present. The incidence of tuberculosis among cattle in a few controlled farms is known to be high.

Many of the parasitic diseases attacking cattle also attack sheep and goats. Scabies (mange mite) is extremely common. The blood protozoan diseases are less serious, but the ticks that carry them are as debilitating to these animals as they are to cattle. The most important infectious sheep and goat diseases are pox, mastitis, anthrax, foot-and-mouth disease, and blackleg.

African horsesickness invaded Iraq in 1960, and notwithstanding the application of more than 110,000 doses of vaccine, over 16,000 horses died and a large number of mules and some donkeys and horses were incapacitated. The disease recurred in 1961 and 1962 but was less serious. It is now estimated that in order to control the disease, at least 45,000 horses a year should be immunized.

Next to horsesickness, parasitic conditions cause the most severe losses in horses. Other equine diseases are tetanus, epizootic lumphantitis, and glanders.

Parasites and disease combined with a low level of nutrition also take a heavy toll in poultry production. The most serious ectoparasites are ticks and mites; prevalent internal parasites include ascarids, caecal worms, and coccidia. Less serious problems are Newcastle disease, pullorum disease, and nutritional deficiencies. Development of poultry disease control and sanitation programs have been slowed by lack of well-trained technical supervisory personnel.

Improved seed

Inferior seed is considered the major factor in the low yields of many crops. Though long recognized by agricultural specialists, this problem received little attention, except for cotton, until the middle 1950's. As late as 1956, seed grain was sold uncleaned with no certainty of purity or varietal identity. For vegetables, the seed situation was similar.

After World War II, the Government took a serious interest in cotton production and has since regulated it to some degree by issuing seed to farmers. Selection of cottonseed is controlled through the ginneries; the seed used comes from Government farms and private farms with improved varieties. Seed for the varieties now used was originally imported from the United States and multiplied for use in the country.

Recently an attempt has been made to establish a certified seed program for all crops. Some seed is still imported, but the leading sources of good seed are the Government experiment farms and the State farms. The main duty of the Farms Division in the Ministry of Agriculture is to increase production of pure seed and nursery varieties of high productivity; these are distributed through the Ministry of Agriculture, by the Agricultural Bank, the Cooperative Bank, and the Ministry of Agrarian Reform.

Complete statistics on the distribution of seed are not available, but the following fragments give some indication of the progress. During the winter season of 1960/61, the Ministry of Agrarian Reform distributed 20,000 metric tons of wheat to some 53,000 farmers, mostly in the rain-fed zone. During 1959/60 the Agricultural Bank distributed 39,600 tons of wheat and

700 tons of barley. The Farms Division of the Ministry of Agriculture plants improved varieties on substantial acreages to produce seed and nursery stocks for distribution to farmers.

AGRICULTURAL PRODUCTION

Crops

The cultivated crops of Iraq are classed as winter or summer. Winter crops are by far the more important. Main winter crops are wheat, barley, and flaxseed, supplemented by vetches, other pulses, and a few root crops. Summer crops are rice, sesame, sorghum, millet, maize, and a number of legumes, as well as most of the vegetables and horticultural crops, cotton, tobacco, and a little cultivated forage.

In reasonably good crop years, Iraq is agriculturally self-sufficient, or nearly so. Sugar and tea, items that are not produced or sufficiently produced in the country generally make up about two-thirds of all agricultural imports. Small quantities of cereals, vegetables, fruits, nuts, vegetable oils, and coffee are also imported. With the exception of coffee, these imports vary in amount with the success of the home crop for any one year, and the current Government trade policy.

The Second Agricultural Census

The agricultural and livestock census for 1958/59 was carried out by the Ministry of Planning and the complete results were published in 1961. This was the second agricultural census on Iraq, the first having been conducted during 1952/53.

The enumeration process started during the first week of October 1958 and the field enumeration was completed in most parts within 2 months. However, the collection of data took up to 4 months in some areas. The census was designed to include all areas planted in crops and vegetables regardless of whether or not the area was also planted with palm or other fruit trees. Also, areas planted more than once during the year were counted for each respective crop. For the livestock census, animals owned by the nomadic tribes were not included.

The wording of census questions generally referred to the 1958 crop year unless another period was specified, and the area for specific crops apparently referred to the area planted rather than the area harvested.

The area and production of crops reported by the census differ somewhat from the estimates of the Ministry of Agriculture published in the Statistical Abstract (which are also reported as Iraqi crop statistics by the FAO). The 1960 Statistical Abstract reported both the 1958/59 census figures and the Ministry of Agriculture estimates; however, no comparative analysis was made. It may, therefore, be noted that the census data presented in table 9 and elsewhere may differ somewhat from other data drawn from other sources.

Cereals are the most important crops of Iraq; they traditionally have been sown in about seven to eight-tenths of the land that is cultivated in any one year. This overwhelming importance has yielded only slightly to efforts of advocates for diversification that have been made in the last decade. Wheat and barley make up at least 95 percent of the cereals grown. Rice, the third

Table 9.--IRAQ: Area planted in principal field crops, 1958/59

Crops	Hectares	Acres
<u>Winter Crops</u>		
Wheat	1,919,115	4,742,133
Barley	1,637,332	4,045,847
Linseed	18,421	45,518
Lentils (ades)	5,061	12,506
Vetch (hurtman)	2,530	6,252
Chick peas	4,662	11,520
Broadbeans	6,763	16,711
	3,593,884	8,880,487
<u>Summer Crops</u>		
Rice	211,119	521,675
Maize	10,360	25,600
Giant millet (sorghum)	15,655	38,684
Millet	9,200	22,733
Cowpeas	2,775	6,857
Green gram	11,280	27,873
Sesame	15,794	39,027
Sugarbeets	242	598
Vegetables	43,045	106,364
Cotton	51,766	127,914
Tobacco	23,859	58,956
	395,095	976,281
Other crops	598	1,478
Total area planted	3,989,577	9,858,246
Area double cropped	1/ 24,694	1/ 61,019

1/ The Census reported that 9,858,246 acres were planted during the 1958 crop year. Separate tables showed 9,735,169 acres of major crops and 184,094 acres of vegetables which together total 9,919,263 acres making an excess of 61,019 acres planted. This excess or residual figure is believed to represent the double-cropped area, a good part of which was probably vegetables. Some vegetables such as potatoes, onions, peas, and carrots are grown as both winter crops and summer crops in the same year.

For the above table, broadbeans were subtracted from the Census total for vegetables and listed separately as a major winter crop.

Selected references (19).

most important cereal is now produced in limited amounts and accounts for about 5 percent of the land in cereals, while sorghum, millet, and maize (corn) are very minor crops (fig. 10).



Figure 10.--Threshing grain and chopping straw in one operation. Similar sled-type threshers are used by many smaller grain farmers. The sled is driven in a circle over grain scattered on a threshing floor.

Barley--Barley is grown throughout Iraq as both an irrigated and dry farmed crop. It is the most important cereal. It is used extensively in the national diet. Wheat and barley usually are eaten as bread. The majority of urban dwellers eat bread made with high-extraction wheat flour while the poorer townsmen, peasants, and nomads use bread made of whole wheat or barley flour. In the south, bread may be made of barley, or of millet and rice flour. Until the revolution this winter crop made up about a third of the value of exports (33.3 percent in 1958 and 49.1 percent in 1954). Barley is expected to maintain a prominent place in the exported products. Barley is better suited to the arid climate than other cereals and easier to grow than wheat because it requires less water, matures earlier, and is more tolerant to soil salts. It also produces a higher yield per hectare than wheat and is often grazed, thus contributing significantly to the total feed supply for livestock (table 10).

Barley is planted usually by hand in October and pastured from December to February. It normally is ripe by the middle of May; after harvesting, the stubble is usually pastured. An important variety is Trabouh (fig. 11).

Wheat--More acres are planted to wheat than to barley and wheat may follow wheat, barley, or fallow in the dry-farming lands of Al Mosul, Kirkuk, Irbil, and As Sulaymaniya. Some wheat is planted in most areas of the center and south. The area planted to wheat has increased by at least one-half since 1950, and most of this increase occurred in the northern dry-farming area, where large tracts of marginal steppe bordering desert areas were brought under cultivation with mechanical equipment. This expansion has resulted in a great year-to-year variation in total production since wide fluctuations in the amount of seasonal rainfall occur.

Table 10.--IRAQ: Area, yield, production, and net trade of barley, average 1951-55, annual 1956-63

Year	Area harvested	Yield per acre	Production	Net trade	Available for domestic consumption ^{1/}
	1,000 acres	Bushels	1,000 M.T.	1,000 M.T.	1,000 M.T.
1952-55	2,580	13.5	761	- 411	350
1956	2,894	13.0	800	- 290	510
1957	3,064	15.0	1,000	- 194	806
1958	2,859	15.3	950	- 314	636
1959	2,691	12.4	725	- 43	682
1960	2,565	14.4	803	+ 2	805
1961	2,572	16.2	911	- 50	861
1962	2,939	17.6	1,125	- 339	786
1963	n.a.	---	790	n.a.	n.a.
1964	n.a.	---	^{2/} 750	n.a.	n.a.

1/ No adjustment made for changes in stocks.

^{2/} Preliminary.

Selected references:

Production - (30) Trade - (17).

Table 11.--IRAQ: Area, yield, production, and net trade of wheat, average 1952-55, annual 1956-63

Period or year	Area harvested	Yield per acre	Production	Net trade	Available for domestic consumption ^{1/}
	1,000 acres	Bushels	1,000 M.T.	1,000 M.T.	1,000 M.T.
1952-55	2,921	8.2	653	- 22	631
1956	3,247	8.8	776	- 101	877
1957	3,598	11.4	1,118	+ 44	1,162
1958	3,788	7.3	754	- 9	745
1959	3,682	5.7	572	+ 146	718
1960	3,141	7.0	599	+ 206	805
1961	3,326	9.0	816	+ 414	1,230
1962	3,931	5.6	1,086	- 39	1,047
1963	n.a.	---	450	n.a.	n.a.
1964	n.a.	---	^{2/} 707	n.a.	n.a.

1/ No adjustments made for changes in stocks.

^{2/} Preliminary.

Selected references:

Production - (30) Trade - (17).



Figure 11.--Combining barley on a large grain farm.
Government of Iraq

Between 1956 and 1960, an average of 3,490,500 acres were planted to wheat while the production for these 5 years averaged 763,600 metric tons. The sizable variations in yield are shown in table 11.

In fairly good crop years, Iraq is self-sufficient in wheat, with small amounts available for export, but when production drops, wheat is imported. In 1959, wheat imports were valued at \$11,101,950, while wheat imports in 1960 cost Iraq \$15,146,090.

Wheat, a winter crop, is planted in November and December. It is sown either by hand on smaller plots or drilled with a grain drill and tractor in the steppe area. The crop is harvested in late May and June.

Rice.--Rice, a summer crop, is grown in all the liwas of Iraq; however, the most important areas are in Ad Diwaniyah, Al Amarah, and An Nasiriyah. The people of Iraq are fond of rice and it plays a very important role in the diet of all who can afford it. Somewhat a status symbol, rice is usually served with roast lamb or fish for honored guests and, to a limited extent, is ground and used in making bread.

In calorie terms, rice has been estimated to make up about 10 percent of the total food supply, but because it cannot be afforded by all, it has been further estimated that only about a third of the population has been consuming an estimated nine-tenths of the rice. With higher incomes and lower prices for rice, consumption could double.

Since 1932, laws and amendments have restricted the cultivation of rice in areas defined by special regulations issued from time to time. These restrictions on rice plantings have provided a measure of malaria control, a rationing or control of irrigation water, and a form of soil conservation.

Before the completion of the irrigation and river control projects built since the 1950's to divert some of the flood waters, rice was a major staple crop of the flood plains. In 1950 the crop was 242,000 metric tons. Since rice can survive floods, flood water has regularly been used for its irrigation, where dams and barrages now divert flood water other crops in addition to rice can be grown. Traditionally, however, the rice crop has varied considerably according to the amount of water available during the season. In good crop years, small quantities of rice have been exported but in recent years as population has increased, Iraq has been a net importer. Table 12 shows rice production and imports since 1956.

Table 12.--IRAQ: Rice, production and imports (rough or paddy) 1959-64

Year	Production	Imports	Available for domestic consumption ^{1/}
		1,000 metric tons	
1959	92	60	152
1960	118	82	200
1961	68	108	176
1962	113	106	214
1963	143	n.a.	n.a.
1964	<u>2/</u> 150	n.a.	n.a.

1/ No adjustments made for changes in stocks; rough rice basis, converted from milled rice of trade.

2/ Preliminary figure.

Selected references:

Production - (30) Imports- (17).

Rice is grown in a widely varying range of climatic conditions from the terraced northern mountain areas irrigated by natural springs, through the arid plains irrigated from the rivers, to the poorly drained swamps along the lower Tigris and Euphrates. Usually, varieties with a medium-growing period are cultivated, and the late varieties are not often grown.

The most common varieties are the Amber, Nayima, Kadrawi, Ghraiba, Basri, Zira, Shalushi in the south and the White Nagaza, the Cea-mah, Brazian, and Germa Basian in the north. Huwayzawi, an early red variety, is grown in small areas in a number of places. There is also much mixing of the varieties.

Millet is cultivated throughout Iraq where it can be irrigated or there is sufficient soil moisture, but the greatest percentage is grown in the central and southern areas. It is a fast growing, hot weather crop seeded in March or April and harvested about the first of August. When millet is used as a forage crop, no grain is harvested but three pasturings can be had in a season. In the 1958/59 census, 22,700 acres were reported with a production of 5,690 metric tons.

Sorghum or Giant Millet was grown on some 39,000 acres in 1958/59 and produced about 11,000 metric tons. Several varieties of sorghum have proved well adapted to the irrigated soils of central Iraq. This crop for grain is seeded in April and harvested in August. When used for green feed it may be seeded anytime during the summer. Normally, small quantities of millet and sorghum are exported, most of the exports going to the shiekhdoms bordering the Persian Gulf.

Corn is grown in the same general areas and in about the same quantities as millet. In 1958 over 10,000 hectares (24,700 acres) were reported in the census, but other estimates for the same year run higher. Most of the corn produced is used for human food or exported. For grain, corn is planted in July, but for forage it may be grown much earlier or later.

Pulses.--Several varieties of legumes are grown. These crops are mostly for human consumption but the threshed stem hay is used for livestock feed and some are grown for forage alone. Total production of beans and peas for food amounted to over 18,000 metric tons in 1958/59. These legumes are both winter and summer crops. Table 13 shows average area and production for the years 1957 through 1961.

Table 13.--IRAQ: Area and production of pulses, by season, average 1957-61

Crop	Area	Production
	<u>1,000 acres</u>	<u>1,000 metric tons</u>
<u>Winter crops</u>		
Broadbeans	27.7	11.1
Lentils	30.1	6.3
Chickpeas	12.8	2.5
Vetch	3.7	.8
<u>Summer crops</u>		
Green gram	25.5	7.0
Cowpeas	6.9	1.8
Total	106.7	29.5

Selected references (16).

Green gram or mash (mung beans) is one of the most important summer pulse crops. It is seeded mostly in the irrigated areas of central Iraq. A total of 27,900 acres were planted in 1958 yielding 5,570 metric tons of beans. This legume is used some for livestock but mainly for human food, usually to make a thick soup. About 358 metric tons were exported in 1960.

The other summer legume widely planted is the cowpeas or lubia. It is well adapted and the threshed vines make a rich nutritious hay. Although cowpeas are widely distributed and are a valuable food and forage crop, only 6,680 acres were reported in 1958.

Of the winter pulses, the broad bean or horse bean is the most widely grown and is found wherever irrigation is practiced. The 1958/59 census reported 16,700 acres which yielded about 6,000 metric tons of beans. Broad beans are planted in October and November and part of the crop is picked green during the winter and early spring to be eaten as a vegetable. Most of the production, however, is harvested later as dry beans. This crop is an important part of the diet of some people, and is a popular vegetable that is used in a number of ways. Surpluses are available for export in some years.

Lentils are the second most important winter legume. They are cultivated in the upper plains and mountains where they are well adapted. Lentils are grown to a lesser extent in the central irrigated regions. In 1958, about 12,500 acres were grown with a yield of 2,359 metric tons. When production does not equal the demand, lentils are imported.

Chickpeas are a relatively important pulse crop that is planted in the fall and harvested for food the following spring. Almost all the production is in the northern liwas where climatic conditions are more favorable. This crop is often eaten green, fresh or roasted, while the dried peas are roasted and eaten as a nut or coated with sugar and eaten as a sweet. In 1958, 11,520 acres were grown and the yield was reported at 2,132 metric tons.

A fourth winter pulse, chickling vetch, is grown in a number of irrigated areas and rather extensively in northern Iraq. In 1958, 6,250 acres were grown, yielding 1,168 metric tons of seed. This legume is used much in the same manner as green gram and lentils.

Many other legumes are grown as vegetables, but seldom as field crops. Soybeans have responded well in experimental plots and may become an important crop in the future.

Forage crops.--Crops cultivated for forage are slowly increasing in Iraq, but they do not have a prominent place. Only a little more than 5 percent of the cultivated land is devoted to growing forage for livestock. Some of the cereals might be considered dual-purpose crops serving both as green forage and grain. The crops first grazed when they are well started and green, are later harvested and then the stubble is again grazed.

Vegetables.--A great variety of vegetables is grown in Iraq, especially near urban areas where they can easily be transported to local markets. However, vegetables grown in the northern regions are shipped to southern towns and early spring vegetables from the south are shipped to the large urban centers in the north. The urban dweller generally has a much greater variety of vegetables in his diet than most rural people.

The 1960 Statistical Abstract listed 18 vegetables, which the agricultural census of 1958/59 found to make up 99 percent of the area in vegetables. This amounted to 182,850 acres but these figures probably fell far short of the actual area planted in both winter and summer vegetable crops.

The principal summer vegetables are melons, tomatoes, onions, cucumbers, okra, eggplant, squash, and potatoes. And the bulk of these plantings is located in the central and southern regions.

The main winter vegetables are carrots, turnips, beets, artichokes, radishes, cabbage, cauliflower, lettuce, celery, and cress.

Watermelons, other melons, tomatoes, cucumbers, onions, okra, and eggplant are the most extensively grown vegetables. Additional areas of vegetables have been included with the pulses. Many of these beans and peas are eaten when the seeds are young and green.

When vegetables are plentiful some are exported, but this foreign trade is far from being a constant figure. For example, in 1959 a total of 3,986 metric tons were exported; in 1960 only 358 metric tons were exported (table 14).

Table 14.--IRAQ: Area planted to vegetables, 1958

Vegetables	Acres
Watermelons	41,913
Other melons	27,267
Tomatoes	31,935
Broadbeans (Bajilla)	16,711
Cucumbers	16,020
Onions	11,228
Okra	10,126
Egg Plant (Aubergine)	8,653
Squash	5,646
Turnips	4,428
Spinach	2,135
Green Beans	1,861
Carrots	1,557
Lettuce	1,307
Green Peppers	937
Cabbage	571
Potatoes	373
Cauliflower	292
Others	1,134
Total	184,094

Selected references (19).

Sugar and Sugarbeets

Iraq's sugar requirements were supplied entirely by imports until the 1959/60 crop year when a small amount of beet sugar was produced. In the 1961/62 crop year the output of sugar reached 1,200 metric tons with a goal of 30,000 metric tons by 1966.

For the foreseeable future Iraq will have a domestic market for all the sugar that it will produce. Imports have been steadily increasing to meet demand. In 1962 well over 200,000 metric tons were imported, of which about 15,000 metric tons were crude sugar from Poland and the remainder was refined. The leading suppliers of refined sugar were the USSR, Rumania, Czechoslovakia, Taiwan, Cuba, and Poland.

Plans are also being considered for sugarcane plantations similar to those being developed in Iran's Khuzestan area. Thought is also being given to converting dates into sugar. The following table shows the sugar beet production for its first 3 years.

Crop year	Acres	Yield per acre	Beet production	Raw sugar
		<u>Metric tons</u>	<u>Metric tons</u>	<u>Metric tons</u>
1959/60	988	6.3	6,218	628
1960/61	1,359	6.7	9,132	877
1961/62	1,453	8.9	12,898	1,210

Iraq has a Government-owned sugar factory at Mosul which produces raw sugar during the beet harvesting seasons and later refines the sugar. This factory has an annual capacity of 25,000 to 30,000 metric tons of refined sugar.

The Government contracts with beet farmers in accordance with set policy and fixes the price paid for beets. It subsidizes production by supplying seed, pest control, and transportation costs from field to factory.

On imports, Government control is through licenses which are issued on a quota basis. However, import regulations are flexible. Raw sugar is currently duty-free, whereas refined sugar carries a duty. The Government also sets the retail price of refined sugar.

Oilseeds.--The most important oilseed is sesame, which is widely cultivated for oil production. The seeds are also used for garnishing cakes and sweetmeats, as well as an ingredient in some livestock feed. This summer crop is planted in May or June; the harvest begins in October. The straw is of little value except for fuel. In 1958, the census reported 37,790 acres which yielded about 7,700 metric tons. As much as a quarter of a crop may be exported while the remainder is consumed in Iraq.

In 1958, 44,500 acres of flax were grown yielding about 6,656 metric tons of seed. This winter crop is seeded the first of November and harvested in June. Competition of winter grains has probably prevented this plant from being a major crop.

Other sources of vegetable oil are cottonseed, sunflower, castor beans, and olives. However, at the present time, none of these are important crops but increased production would find a domestic demand. In 1960, over 20,000 metric tons of vegetable oils were imported. The Government in recent years has followed a rigorous protectionist policy to assist local producers.

Licorice root, which is a valuable export, is a wild plant growing in uncultivated areas. The roots are collected in small quantities and exported to a number of countries, mostly the United States.

Fruits and nuts.--A great variety of fruit trees and some nuts grow well in Iraq. Some trees that otherwise would not flourish do well under the protection of palms. Orchards and fruit gardens are intensively cultivated and in many cases, trees are too close together to move modern spraying equipment among them. There is much interplanting of vegetables between the rows of date palms.



Figure 12.--(Above) A date grower harvesting ripe Hillawi dates in Basra.

(Below) A method of planting date off-shoots for new groves by building a soil mound where the water table is high in Medinah, Basra.

Courtesy of Dr. Ali A. Hussain of the Iraqi Date Administration 1965.

Table 15.--IRAQ: Dates, production and export, selected periods or years, 1951-1964

Period or year	Production	Exports	Available for domestic consumption
	Metric tons	Metric tons	Metric tons 1/
1951-55 average	373,400	247,886	125,512
1956	349,000	264,000	85,000
1957	323,000	238,100	84,900
1958	363,000	239,300	123,700
1959	324,000	281,800	42,200
1960	337,000	250,614	86,386
1961	271,000	187,000	84,000
1962	315,000	230,000	85,000
1963	310,000	n.a.	n.a.
1964	400,000	n.a.	n.a.

1/ No allowance made for changes in stocks.

Selected references:

Production through 1962 - (5) Production 1963 and 1964 - (30) Trade - (17).

Dates.--Iraq is the world's leading date producing country and dates are the leading fruit crop. Dates normally are Iraq's second largest agricultural export item, but in some years, the largest. Since 1951, an average of about 240,000 metric tons of dates have been exported annually and this is expected to increase in the future as more attention is given to the handling of dates. The date is a staple food in Iraq and used to produce a number of valuable by-products. Since it makes up one-fifth to one-third of the value of all agricultural exports it is a valuable source of foreign exchange and has been given special attention by the Government. Efforts are being made to raise the commercial standards of dates by developing new packing and storage techniques. Since 1958, 14 modern packing plants have been built in various date-producing areas. Also, 10 modern storehouses have been built to meet strict hygienic requirements (fig. 12).

Domestic consumption is thought to be about 85,000 metric tons of a total estimated production of 310,000 metric tons for 1963 and 400,000 metric tons for 1964. Production estimates, however, vary considerably and a recent Iraqi estimate of 400,000 metric tons was suggested as being a reasonably good crop. Production figures probably do not include many of the dates eaten domestically (table 15).

The date trade has been responsible for a somewhat uneven division of Iraq's principal date-growing areas. Although there may be 450 or more varieties of date palms growing in Iraq, only 4 are of commercial importance. The relative importance of these four varieties in foreign trade has separated Iraq's date areas into two loosely defined sectors. The most northern of these sectors is called the "Central Area" which is sometimes referred to as the "Euphrates-Baghdad-Diyala Area." South of this is the "Southern" or "Basra Area" of Basra Liwa. Date palms growing outside the more concentrated date grove areas are also at times referred to as "outlying areas of production." This production is not important to foreign trade but does supply staple food for internal consumption.

The production of dates was not recorded in the 1958-59 Census of Agriculture; however, the Census did report the number of trees by liwa. From this count it is found that about 60 percent of the date palms were in liwas of the "Central" date-growing area. This area grows the Zahdi variety of dates almost exclusively, and these dates together with a few Zahdi dates grown in the "Basra Area" are sold to lower price markets. They are bought by traders who have a preference for the Zahdi or will accept lower quality dates at a corresponding price. Since there has been little demand in the higher-paying markets for Zahdi dates, less attention has been given to the handling and packing of this variety.

The "Southern" or "Basra Area" dates are principally the Hillawi, Sayer, and Khadrawi varieties which have a long tradition of commanding the highest prices for Iraqi dates in western world trade. In Basra, the date handling practices and the processing and packing of dates are more highly-developed than those of the "Central Area." Also, in Basra, quality control by the Date Administration authorities has been carried on to some extent. Therefore, although more dates are produced in the "Central Area," Basra is considered to be the "center" of the date industry, and the foreign marketing "center."

Two liwas, Nasiriyah and Amara, bordering Basra on the north, at times have supplied small quantities of Khadrawi dates to the Basra foreign market when the demand for Basra dates exceeded the available supply. Generally, the production of Nasiriyah Liwa has been consumed domestically and the excess marketed with the other "Central Area" dates. The output of Amara Liwa is negligible.

The prices for the four major varieties are fixed by the Council of Ministers and the production of the "Central Area" and the "Basra Area" is under jurisdiction of the Date Administration. The 20 percent which is produced in the outlying areas enters into the market uncontrolled. The Date Administration represents the date growers in the area it services and contracts with the Iraqi Date Trading Company to supply dates for export. The growers supply the packers with dates and get paid by the trading company on the basis of export quality. Considerable attention has been given the problem of reducing infestation of export dates, and in the future more select dates should reach the export market. The control of infestation is difficult, however, because the packing industry is scattered and because many growers are still not as careful with the handling of dates as is required to prevent infestation.

Although the dates of Iraq are not as sensitive to weather changes as some other crops, year to year weather conditions such as dust storms and insect ravages do cause variations in harvested tonnage. Adverse conditions, poor drainage, or insufficient water all affect yield.

Dates are very well adapted to the conditions of Iraq. They grow best in an environment of high temperature and a long hot summer, and there are few crops that can tolerate soil salinity better. Dates also have an adaptability to variable conditions of soil moisture. They survive the floods and make good use of irrigation water but can produce with irregular and very limited irrigation. Basra, in the extreme south of the country, is the main center of the date industry since it has traditionally been the outlet for select dates in foreign trade. Groves are concentrated along the Shatt al Arab River in an area where they follow the course of hundreds of canals leading out into the desert, sometimes only for a few hundred meters but at other places for as much as 5 miles. This area contains about 40 percent of all the date palms in the country. The groves here are irrigated by small lateral canals radiating from the river and the palms are

naturally irrigated and drained by the rise and fall of the tides which may help to wash away some of the accumulated salts.

The Iraq Date Administration, under the Ministry of Commerce, supervises processing and marketing; it has also cooperated with Government and foreign agencies in studies on the use of surplus or damaged dates in animal feeds. Its objectives are furthered by a number of affiliated organizations, including the Iraqi Date Trading Company; the Date Industries Company, producer of date sirup; and two so-called producer marketing cooperatives, one for the "Central Area" and the other for the "Southern Area." In the "Basra Area," export dates are sold to the Trading Company, but the "Central Area" merchants may buy them direct from growers on payment of a premium.

Losses from diseases and insects are serious. Control measures, seldom used, are directed mainly toward insects and rarely toward diseases. Common orchard practices favor pest development; close spacing of trees, and improper or no pruning, hamper spraying and favor the spread of insects and diseases. Dust storms also injure the crop. Inadequate insect control frequently results in damage to the picked and stored fruit.

To reduce crop damage, dates are picked as soon as they ripen; they are fumigated in the grove and again at pressing stations after they are packed. At the height of the season, some 100,000 workers, local and migratory, may be employed. The men pick and transport the dates; the women pit and pack them. Higher standards recently established for shipments to the United States have directed more attention to the quality of dates for home consumption.

Iraq's principal markets for dates in 1962 were the Peoples Republic of China, India, the United States, Syria, the USSR, and Ceylon. Well over 60 countries imported dates from Iraq in 1962 for a return of over \$19.7 million (fig. 13).

Other fruits and nuts.--Major fruits are grapes, pomegranates, oranges, and apples; other fruits include apricots, figs, lemons, pears, peaches, and plums. The principal nuts are walnuts and almonds. Total production of fruit and nuts (excluding dates) was reported in the 1958 census at less than 150,000 metric tons. Some trees that otherwise would not flourish do well under the protection of date palms (fig. 14).

Vineyards are concentrated in Sulaymaniya and Liwa. In the Kurdish areas, grapes are the principal fruit; they grow on terraces and receive no irrigation. The Shaqlawah district in central Irbil is an important raisin center where the common small purple grapes are picked and dried in the open from August to December. Around Baghdad, some white and purple grapes are cultivated under irrigation. Olives grow mostly in northern Iraq, especially around Mosul; the crop is consumed domestically as olives or olive oil. The two major areas for other fruit and nuts are the Diyala Valley and the northern mountains. Table 16 shows the number of trees and vines and the production of fruits and nuts in 1958.

Cotton.--The only vegetable fiber of current significance grown in Iraq, cotton has fluctuated widely in area and production. Since 1960, up to four-fifths of the annual cotton crop has been used domestically but increased production would most likely find foreign markets. In 1962 only 1.6 thousand metric tons (7,349 bales) were exported, compared with 4.5 thousand metric tons in 1957 and a 1950/55 export average of 2.9 thousand metric tons. Special governmental attention



Figure 13.--Sorting dates for packaging. Source: Iraqi Government.



Figure 14.--Cultivation of a young apple orchard. Old orchards and groves are often too closely planted to use heavy equipment. Source: Government of Iraq - 1964

Table 16.--IRAQ: Number of trees and production of fruit and nuts, 1958

Kind	Trees	Production
	<u>Thousands</u>	<u>Metric tons</u>
<u>Fruit</u>		
Date	21,643	1/ 245,000
Pomegranate	2,519	27,858
Orange	1,274	14,333
Lemon (sweet)	244	2,574
Lemon (sour)	133	1,413
Apple	911	18,775
Apricot	373	4,842
Pear	322	3,378
Peach	230	1,472
Plum	167	1,434
Fig	526	3,310
Grapes	12,448	45,314
Other fruit	399	7,138
Olive	23	193
<u>Nut</u>		
Almond	55	477
Walnut	41	474
Pistachio	6	58
Other nuts	20	491

1/ The date production figure differs from that in table 15 and probably is the figure for marketed dates at the time of the enumeration. Exports alone reached 239,300 in 1958.

Selected references (19).

to cotton production and the building of raw cotton markets abroad could make this fiber a much more important export item. Table 17 shows cotton statistics for recent years.

Cotton is produced mainly in the irrigated areas of central Iraq, and in Sulaymaniya and Mosul Liwas. The crop is planted in April and harvested in the fall. During most of the 1950's Acala Rogers was the only variety of cotton officially permitted on farms in Iraq. Then, Coker Wilt R100, originally imported from the United States, was introduced; it is now distributed in all the cotton-growing provinces and is expected to replace Acala Rogers entirely.

Expansion of the output of cotton must overcome several obstacles. Droughts cause shortages of irrigation water, and fierce duststorms during the blossoming season impede boll formation. Though reservoirs of the Tigris and Euphrates may solve the drought problem, little can be done about the duststorms. Labor has become more and more scarce with migration to urban areas. Lack of initiative and technical knowledge on the part of farmers, both small and large,

Table 17.---Cotton: Area, production and exports for selected years, Iraq, average 1950-55, annual 1956-64

Period or year	Area, 1,000 acres	Cotton-seed, metric tons	Production of cotton lint					
			Production	Exports	Lint for domestic use 1/	Production	Exports	Lint for domestic use 1/
Average			Metric tons				No. of 480 lb. bales	
1950-55	136	11,994	5,724	2,964	2,760	26,456	13,614	12,677
1956	144	15,291	8,012	3,900	4,112	36,799	17,913	18,886
1957	160	30,114	14,200	4,500	9,700	65,221	20,669	44,552
1958	139	24,079	11,905	7,400	4,505	54,680	33,988	20,691
1959	91	15,936	7,707	10,100	-2,393	35,398	46,389	-10,991
1960	76	15,718	7,648	1,797	5,851	25,127	8,254	26,874
1961	120	16,767	8,393	1,367	7,026	38,549	6,279	32,270
1962	140	8,852	8,000	1,600	6,400	36,744	7,349	29,395
1963	100	n.a.	5,500	n.a.	n.a.	25,262	n.a.	n.a.
1964 2/	75	n.a.	6,500	n.a.	n.a.	29,855	n.a.	n.a.

1/ No allowance made for stocks.

2/ Preliminary estimates.

Selected references:

(30) (16) and (17).

are probably the greatest obstacles to the expansion of cotton area. In addition, when considering a shift to cotton production, the small farmer is also faced with a shortage of available credit and unfavorable pricing policies. This array of unfavorable factors may continue to limit cotton output until special governmental action is taken.

Experience has been somewhat better with seed. The Government distributes improved seed to cotton growers, who must have licenses (issued free by the Government) to plant cotton. However, the farmers must first prove, at least in theory, that all old cotton stalks have been removed from the fields and burned. This clearing activity by the farmer helps to control cotton pests.

Cotton is ginned by five ginneries in Baghdad, three in Mosul, and another, owned by the Agricultural Bank, in Al Axiziyah (a town on the Tigris between Baghdad and Kut). There are only two large domestic mills, at Baghdad and Mosul, but a third, sponsored by the Soviets, that was originally scheduled for completion at Kut in 1963 is progressing but will not be completed before 1966. The cotton not processed by these large mills is exported. In 1959 the Government attempted to encourage the export of cotton to build up a steady market abroad, even at the risk of not maintaining sufficient stocks for domestic consumption.

Tobacco.--Tobacco is grown in the northern mountainous parts of Iraq, especially in the liwas of Sulaymaniya and Irbil. Sulaymaniya provides about 80 percent, where it is the major cash crop. Small amounts are grown in Mosul and Kirkuk liwas, where suitable growing conditions are locally available. Yields range from 500 to 1,000 pounds per acre, depending on rainfall.

The tobacco in Iraq is mostly cigarette-type, predominantly Oriental. In June 1964, the Director General of the Tobacco Monopoly Administration stated that most of the efforts of the Monopoly would be directed toward the improvement of the Oriental tobacco. Sun-dried Oriental varieties produce a tobacco with some aroma but a low nicotine content.

In addition to the cigarette types, a dark, strong tobacco called tumbaki, which is used in water pipes, has been grown since about 1900. Since 1960, tumbaki production has shown increases. Two varieties of tumbaki, Indian and Siraq, are produced in the northern part of the Middle Euphrates, in the Hindiya vicinity. The output of tumbaki amounted to 294,000 pounds in 1959 and had risen to 1.26 million pounds by 1962.

Although tobacco has been grown in Iraq since the middle of the 17th century, quality was poor and did not improve until recent decades when more attention was focused on seed selection, cultivation, pest control, processing, and marketing. In 1939 the Tobacco Monopoly Law was enacted and the Tobacco Monopoly Administration began operations in 1943 as an official government agency. It issues annual permits to individual farmers limiting the area to be legally planted. This agency also purchases the tobacco crop and sorts it in warehouses (there are now 30 warehouses owned by the Monopoly), and controls processing, manufacturing, and marketing.

In 1943 tobacco production amounted to something over 2,000 metric tons. This rose and was held fairly constant at less than 6,000 metric tons during most of the early and middle 1950's, then rose to 11,306 metric tons in 1959, and 12,290 metric tons in 1960 (table 18).

In recent years the number of tobacco producers has been increasing. In 1956 approximately 18,500 acres of tobacco and 250 acres of tumbaki were licensed by the Monopoly to 21,089

Table 18.--IRAQ: Production of tobacco by kinds, 1951-63

Year	Flue-cured	Burley	Oriental	Tumbaki	Total
	Metric tons				
1951.....	600	1,197	1,200	91	3,088
1952.....	835	1,671	1,671	91	4,268
1953.....	1,440	2,879	2,879	91	7,289
1954.....	1,740	3,479	3,479	102	8,800
1955.....	2,100	1,050	2,109	91	5,350
1956.....	2,086	1,043	2,086	188	5,403
1957.....	1,977	989	1,977	113	5,056
1958.....	2,167	1,083	2,167	123	5,540
1959.....	2,948	2,041	6,184	133	11,306
1960.....	5,714	1,497	4,807	272	12,290
1961.....	4,807	1,361	2,676	442	9,286
1962.....	3,696	544	1,429	570	6,239
1963.....	3,175	907	2,426	570	7,078
1964 <u>1/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	10,115

1/ Preliminary. 2/ Not available.

Foreign Agriculture Circular - Tobacco - FT 17-63, October 1963, U.S. Dept. of Agriculture, Foreign Agricultural Service.

Table 19.--IRAQ: Producers, area, yield, and production of tobacco, 1951-63

Year	Number of growers	Acres	Yield per acre	
			Pounds	Metric tons
1951.....	<u>1/</u>	9,808	674	3,088
1952.....	<u>1/</u>	15,000	614	4,268
1953.....	<u>1/</u>	18,600	853	7,289
1954.....	<u>1/</u>	24,800	773	8,800
1955.....	<u>1/</u>	18,600	622	5,350
1956.....	21,276	19,220	620	5,403
1957.....	22,658	19,375	575	5,056
1958.....	22,514	19,375	617	5,540
1959.....	29,934	24,413	1,021	11,306
1960.....	30,500	32,500	834	12,290
1961.....	30,687	32,850	620	9,286
1962.....	<u>1/</u>	32,500	594	6,239
1963.....	<u>1/</u>	27,700	560	7,078
1964 <u>2/</u>	<u>1/</u>	37,000	604	10,115

1/ Not reported. 2/ Preliminary.

Selected references (15) and Foreign Agriculture Circular - Tobacco FT 17-63, October 1963, U.S. Dept. of Agr., Foreign Agricultural Service.

tobacco and 187 tumbaki growers. By 1961, there were 30,888 acres licensed for tobacco and 650 for tumbaki, which were cultivated by some 30,687 farmers as shown in table 19.

Until July 14, 1964, there were three private cigarette factories in the Baghdad area with a capacity of producing 13 million cigarettes per day. Now operated by the Government, these nationalized factories may be combined into one company, although none of the factories are expected to be closed. There is a fourth factory at Sulaymaniya which produces a million cigarettes per day and has a total daily capacity of four million. This factory has always been a public firm and will probably continue to be administered separately. Tobacco is thus becoming a larger source of government revenue and an income for an increasing number of laborers as domestic cigarettes replace foreign brands.

Because of a trend favoring quality filter-tip cigarettes, Iraq will likely need to import high-quality tobacco for blending with domestic leaf to produce cigarettes with flavor and aroma. For this purpose, Iraq planned to purchase about 3.3 million pounds of unmanufactured tobacco through a P.L. 480, Title IV agreement. However, by mid- 1964 only about half of the U.S. tobacco had been purchased and Iraq's "filter-tip" apparently awaits the installation of specialized machinery that has been purchased for their manufacture. Once the filter-tip industry is established there may be a market for U.S. tobacco.

Livestock and Livestock Products

Livestock provides a livelihood for a major segment of Iraq's people and contributes essential nutrients to the diets of an even greater number. In 1960 the Government estimated that there were over 17 million head of livestock, excluding poultry. Livestock products accounted for 22 percent of the value of agricultural exports. Such prevalence and value make livestock production one of the major sources of wealth for Iraq, ranking with grain and dates among the agricultural enterprises.

One type or another of livestock is found in all parts of the country; they are found on farms and small holdings in limited numbers, for the cultivator at least needs a draft beast for his plow and milk for his family. Generally, most of the settled families have some poultry. Many town dwellers also raise animals and some poultry, which are kept in the town or nearby, and fed in compounds by hand.

Flocks and herds, usually of several kinds of animals, are owned by semi-nomadic and nomadic tribes, the Bedouin, who breed camels, sheep, and goats. The Kurds of the north and northeast own all types of livestock with the exception of camels and swine. They are the donkey breeders of the country, but not exclusively, for the donkey like the goat is ubiquitous. In general, sheep breeding is a nomadic or semi-nomadic occupation, while cattle and horses are more commonly bred in the sedentary agrarian communities. Exceptions are the rule, however, and some cattle and horses are raised by the migratory peoples, while some camels are found in odd places east of the Tigris. Buffalo are kept in and near towns for milk supply and are found in many other riverine areas and in the marshes of the south. Some of the wealthy livestock owners have fine Arab horses, as do most owners of estates. Throughout the land, goats, whose skins are of high commercial value, are kept for milk and are raised in areas where grazing would be inadequate for sheep or cattle.

The practice of keeping large numbers of animals that may also result in severe losses when feed and water give out, is the product of a custom of pastoral cultures. Livestock to many of these people represent a store and a measure of wealth, more like a savings account than an income-producing enterprise. Among the tribes in the nomadic regions, animals are rarely slaughtered for home use unless physically unable to travel or unless they are needed for ceremonial or hospitality reasons.

The periods of the year in which vegetation is adequate for grazing vary considerably in the different parts of the country. In the south and west, the desert and steppe ranges are grazed in winter and spring. By the time summer arrives, most of the desert vegetation, which is chiefly annual growth, has been depleted by overgrazing or soon dries up from the heat and lack of rain. Most of the flocks are then moved to the cultivated sections of the irrigated zone, to graze along the river and canal banks, on the stubble of winter crops, on fallow fields, and on barley in the early months of its growth.

In the north the rain-fed cultivated areas of the plains, foothills, and mountain valleys provide winter and spring forage. The scrub oak forests on the mountain slopes provide summer grazing. Winters in this area are cold compared with those at lower altitudes, and the people of the oak forest zone store leafy oak branches along with hay for winter feeding. There is, however, never sufficient feed to keep the animals in good flesh, and many die from cold and hunger. Above the tree line (about 1,800 meters elevation), alpine pastures are grazed in the summer after lower pastures have been depleted and until cold weather forces a move to lower altitudes.

In general, forage supplies are adequate during February-June; most critical shortages usually occur in August-January.

About 53 percent of Iraq's livestock are kept on holdings. The Directorate General of Veterinary Services estimated the total number of livestock to be over 14.5 million for all of Iraq, as shown in table 20. These are approximately the same figures carried by the 1963 FAO Production Yearbook which also reports close to 3.5 million chickens in addition to the livestock.

Sheep and goats.--The most numerous classes of livestock in Iraq are sheep and goats, found especially in the nomadic herds of the north and northeast. Sheep are raised for wool, milk, meat, and fat. The three main breeds are the Karadi in the northern mountains, the Awasi in the northwest and central areas, and the Arabi in the south. These are all fat-tail breeds, extremely hardy, and because of the storage of fat in their tails, able to withstand long periods of sparse feeding. There has been some crossing of these breeds during migrations, and the occasional introduction of fine-wooled breeds has slightly influenced the characteristics of the fleece of the native sheep. The wool of all the sheep, particularly the Karadi, is coarse.

Most of the goats in Iraq are small, black, short-haired animals, with characteristics of various African and Mediterranean breeds. A type of Angora goat, called the Miriz, with long, fine hair, is raised in the northern mountains. Iraqi goats are hardy and can survive where grazing is inadequate for cattle or even sheep. Some are found with almost every flock of sheep. They are raised for milk, meat, and skins.

Cattle and buffaloes.--Cattle are found throughout Iraq, mostly on settled farms. They are an important source of meat, hides, and milk, and are used extensively as draft animals.

Table 20.--IRAQ: Number of animals in Iraq
by kind and by liwa, 1958

Liwa (Province)	Sheep	Goats	Cattle	Buffalo	Camels	Horses	Mules	Donkeys	Total
Al Amarah	911,200	56,725	219,100	105,925	30,020	27,635	135	31,515	1,382,255
Irbil	600,000	400,000	105,000	2,000	300	10,000	15,000	25,000	1,157,300
Baghdad	290,700	66,250	38,900	21,750	18,400	13,312	n.r.	12,450	461,765
Al Basra	160,000	50,000	60,000	50,000	50,000	6,000	10,000	40,000	426,000
Ad Diwaniyah	1,086,400	117,320	100,170	17,893	16,090	13,875	3,220	24,970	1,379,938
Diyala	507,895	110,376	103,761	2,753	5,807	19,632	5,528	28,875	784,627
Al Hillah	733,600	109,220	197,670	16,435	9,960	19,009	30	76,170	1,162,094
Karbala	32,475	7,800	18,992	1,664	1,687	1,334	448	13,455	77,755
Kirkuk	691,683	289,895	81,781	540	4,208	4,037	7,495	12,882	1,092,521
Al Kut	564,200	136,360	67,120	10,025	14,844	27,332	423	43,690	863,994
Al Mosul	1,631,965	813,510	190,725	4,949	19,356	32,115	53,565	95,510	2,841,695
An Nasiriyah	982,000	41,600	182,200	45,500	11,900	49,200	300	60,700	1,373,400
Ar Ramadi	445,398	40,967	15,134	567	10,055	6,926	280	9,160	528,487
As Sulaymaniya	583,870	399,313	144,583	1,285	n.r.	4,084	3,429	19,119	1,155,683
Total	9,221,386	2,639,336	1,525,036	281,286	192,627	234,494	99,853	493,496	14,687,514

n.r. - Not reported.

Source: Directorate General of Veterinary Services,
Iraq Ministry of Agriculture - 1958



Figure 15.--Prize dairy cattle at an agricultural fair.

The indigenous cattle, primarily small with admixtures of various Indian, African, and European breeds, are mainly of three breeds. The Janubi, an animal of fair size, mixed colors, and Asiatic origin, with hump and heavy dewlap, is more numerous in the south. It is said to be the best milking animal of the Iraqi breeds. The Kurdi, kept primarily in the mountainous north, appears to have a common ancestry with European breeds. They are straight-backed cattle, mostly black with some browns and brindles, and are relatively poor milkers. The Sharabi is more common on the northern plains. Crossbreeds of the Sharabi with Ayrshire and Sindi, owned mostly by settled farmers around the larger Iraqi towns, reflect recent programs to improve the milk industry (fig. 15).

Though poor milk and meat producers, Iraqi cattle are hardy, resistant to disease, and adapted to their environment. European breeds, on the other hand, are highly susceptible to external parasites and tick-borne diseases, and are used chiefly to upgrade native strains.

Water buffaloes are kept in all regions, but they are most numerous by far in southern Iraq. They are the principal livestock of the marsh dwellers of the lower Tigris and Euphrates. Water buffaloes are kept principally for milk production and for use as draft animals, but they are also important sources of meat, hides, and fuel (manure). As draft animals are increasing in the irrigated crop area, considerable numbers are kept in or near the larger towns as dairy animals.

Camels.--Camels are kept and bred mostly by nomadic tribes, though some are found on farms. Most of them are in the northwest and southwest desert areas, where they are raised together with sheep and goats. Camels are used principally for transportation, but they also

supply milk, meat, and hair. The two main breeds of camels in Iraq are the Khawar and the Judi. The Khawar, relatively few in number, is bred by the Shammar tribe in the northwest, and is a hardy animal able to go without food and water for longer periods than the Judi. Two tribes in the southern desert raise the Judi breed, mainly to carry loads. In recent years their number has declined with increased use of truck transportation.

Horses, mules, asses.--It was probably within the area of present-day Iraq that the Arabian horse, the ancestor of important breeds of the world, originated. In recent times the Arabian horse has been interbred with other strains and breeds, but some herds of horses have retained the classic Arabian characteristics and conformation. Some pedigreed horses are bred for use as racehorses, partly for export. After the 1958 revolution, however, the ban on horseracing and the expropriation of large estates had an unfavorable effect on this enterprise.

Mules are bred principally in the mountainous areas of the north, but are found in all provinces. They are medium to small in size, extremely hardy, and disease resistant. They are used for plowing and as pack animals on farms, and for travel in the northern mountains. Al Mosul Province alone accounts for about half the mules.

Asses are common throughout Iraq. The indigenous Iraqi breed is a small, wiry, black or dark-brown animal, used extensively for transporting agricultural products from farm to market. A large gray or white breed is used especially for riding.

Poultry.--Settled farmers usually keep some poultry but give them little attention. Most of the chickens, known as Iraqi, are a mixture of breeds, but are probably derived from Basrah chickens of India and Pakistan. Except on Government farms or private poultry establishments, the average hen produces less than 60 eggs a year. The Fayoumi chicken has been introduced and has become widely established, and some U.S. breeds have been introduced at Government or privately owned poultry farms. Some ducks, geese, and turkeys are raised but chickens far outnumber the other fowl.

There are only a few specialized poultry farms, but with growing urbanization the industry has possibilities for future development. Most of the few poultry enterprises which have been started have failed because of lack of capital, high death rate of imported baby chicks, summer heat, disease, lack of vaccine, and shortage of feed.

The Government experiment farm at Abu Ghuraib (west of Baghdad) has been working on development of the poultry industry. New Hampshire and White Leghorn hens supply chicks for distribution to new poultry farmers. The farm also sends out trained technicians to help the poultrymen.

Livestock products.--Livestock products and by-products from slaughter play an important role in the economy since they made up almost 25 percent of the total agricultural exports in 1960 and 1961, and over 12 percent in 1962--a better barley and date year. They also supply a large percentage of the domestic food and fiber requirements.

Meat.--Meat production figures for Iraq are, at best, crude estimates because almost all the meat is consumed domestically. Livestock specialists placed meat production around 85,000 metric tons in 1956. The current production is about 100,000 metric tons. Table 21 lists the

Table 21.--IRAQ: Animals slaughtered in abattoirs, 1955-62

Kind	1955	1956	1957	1958	1959	1960	1961	1962
	Thousands							
Sheep	1,381	1,483	1,549	1,712	1,758	1,905	1,886	1,820
Goats	429	511	620	532	610	545	618	682
Cattle	170	189	206	200	216	222	216	211
Buffalo	11	13	13	13	16	18	18	13
Camels	2	2	4	5	5	13	16	11
Total	1,993	2,198	2,392	2,462	2,605	2,703	2,754	2,737

Selected references (16).

number of various animals slaughtered in abattoirs, indicating the relative importance of various red meats in Iraq. Since some animals and poultry are dressed outside of abattoirs, and figures for this are often omitted from slaughter statistics, reported meat production figures fall short of total output.

Dairy products.--The production of hygienic dairy products in Iraq is a recent accomplishment and the modern dairy industry is in its infancy. It has been the practice in Iraq for people in towns and cities to be provided with their milk and many dairy products from cattle, buffalo, sheep, and goats raised either in the towns, or in compounds just outside the towns. Besides the unsanitary conditions created by the presence of live animals in a congested population center, the methods used in preparation of products for market have not promoted hygienic products.

In recent years considerable progress has been made in developing modern dairy facilities for the larger cities. Under supervision of the Dairy Administration of the Ministry of Agriculture, a model animal production community was completed at Abu Ghraib in 1960. Since June 1960, it has been in production and the milk has been distributed in Baghdad.

The plans for these modern dairy facilities provided for removal of dairy cattle from within the city of Baghdad to the new location 25 kilometers west of the city. When the dairy operation started, written agreements were made with farmers to purchase milk on the basis of butterfat content. The plant processed over 2 million liters of milk and over 90,000 kilograms of butter the first 9 months of operation. The plant is also producing small amounts of soft cheese, dried milk, and a local type of thick cream which is sold in cartons.

Milk and dairy products are not exported since the country has a consumption requirement exceeding its production which makes it a dairy product importer.

In 1961, about 4,500 metric tons of dairy products valued at \$2,464,302 were imported. These products made up less than 1 percent of total imports.

In the country, in the rural villages, in the settlements, and among the nomads, the people depend considerably on milk and milk products which are produced in small quantities by family-owned animals and processed in a primitive manner. Fresh milk is used, but to prevent spoilage and to enable storage, much milk is converted into yogurt or laban, ghee or dehin, butter, and cheese. The production of ghee, the country's most important cooking fat, is largely from sheep's milk. Butter and cream more often are made from sheep and buffalo milk, while cow's milk is

used for laban, yogurt, and fluid milk. Goats and sheep provide the major amount of milk used in making cheese.

Because of the manner in which milk is handled, especially in rural Iraq, few statistics are available on the amount of milk and milk products produced. The Food and Agriculture Organization Production Yearbook lists the total production of milk in Iraq as 899,000 metric tons for 1961. These figures appear to be conservative and they do not include the milk from camels.

Kind	Milk produced
	<u>Metric tons</u>
Cattle.....	186,000
Sheep.....	258,000
Goats.....	232,000
Buffalo.....	223,000
Camels.....	<u>no record</u>
Total.....	899,000

Wool.--Clipping of wool takes place in April and May, the flocks in the south being clipped first. The wool from the various fat-tailed breeds of sheep makes good carpet wool and is a valuable export product. However, wool buyers often complain of poor quality. Wool is generally marketed unwashed on a "greasy" basis. Many owners of sheep give little attention to good shearing practices because the sheep are primarily kept for milk and meat rather than for their wool. Shearing is often done quite haphazardly, leaving much wool on the neck, legs, and around the tail. Although the wool is generally used for rug manufacture, its value is reduced due to the large number of black and brown fleeces that make it unsuitable for fine yarns and worsteds.

Wool production for 1963 is estimated at 10,000 metric tons of which 5,500 metric tons were exported. In mid-1962 the Animal Products and Trade Organization Service was established with the objectives of fostering the improvement of all animal products, both export and domestic. This organization hopes to improve the quality of exported wool by eliminating impurities.

The annual clip of goat hair is believed to be over 500 metric tons. Except for small amounts bought by neighboring countries, goat hair is used domestically for making tents.

Other livestock products.--Sheep and goat skins are a valuable export of increasing importance. In 1961-62, the export value of these products averaged about \$2,160,000. Cattle and buffalo hides are apparently used almost entirely within the country. The Hides and Skins Association, which operates through the abattoirs and the Ministry of Agriculture, is attempting to improve methods of handling hides and skins in order to improve their quality. The Association also cooperates with other Government departments to find new foreign and domestic markets, not only for hides and skins but for other animal by-products as well.

Export of casings, by-products of sheep and goat slaughter, averaged nearly \$535,000 in value during 1961-62.

Considerable quantities of eggs and poultry meat are produced and consumed domestically. Some 5,000 metric tons of poultry meat and 160 million eggs were produced in 1960. Trade in these products is negligible.

AGRICULTURAL POLICY, DEVELOPMENT, ORGANIZATIONS, AND SERVICES

Agricultural Policy

The main goals of Iraq's agricultural policy are to develop its agricultural resources and raise the standard of living of its rural population. The Government has two programs, one of agricultural development (under long-term economic plans financed mainly by oil revenues), and one of agrarian reform.

Aside from import controls, Iraq has few measures to protect agricultural incomes. For the consumer, however, prices of flour and bread have been fixed, at least in part. The Government also controls the price at which the Tobacco Monopoly buys tobacco and the retail price of local cigarettes.

Regulation of crop production by means of controlling the area cultivated has been limited to tobacco, cotton, and rice. Direct subsidy payments for agricultural production has been limited to sugarbeets, still grown in very small quantities.

Although price stabilization is one of the functions of the Grain Board, in recent years grain prices have not been directly supported. If the Government considers it necessary the Grain Board is empowered to purchase and hold domestic grain at a Government set price. Support measures for wheat have not been required in recent years since production has fallen short of internal demand, and the domestic wheat flour prices have exceeded the world price level. As for barley, there normally is some exportable surplus. In the future assistance may be sought so that a surplus of this feed grain will be able to compete in the international market. This may become a problem for the Grain Board; however, a direct subsidy would probably be avoided if possible. Increased silo storage capacity for grains makes it possible to hold more grain for marketing later.

The Government of Iraq has been carrying on a subsidized bread program since before the revolution. This program assures the availability of this basic food for low income groups and has been handled by a special department of the Ministry of Finance which contracts with flour mills and bakeries in larger population areas to produce bread for sale at about one-half its normal price. The contracting organizations are subsidized and the low income people are supplied with low cost bread. In some areas where there are no bakeries, flour is made available at subsidized prices.

Agricultural Development

In 1950 the Government set up a Development Board which made plans for using 70 percent of Iraq's share of the oil revenues for the economic development of the country, and in 1953 a Ministry of Development was established to take over some of the Board's functions. A 6-year development plan was drawn up in 1952, calling for expenditures of \$434 million.

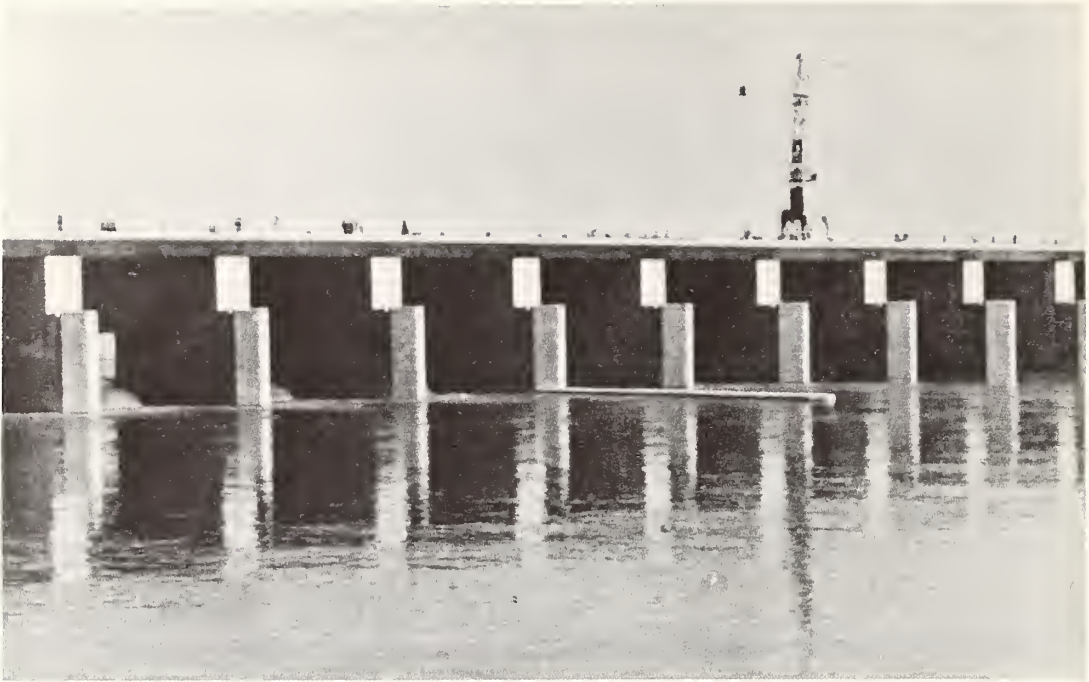


Figure 16.--A water regulating barrage forming part of the Wadi Tharthar Flood Control and Water Storage Scheme on the Tigris River at Samarra. This barrage system diverts Tigris floods which annually threaten both farmer and city dweller downstream. Source: Iraqi Government.

This plan was altered but continued under Qasim, who in April 1961 released a new 5-year development plan providing for a total expenditure of \$1,568 million to be financed from oil revenues, domestic sources, and about \$216 million in loans from the Communist bloc. Agriculture's share was about 20 percent of the proposed investment. This plan, however, met with both financial and technical difficulties and fell behind schedule. After the Qasim Government fell, the development program was completely reappraised. Most projects already begun were continued but those in the planning stage were modified. The proposed investment for the remainder of the plan was scaled down to about \$980 million. The Government is now developing a new plan for 1965-70. This new plan will be financed primarily from the Government's share of oil revenues, augmented by loans from foreign sources, plus, perhaps, some private investment (fig. 16).

Though none of these development plans has been carried to completion there have been significant accomplishments. For agriculture, the developments of greatest value have been for irrigation and flood control. Silo construction, tractor station, and complementary communications and industrial projects have also been quite helpful. However, three Government controlled "state" farms for specific crops, established since 1959, have not proved profitable and may be broken up among individual farmers.

Extension, Education, and Research

The land reform program, both before and after the 1958 revolution, has progressed haltingly. It has been difficult for some new landowners to obtain adequate facilities and services

to enable them to modernize their farming methods and increase the productivity of their holdings. Realizing this, the Government is giving renewed attention to extension and credit services. Internal political changes have interrupted earlier efforts.

Iraq has had an extension service since the creation of the Ministry of Agriculture in 1952, but until recently it was combined with other services in the Ministry. The country had considerable outside assistance in its efforts to improve its extension services and train extension agents, and by 1958, more than 60 field agents had been trained and assigned. By 1960, however, the number of field agents had dwindled to one-fifth of that number. Most of the original personnel had transferred to administrative positions.

The creation of a strong extension service is hampered by a shortage of students being trained specifically in agriculture. The literacy level among the rural people is also a factor, but literacy is constantly rising among the younger generation, many of whom will choose agriculture as a career.

In 1960 some 1,600 students were enrolled in 11 secondary agricultural schools and 1,340 students in intermediate agricultural schools in 10 provinces; students and teachers had almost tripled since 1957. The College of Agriculture was incorporated in the University of Baghdad in 1958, in 1962 the number of students enrolled was 372. The Veterinary College, also part of the University of Baghdad, had 106 students. A considerable number of Iraqis receive special agricultural training abroad, many in the United States.

Shortage of trained personnel has been a handicap to agricultural research. All the Directorates of the Ministry of Agriculture carry on some experimentation and research, though there is a special Directorate of Agricultural Research with six subdivisions. Closer coordination of research among the various directorates engaged in research, and with educational institutions and the extension service, is a goal.

Marketing and Transportation

The traditional marketing system has been a limiting factor in agricultural development. The sharecropper, usually in debt to his landlord, keeps a small share of his crop. He has little money for essentials and not much incentive to increase or diversify his production. Improper handling and storage of crops and delays in transportation have caused enormous losses and low financial returns. In recent years, however, the Government has tried to improve marketing facilities in an effort to meet competition in foreign markets. A news service on grains, subsequently expanded to include flaxseed, has been operating since 1956. Grain analysis laboratories have been set up, and a number of large grain silos have been built. A few marketing cooperatives have been established, and efforts have been made to provide adequate grading and other improved facilities for a number of commodities. In general, however, marketing facilities remain inadequate by more modern standards.

Since 1950, considerable effort has been made to improve the transportation system. New roads, some paved, have been built, and flood-control projects have also reduced the threat of damage to roads. Some rolling stock has been added to the rail system, and a 325-mile standard gage railroad has recently been completed between Baghdad and Basra. This line, which was constructed with Soviet assistance, will replace the narrow gage line and eliminate the necessity of transshipment of commodities between it and the standard gage line which runs from Baghdad

to Mosul and on into Turkey. The Government has also considered the construction of a rail line to the new port city of Umm Qasr on the Persian Gulf (fig. 17).



Figure 17.--Transporting grain by camel.

Agricultural Organizations

The largest group of agricultural organizations is the cooperatives. The cooperative movement receives its impetus from the Government rather than from the farmers themselves. A law regulating the establishment of cooperatives was passed in 1944, but cooperative development has not been rapid. The Directorate General of Cooperatives in the Ministry of Agrarian Reform is charged with promoting the formation of agricultural cooperatives, including those for farmers under the land reform program. Their main purpose is to enable organized groups of peasants to obtain loans from the Government-controlled Cooperative Bank for purchasing machinery, pumps, seed, and farm animals, and establishing cooperative stores and other communal buildings. Plans call for the formation of 2,000 cooperatives under the land reform program during 1961-65; by the end of 1962 only 32 had been established.

As of mid-March 1964, the number of registered cooperatives had grown to 83. The Cooperative Institute had graduated 60 cooperative managers as an initial step toward a corps of professional managers.

Several semiautonomous organizations control production and trade in specific commodities; these are all managed by the Government. They include the Tobacco Monopoly, the Date Trading Company, the Grain Board, and the Animal Products Trade Organization Service, a recently organized marketing organization.

The Tobacco Monopoly, begun in 1939, restricts the buying and selling of raw tobacco to the Government. Tobacco is bought by Government warehouses by type and grade. The retail price of domestic cigarettes is also regulated.

The Government-operated Date Trading Company has taken an active part in finding markets for dates and has made some efforts to raise the commercial standards. Prices are fixed by the Administrative Board of the Service which also decides on the classification of export dates.

The Grain Board, which is responsible to the High Supply Committee, has jurisdiction over both domestic and foreign trade in grains. This board has a number of functions; it records and publishes supply and market information, grants permission to buy and sell grain, and regulates the movement of both domestic and export trade. In this manner it can stabilize prices and is trusted to support domestic prices if necessary. For use in supply management, the Grain Board has had the responsibility of the construction and operation of grain silos. These sizeable capital investments form an important and integral part of Iraq's development plans. The silos are necessary for efficient and modern handling of grain supplies and serve as a depository for reserve supplies. The use of silos also enables the Grain Board to establish standards for checking the quality of market wheat. These standards are important in export trade and for improving the quality of the domestic food supply. Although grain trade has been handled by private merchants it is subject to the Grain Board regulations. The framework is thus available should the Government decide to take over the grain business. The Grain Board now acts as the agent for the Government when grain is a commodity of a trade agreement.

Iraq's silo capacity in mid-1964 was as follows:

<u>Location</u>	<u>Metric tons</u>
Basra	65,000
Baghdad (steel)	12,000
Baghdad (cement)	5,000
Irbil	16,000
Mosul	24,000
Hillah	8,000
	<u>130,000</u>

Financial institutions and services

(1) Agricultural credit--The traditional sources of credit to the Iraqi peasant have been the landlord, the merchant, and the moneylender. Legislation provides that advances made by the landlord to his tenants shall be free of interest, but this regulation has been easily circumvented when the advance was made in kind against a return in the form of a larger share of the crop. The tenant has been in a weak bargaining position, since he could not leave the farm until debts were settled by him or his new employer.

Credit from merchants and moneylenders has usually taken the form of an advance sale of a specified amount of a crop at a given price, incorporating interest charges. Since the terms are usually settled a few months before the harvest, it has been easy to exploit the farmer's inability to wait and market his crop himself. For loans made against collateral, interest rates have generally ranged from 20 percent to 40 percent or even higher. Under another form of credit, the usufructuary mortgage, the creditor acquires the right to the crop (generally an orchard crop) and markets it himself during the duration of the mortgage, which may be for several years. The effects on productivity are obviously unfavorable, since neither the borrower nor the lender has any interest in improving or maintaining the condition of the trees.

The Government has attempted to provide more reasonable credit for farmers. The principal Government institution for farm credit is the Agricultural Bank, founded in 1936. The Agricultural Bank has extended little credit to small farmers in the past; it has concentrated principally on medium-term credit, secured by mortgages on real estate. Although loans are supposedly granted under customary banking terms, defaulted installments can be postponed without penalty. Additional loans are granted to farmers who have defaulted, and mortgages are not foreclosed.

The number and amount of loans extended by the Agricultural Bank in recent years (April-March) are as follows:

	Number of loans	Amount loaned 1,000 dollars
1959/60	3,780	\$1,554.3
1960/61	2,390	\$1,556.6
1961/62	2,654	\$2,550.2

During the 1961/62 period the Agricultural Bank made loans for the following purposes:

1,250 loans for orchard improvement	\$1,037,534
175 loans for agricultural machinery	580,392
875 loans for seeds etc., winter season	622,762
330 loans for seeds etc., summer season	258,790
22 loans for mortgage redemption	46,620
2 loans for machinery and equipment	4,060

The Cooperative Credit Bank is an additional institution which makes credit available for agriculture. It was established in 1956 with limited capital, half of which is supplied by the Ministry of Finance, and half by the various cooperative societies. This bank not only grants loans to cooperatives, but provides them with technical and economic advice and even maintains their accounts and records, especially those of the agricultural cooperatives. In 1961/62 it lent some \$943,040 to 37 cooperatives, some agricultural.

(2) Taxes--Liberalization of agricultural tax laws was announced along with several other revisions early in 1961. Abolition of the 10-percent tax on all agricultural produce sold off the farm (istihlak tax) eliminated a consumption tax which was objectionable, both for the burden it placed on low-income groups, and for the difficulty of collection.

The agricultural land tax law, a tax on agricultural production, was also revised twice in 1961. Tenant farmers, sharecroppers, and farmers who receive land through agrarian reform

were exempted from payment of the tax. Land planted in fruit, vegetables, cotton, sugarbeets, jute, peanuts, trees and shrubs, as well as land reclaimed at a cost exceeding \$22.40 per acre, was also exempted. These changes not only relieved most small farmers but also offered substantial relief to many larger landowners.

Landowners, including the Agrarian Reform Institute, continue to be liable for the land tax but are prohibited from sharing the tax burden with their tenants. The tax is assessed, only on the landowner's share of the crop and at rates reduced by 20 to 60 percent.

INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS

Iraq's agricultural exports, consisting mostly of barley, dates, wool, cotton, livestock, and livestock slaughter by-products, regularly account for 85 to 95 percent of the value of all Iraqi exports, excluding petroleum. After the 1958 revolution, barley lost its top ranking among the agricultural exports. In 1962 it was second to dates, the new leader. For the years 1954-58, barley averaged more than a third of all exports, excluding oil, then dropped out of the export picture, reflecting lower crop yields. By 1960, total agricultural exports had dropped over 38 percent of the value exported in 1957. Dates, however, showed a slight increase as did hides and skins. The 1962 exports reflect more favorable weather conditions; the value of 1962 exports was more than double that of 1961.

Iraq's agricultural exports have not been concentrated to any one area of the world, and in 1962 no more than 12.5 percent went to any one country. The Federal Republic of Germany replaced the U.S.S.R. as the leading agricultural buyer and the United States took over 10.7 percent to become the second largest purchaser.

In 1962, a good crop year, agricultural products accounted for over 22 percent of the total imports, which compares well with an average for recent years, but is well below the value of agricultural imports in both 1960 and 1961.

Exports

In 1962, dates represented nearly 38 percent of the total value of agricultural exports, amounting to about \$51.5 million. Of the total exports barley accounted for 31 percent, livestock products, over 12 percent, with wheat, legumes, oilseed, cotton, licorice, gall nuts, and other miscellaneous items comprising the remainder.

Imports

Tea, grains, and sugar were the three largest imports in 1962, making up about two-thirds of the total value of all agricultural imports which amounted to \$78,900,000. The ranking suppliers were the United Kingdom (16.5 percent), the United States (11.6 percent), West Germany (11.1 percent), U.S.S.R. (6.8 percent), and Ceylon (5.5 percent). The remaining 48.5 percent was divided among many other countries.

Import requirements dropped considerably in 1962 because of the excellent harvests; however, they rose again in 1963 following the poorer wheat, barley, and vegetable turnout. The increased need for food items carried into 1964.

Table 22.--IRAQ: Exports of principal agricultural commodities, 1961 and 1962

SITC	Commodity	Unit	Quantity		Value	
			1961	1962	1961	1962
			Thousands		1,000 dollars	
001	Live animals.....	No.	11	10	218	215
011.6	Intestines.....	No.	1,241	1,495	462	609
041	Wheat.....	MT	---	39	---	2,954
043	Barley.....	MT	50	339	2,249	17,009
042-046	Other grain.....	MT	1	<u>1/</u>	70	3
047	Grain products.....	MT	5	5	249	318
052	Dates.....	MT	187	229	7,860	19,752
053.5	Date juice.....	MT	1	1	64	60
054.8	Legumes.....	MT	6	11	594	1,009
081.1	Straw and fodder.....	MT	2	1	47	18
081.9	Date cake and seed.....	MT	20	18	1,183	1,087
211	Hides and skins.....	No.	2,711	2,893	1,620	2,700
221	Oilseeds.....	MT	5	9	687	1,385
262	Wool.....	MT	4	4	2,510	2,885
262.3	Animal hair.....	MT	<u>1/</u>	<u>1/</u>	76	109
263	Cotton.....	MT	1	2	678	995
291.9	Products of animal origin.....	MT	1	<u>1/</u>	57	22
292.1	Gall nuts.....	MT	1	<u>1/</u>	374	115
292.9	Licorice.....	MT	4	2	275	166
292.9	Other roots.....	MT	<u>1/</u>	1	3	73
	Other agricultural.....				<u>56</u>	<u>62</u>
	Total agriculture.....				<u>19,330</u>	<u>51,507</u>
	Nonagriculture excluding petroleum:				<u>2,717</u>	<u>2,581</u>
	Total excluding petroleum.....				22,047	54,088
521.4	Petroleum.....				624,600	626,483

--- None or insignificant.

1/ Less than 500 of unit.

Selected references (17).

Table 23.--IRAQ: Imports of principal agricultural commodities, 1961 and 1962

SITC	Commodity	Unit	Quantity		Value	
			1961	1962	1961	1962
			Thousands		1,000 dollars	
011-013	Meat and preparations.....	MT	<u>1/</u>	<u>1/</u>	477	441
022	Dairy products.....	MT	5	4	2,459	2,428
041	Wheat.....	MT	414	<u>1/</u>	27,959	<u>1/</u>
042	Rice.....	MT	70	<u>69</u>	11,600	12,277
043-048	Other grain and preparations.....	MT	3	4	519	563
051-053	Fruit, nuts and preparations.....	MT	30	30	4,492	3,161
054-055	Vegetables and preparations.....	MT	41	52	5,431	6,386
061-062	Sugar, sugar preparations and honey.....	MT	238	228	22,221	16,847
071	Coffee.....	MT	1	1	506	647
074.1	Tea.....	MT	25	27	24,003	22,968
075	Spices.....	MT	2	5	585	927
211	Hides and skins.....	MT	1	2	792	855
221.1	Peanuts.....	MT	13	15	4,153	3,010
221.2	Copra.....	MT	3	4	578	717
221.8	Oilseeds.....	MT	<u>1/</u>	<u>1/</u>	45	87
231.1	Rubber, raw.....	MT	1	1	325	285
262.1	Wool.....	MT	<u>1/</u>	<u>1/</u>	439	240
262.3	Animal hair.....	MT	<u>1/</u>	<u>1/</u>	153	109
263	Cotton.....	MT	<u>1/</u>	<u>1/</u>	2	23
411-431	Animal and vegetable fats.....	MT	25	25	5,877	5,651
	Other agricultural.....				<u>1,546</u>	<u>1,284</u>
	Total agricultural.....				<u>114,161</u>	<u>78,907</u>
	Nonagricultural.....				<u>293,720</u>	<u>281,628</u>
	Total imports.....				407,881	360,535

1/ Less than 500 tons.

Selected references (17).

Tables 22 and 23 show the principal commodities Iraq exported and imported during 1961 and 1962.

United States Trade with Iraq

The United States agricultural trade with Iraq in 1963 exceeded that in any of the three preceding years. A listing follows that shows the U.S. agricultural trade with Iraq since 1955:

Year	Imports	Exports
	<u>1,000 dollars</u>	<u>1,000 dollars</u>
1955	13,703	640
1956	14,610	780
1957	13,524	1,107
1958	7,801	472
1959	12,249	2,301
1960	8,355	3,352
1961	8,047	4,348
1962	6,440	3,269
1963	8,557	5,430

Raw wool, dates, sausage casings, hides and skins, and licorice root have been the principal agricultural commodities purchased by U.S. from Iraq. Wool and dates are by far the most valuable items.

In recent years United States agricultural exports to Iraq have been predominantly cereals, mostly rice, dairy products, inedible tallow, edible fats and oils, and food preparations (tables 24 and 25).

On August 27, 1963, the United States executed its first Title IV Public Law 480 agreement with Iraq to finance the sale of \$6,856,000 worth - including certain ocean transportation costs - of U.S. agricultural products. The commodity composition of the agreement was as follows:

Commodity	Approximate maximum quality	Max. export market value
	<u>Metric tons</u>	<u>1,000 dollars</u>
Wheat	50,000	\$3,210
Tobacco	1,500	2,513
Poultry	450	317
Ocean Transport (est.)		816
Total		<u>\$6,856</u>

On December 5, 1963, this Food-for-Peace agreement was amended to provide for financing the sale of an additional 100,000 metric tons (about 3.7 million bushels), of wheat and wheat flour at a maximum export market value of \$6,485,000 with ocean transportation costs up to \$1,474,000. The period of supplying all products extends through the fiscal year ending June 30, 1965.

Table 24.--IRAQ: United States agricultural exports to Iraq, 1960-63

Commodity	Quantity				Value			
	1960	1961	1962	1963	1960	1961	1962	1963
	----- 1,000 pounds -----				----- 1,000 dollars -----			
Wheat.....	55,500	0	0	1,847	1,489	0	0	3,111
Rice.....	925	51,021	22,567	3,757	967	3,384	1,685	282
Other grain and preparations.....	1/	1/	1/	1/	57	14	54	46
Vegetables and preparations.....	387	275	346	124	20	50	65	24
Vegetable seed.....	42	45	111	147	38	47	118	152
Coffee.....	23	12	15	20	18	13	13	22
Soybean oil (refined).....	0	0	1,660	0	0	0	226	0
Fruit and preparations.....	1/	1/	1/	1/	42	52	79	29
Dairy products.....	616	1,525	354	220	227	286	254	157
Tallow, inedible.....	4,929	5,433	8,576	6,431	388	414	711	506
Other fat, inedible.....	220	220	0	0	19	18	0	0
Tobacco.....	0	0	0	1,444	0	0	0	965
Other agricultural.....	1/	1/	1/	1/	87	70	64	136
Total agricultural.....	---	---	---	---	3,352	4,348	3,269	5,430
Nonagricultural.....	---	---	---	---	33,585	32,983	31,275	27,370
Total exports.....	---	---	---	---	36,937	37,331	34,544	2/ 32,800

1/ Reported in various units or quantity not reported.

2/ Excludes "Special Category" commodities.

Compiled from U.S. Bureau of the Census data.

Table 25.--IRAQ: United States agricultural imports from Iraq, 1960-63

Commodity	Quantity				Value			
	1960	1961	1962	1963	1960	1961	1962	1963
	----- 1,000 pounds -----				----- 1,000 dollars -----			
Dates, dried.....	25,615	18,952	18,017	29,084	1,947	2,012	1,961	3,058
Licorice root.....	6,494	11,010	5,533	1/	287	449	207	367
Wool raw, free.....	7,512	15,265	5,435	14,456	5,614	5,245	3,929	4,830
Wool, raw, dutiable.....	16	0	2/	2/	10	0	2/	2/
Animal hair, unmanufactured.....	124	31	70	115	50	21	25	38
Sausage casings.....	80	37	n.a.	1/	267	244	305	52
Hides and skins, raw....	246	220	31	1/	179	9	12	32
Other agricultural.....	1/	1/	1/	1/	1	67	1	180
Total agricultural.....	---	---	---	---	8,355	8,047	6,440	8,557
Nonagricultural.....	---	---	---	---	18,448	21,017	2,167	696
Total imports.....	---	---	---	---	26,803	29,064	8,607	9,255

1/ Reported in various units or quantity not reported.

2/ Less than one-half the unit.

Compiled from U.S. Bureau of the Census data.

Iraq, although relatively self-sufficient, has a current need for a number of commodities because crop production has been damaged by weather, pests, and unstable internal conditions. Advances in agricultural practices were disrupted by both the agrarian reform and political disturbances. Therefore, the rate of production fell behind the rate of population increase. Even in a period of internal stability and reasonably good weather it appears there are market opportunities. There should be a continued need for a number of commodities which the United States can supply.

Imports of wheat may be required in all but bumper crop years; rice will be needed in most years along with varying amounts of animal feeds. Iraq also regularly has an import need for inedible tallow, edible oils, processed fruit and vegetables, and various forms of dairy products. The following figures show that the U.S. has recently been supplying only slightly more than 10 percent of Iraq's dairy product imports:

Year	Imports of dairy products	U.S. share
	<u>1,000 dollars</u>	<u>Percent</u>
1960	2,156	10.5
1961	2,459	11.6
1962	2,428	10.5

Almost all the commercial dairy product shipments from the U.S. have been malted milk, infant and dietetic products. With the exception in 1962 of 55,000 pounds of nonfat dry milk obtained under the Food-for-Peace Program, other imports from the U.S. in 1960 and 1961 have been nonfat dry milk donations under the UNICEF program.

Poultry is another item for which there appears to be a demand that will continue. Until a shipment of 15,000 pounds of frozen poultry, mostly broilers, was supplied in 1962, the U.S. had provided Iraq with only very small amounts of poultry. The 992,000 pounds provided under the Title IV agreement should provide Iraq with a good introduction to U.S. poultry products. The availability of freezer space may become a factor limiting sales.

Iraq, the world's foremost exporter of dates, has traditionally sold the United States considerable quantities of its highest quality dates. However, in recent years the United States has been advising the Iraqi date producers to take stronger measures in handling and packing that would reduce the insect infestation. The U.S. tolerance level on imported dates has been 10 percent. However, the new marketing standards that would reduce it to 5 percent, most certainly would reduce the quantity of dates purchased from Iraq by U.S. companies.

Trade Policy

Iraq's current foreign trade practices have developed from import controls which were established in 1941, along with recent modifications and amendments, to achieve the national policy objectives of Iraq. For administration of control measures, broad powers were legislated in 1943 to the High Supply Committee, composed of the Prime Minister and three other members of the Council of Ministers. The High Supply Committee controls imports, exports, distribution of goods, prices, and takes any action relating to commerce considered necessary for the good of the country.

An annual program based on the anticipated needs of the economy and other considerations, such as protection and the availability of exchange, establishes the total value and composition of imports. Imports of some items are prohibited; for the rest, licenses are issued up to the limits of the quota established in the annual program. The licenses issued are valid for imports from all countries except Israel, from which all imports are prohibited. Only licensed importers and contractors who have entered into contracts with the Iraqi Government may import. Exchange controls are administered by the Central Bank of Iraq. When import licenses have been issued, exchange allocation is automatic.

Iraq's import duties are established by the Customs Tariff Law No. 77 of 1955, and subsequent amendments. Duties are levied by weight or value, according to the item. Ad valorem duties may be charged on a total cost basis or a wholesale market basis, at the option of customs. In 1962, customs duties were increased on a wide range of items which were competing with national production or which were considered to be luxury items. Reductions were made for essential raw materials not currently produced by Iraq. Since February 1963, there has been some relaxation of duties and some items have been taken from the prohibited list.

After the 1958 revolution, new measures were introduced that afforded opportunities to the Sino-Soviet Bloc countries which they had not previously enjoyed under the monarchy. In an effort to secure a better balance of trade and move agricultural items, such as surplus dates, a number of trade agreements have been promoted with Bloc and various other countries. Based as much as possible on barter arrangements for mutual benefit, such agreements have been aimed at increasing Iraq exports and securing for them regular and permanent foreign markets.

In 1962, when customs duties were increased the 10 percent tax (istihlak tax) on exports of animals and animal products was replaced by a 5 percent export tax on all agricultural commodities. Iraq does not usually subsidize any of its agricultural exports, though it has done so at least once in the recent past (barley, August 1957-February 1958).

Export controls also are now applied to all areas equally. Exporters must declare their exports to insure that foreign-exchange proceeds are received and surrendered to the Government. However, proceeds from the export of dates to a number of neighboring countries, including India, have in the past been exempted from the surrender requirement.

Specified exports (e.g., certain kinds of livestock, certain foods in short supply, grains, fruits, and raw materials in short supply) may be prohibited, and some of these (e.g., wheat and fruits) may be exported only if specially authorized by the High Supply Committee. All other products are licensed freely, except that none may be exported to Israel.

COMPETITION WITH U.S. AGRICULTURE

At this time and probably for a considerable time in the future, Iraq will offer little competition to the United States farm products in world markets. Apart from petroleum, raw materials for export are either limited or underdeveloped. The country has undeveloped land, capital, labor, and electric power and it is potentially capable of a higher output. However, the population is increasing at a fairly rapid rate and any increase in agricultural production will have to supply a continually increasing internal consumption. In poor crop years, food deficits will occur which will require the importing of sizeable quantities of grain and perhaps other foods.

Barley, the grain usually exported in most years, is not expected to change trading patterns. Dates will probably show no rapid increases and the current export pattern is expected to continue. Livestock products may continue to be exported at about the present rate, or may even decrease in future years. Although cotton production is somewhat on the increase, it is unlikely it will become a leading export crop. Small quantities of cotton are exported, but this cash crop for Iraqi farmers will probably not far outstrip domestic demand.

The development of a larger and better balanced domestic economy, a goal of the Iraqi Government, very well may result in both an increased consumption of Iraq's own increased agricultural production and a better market for U.S. produce.

EXTERNAL AID

During the past decade a substantial amount of technical assistance has been received from foreign countries. In 1951, at the request of the Iraqi Government, the United States signed a Technical Assistance Agreement. In addition, the Government requested the International Bank for Reconstruction and Development to make a survey of Iraq's potential for economic development, which was completed in 1952. The report and recommendations of the Bank's survey were used in the preparation of the first 6-year economic plan. The country's abundant oil revenues made it unnecessary to obtain any substantial foreign financial assistance for its development projects and for the employment of foreign technicians.

Besides the United States, the United Kingdom and other nations, and international agencies have supplied technicians. Agencies of the United Nations, including FAO (Food and Agriculture Organization), ILO (International Labor Organization), WHO (World Health Organization), and UNICEF (United Nations International Children's Relief Fund) were quite active. Other groups giving assistance included the Rockefeller Foundation, the Baghdad Pact Organization, and the Ford Foundation.

The U.S. technical assistance of the Point IV program was largely concerned with agricultural development or closely related projects. Just before the 1958 revolution there were 83 directly hired, and 17 contract personnel assistants from the United States in Iraq. At that time a high government official estimated that over 1,200 foreign technical personnel of about 24 nationalities were assisting with various programs.

Following the Qasim revolution in 1958, the new Republic of Iraq turned to the Soviet Bloc for aid. U.S. economic assistance was limited to training grants, very small amounts of technical assistance, and donations of agricultural commodities through voluntary relief agencies, under Title III of Public Law 480.

The bulk of the Soviet bloc technical assistance came from the Soviet Union and Czechoslovakia, through agreements and loans. Projects listed in the agreement with the Soviet Union included a nitrogen fertilizer plant, an agricultural machinery plant, grain silos, Government farms, tractor renting stations, drainage and irrigation projects, and railway projects. Czechoslovak projects of the same nature included a slaughterhouse and a sugar refinery. Iraq also contracted with East Germany for 14 date packing units.

Since Qasim's Government fell in February of 1963 foreign technical assistance programs have been under review and altered. Countries outside the Soviet Bloc have again been considered

as sources of aid and credit. Iraq has negotiated loans and technical assistance agreements with several of these countries. An \$84 million interest-free loan has been made available by Kuwait, a Swedish loan of \$42 million has been granted for Swedish capital equipment, the Federal Republic of Germany has loaned \$36.4 million, and loans have been granted by the Export-Import Bank.

FOOD SUPPLY AND CONSUMPTION

The per capita food consumption was estimated at about 2,275 calories per day as an average for the 3-year period 1959-61 (table 26). This calorie intake is somewhat below the average for the Middle East, even though it is 100 calories higher than the comparable figure for Iraq in the 3-year period 1956-58 because of better crops.

Grain products furnished nearly three-fifths of the energy value of the food supply, and wheat products alone almost a third. Sugar furnished the next largest share of the total calories.

Wheat and barley are mostly eaten in the form of bread. The majority of urban dwellers eat bread made with high-extraction wheat flour though some urban dwellers, as well as the peasants and nomads, eat bread made from whole wheat or barley. Bread called "samoun" and "regheef" is made in 100 gram (almost 1/4 pound) disks from wheat. In the south similar bread called tabag is made of unleavened barley or of millet and rice flour. These large, thin, disks serve as edible plates. Wheat is prepared parboiled (burghul) in the north. Corn and millet, which are popular in the center and south, are used in soups as well as in bread. Rice is a favorite food, but a large proportion of the population cannot afford to eat it.

In the average family, meat is eaten only at irregular intervals because of its high cost; an estimated one-fourth of the population consumes about three-fourths of the total meat supply. Milk and milk products are popular and greater quantities could be consumed, if available. In rural areas, sheep and goat milk is more common than cow's milk, but is seldom consumed as fluid milk; much of it is converted to leban or yogurt which keep longer, or to ghee.

Pulses are eaten throughout the year; vegetables, melons, and most types of fruit are eaten only in season. Dates are a staple of the diet, especially in the south. Much of the sugar consumed is used for sweetening tea.

At present, Iraq depends entirely on imports for its sugar supply; though it has a refinery to process sugarbeets produced locally, the amount available is small and the plant is engaged chiefly in refining imported raw sugar. Roughly half of the country's total fat supplies are imported, chiefly as oilseeds or unrefined oil processed further in Iraqi plants; imports of edible oils are prohibited. Iraq also depends entirely on imports for its supplies of tea and coffee; tea imports are approximately as large as sugar imports in value terms.

As Iraq's population increases it appears to become less and less self-sufficient in its production of food for domestic consumption. Using the average figures for the period (1959-61) covered by the food balance, almost 32 percent of Iraq's caloric intake came from commodities that showed some portion of the total supply to have been imported. Almost half of food imports was sugar, and sugar and cereals account for over 90 percent.

THE OUTLOOK FOR IRAQI AGRICULTURE

Iraq's agricultural production can be expected to increase during the next decade. Future production will be greatly influenced by the maintenance of peace. It also depends on actions the Government takes to develop the country's agricultural resources and to what extent farmers are provided with the technical assistance and training in improved methods and means of production, and credit facilities.

Iraq's land and water resources, if effectively employed, could support a much higher agricultural output, enabling the country to maintain a much larger population or to increase agricultural exports substantially. The economic development programs launched a decade ago using oil revenues for national improvements have benefited the country's agriculture considerably. The agricultural sector would benefit from increased emphasis in economic planning, particularly for improvements in livestock management, crop production, irrigation, and water control.

Iraq's land reform program, although not moving with impressive speed, is bringing about an improvement in the country's land tenure system and should raise the level of living for many.

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