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Iraq Agriculture and Food Supply: Background and Issues

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Summary

Iraq's agricultural sector represents a small but vital component of Iraq's economy. Over the past several decades agriculture's role in the economy has been heavily influenced by Iraq's involvement in military conflicts, particularly the 1980-88 Iran-Iraq War, the 1991 Gulf War, and the 2003 Iraq War, and by varying degrees of government effort to promote and/or control agricultural production.

Rapid population growth coupled with limited arable land and a general stagnation in agricultural productivity has steadily increased dependence on imports to meet domestic food needs since the mid-1960s. Prior to the 1991 Gulf War, Iraq was a major trading partner with the U.S. Iraq benefitted from substantial USDA agricultural export credit during the 1980s to purchase large quantities of U.S. agricultural commodities. By the mid-1980s Iraq was the major destination for U.S. rice exports. Iraq was also an important purchaser of U.S. wheat, corn, soymeal, and cotton. After the 1991 Gulf War, U.S. agricultural export credit to Iraq was ended and USDA was left with $2 billion in unpaid credit. U.S. agricultural trade with Iraq remained negligible through 2002.

Present-day Iraqi agriculture and trade have been heavily shaped by the 1990 U.N. sanctions and the Iraqi government's response to them. From 1991 to 1996, prior to the startup of the U.N.'s Oil-For-Food program (OFFP), Iraq's agricultural imports averaged $958 million or less than half of the pre-war level. Under the OFFP, the value of Iraq's agricultural imports rebounded to average $1.5 billion (during the 1997-2002 period).

In early 2003, just prior to the U.S. — Iraq War, the country's agricultural sector remained beset by the legacy of past mis-management, unresolved disputes over land and water rights, and the lingering effects of a severe drought during 1999-2001. Clearly, Iraq will be dependent on imports for fully meeting domestic food demand for several years to come. In the near term, food aid shipments are likely to play a major role in determining the share of Iraq's agricultural imports, and may influence the evolution of future commercial imports.

This report is an extension of CRS Report RS21516, "Iraq's Agriculture: Background and Status." It provides a brief description of Iraq's agro-climatic setting and the history of agricultural policy, production, and trade leading up to the period just prior to the 2003 Gulf War; it reviews issues likely to affect the long-term outlook for Iraq's agricultural production and trade; and it provides several tables of historical data relevant to understanding the evolution of Iraq's agricultural production and trade. This report will be updated as events warrant. For detailed discussion on the status of humanitarian aid efforts, see CRS Report RL31833, *Iraq: Recent Developments in Humanitarian and Reconstruction Assistance*. For discussion on the U.N. Oil-For-Food Program and trade during the decade of the 1990s see CRS Report RL30472, *Iraq: Oil-For-Food Program, International Sanctions, and Illicit Trade*.

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Iraq Agriculture and Food Supply: Background and Issues

Purpose of This Report

This CRS report provides background on the nature and evolution of Iraq's agricultural sector and food supply situation leading up to the 2003 Iraq War. It directly supports an understanding of Iraq's current food production and supply situation by describing the historical development of agricultural policy, production, and trade, as well as land use and tenure issues and the recent evolution of the country's irrigation system. As such, it provides clues to understanding what Iraq's agricultural potential and future trade needs might be under a new political and economic environment in the post-2003 Iraq War era.

The report includes maps that highlight the principal agricultural zones and political divisions, and it provides several tables of historical data relevant to understanding the evolution of Iraq's agricultural production and trade into the 21st century. The development and implementation of Iraq's food ration system, as well as the role of the U.N.'s Oil-for-Food program (OFFP) and its influence on Iraq's agricultural sector are outlined. The report ends with a brief discussion of issues likely to affect the long-term outlook for Iraq's agricultural production and trade.

Introduction

Iraq's agricultural sector represents a small, but vital component of the country's economy. Prior to the development of the petroleum industry, agriculture was Iraq's primary economic activity. As late as 1976, agriculture still contributed about 8% of Iraq's GDP, and it employed more than half the total labor force.[1] Over the past several decades agriculture's role in the economy has been heavily influenced by Iraq's involvement in military conflicts, particularly the 1980-88 Iran-Iraq War, the 1991 Gulf War, and the 2003 Iraq War, and varying degrees of government policy intervention to promote and/or control agricultural production.

Population dynamics also have been influential in determining the role and importance of Iraq's agricultural sector in the general economy, and the extent of domestic food security. During the period from 1971 to 1990, Iraq's population grew at an annual rate of 3.2% compared with only a 1.2% growth rate for Iraq's

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[1] Library of Congress (LOC), Federal Research Division (FRD), *Iraq: A Country Study*, edited by Helen Chapin Metz, research completed May 1988, p. 153; Copyright(C)United States Goverment as represented by the Secretary of the Army.

cereal production (cereals are the principal source of calories in Iraq).[2,3] As a result, food demand outpaced food production and created a growing dependence on agricultural imports to close the gap between food demand and availability.

Table 1. Iraq Population Dynamics, Selected Category by Decade Since 1960

				Age group			
	Total	Urban		0-14	15-64	65+	Female
Persons	Millions						
1960	6.8	2.9		3.2	3.5	0.2	3.4
1970	9.4	5.3		4.4	4.8	0.2	4.6
1980	13.0	8.5		6.0	6.7	0.3	6.4
1985	15.3	10.5		6.9	8.0	0.4	7.5
1990	18.1	12.6		8.0	9.6	0.5	8.9
1995	20.8	14.3		8.9	11.3	0.6	10.2
2000	23.3	15.7		9.7	12.9	0.7	11.4
2003	24.8	na		na	na	na	na
	Percent						
Share of Population							
1960	100.0	42.9		46.1	51.4	2.4	49.1
1970	100.0	56.2		46.6	51.0	2.4	49.1
1980	100.0	65.5		46.0	51.3	2.7	49.1
1985	100.0	68.8		45.2	52.0	2.8	49.1
1990	100.0	69.6		44.2	52.9	2.9	49.1
1995	100.0	68.6		42.8	54.2	3.0	49.1
2000	100.0	67.5		41.6	55.5	2.9	49.2
2003	100.0	na		na	na	na	na
	Percent						
Average annual growth rate per period							
1960-69	3.1	5.9		3.2	3.0	3.1	3.1
1970-79	3.3	4.9		3.2	3.4	4.1	3.3
1980-84	3.3	4.2		2.9	3.5	4.1	3.2
1985-89	3.3	3.6		2.9	3.7	3.9	3.3
1990-94	2.9	2.6		2.1	3.3	3.5	2.9
1995-99	2.3	2.0		1.7	2.7	1.5	2.3
2000-02	2.1	na		na	na	na	na

na = not available.
Source: World Bank, World Development Indicators, 2003.

By Middle-Eastern standards, Iraq is fairly well-endowed with agricultural resources that include fertile soils, access to water from two major river systems (the

[2] World Bank, World Development Indicators (WDI) 2003. Note that the World Bank's WDI data does not appear to include adjustments for 1991 war-related population loss as is done by the U.S. Bureau of the Census in their population series for Iraq.

[3] Average annual growth of cereal production between the periods 1969-71 and 1988-90.

Euphrates and the Tigris), and extensive irrigation potential. However, the agricultural sector has a long track record of government intervention and mismanagement of the agricultural policy setting. Investment in the sector has been discouraged by a history of shifting land and water property rights that has ebbed and flowed with the government's changing role. Multiple claims to individual land and water rights have evolved, spawned by tribal affiliation, political patronage and persecution, and outright military conflict.

Agro-climatic Setting

Over 90% of Iraq's rainfall occurs during the November-April period (Table 2). However, precipitation may vary greatly from one year to the next in intensity, timing, and frequency. Generally precipitation levels increase from lower to higher elevations (Figure 1). For example, precipitation at Nasiriyah in the southern lowlands averages only 112 mm (4.4 in.) per year compared with 408 millimeters (16.1 inches) at Mosul in the northwest foothills.

Table 2. Historical Precipitation and Temperature Data for Mosul and Nasiriyah, Monthly and Annual Averages

	Precipitation[1]						Temperature[2]				
City	Mosul[3]			Nasiriyah[4]			Mosul[3]			Nasiriyah[4]	
Period	1923-1990			1941-1990			1961-1999			1941-1970	
units	mm	inches		mm	inches		C	F		C	F
Jan	58	2.3		22	0.9		7.2	45.0		11.5	52.7
Feb	64	2.5		16	0.6		6.1	43.0		13.8	56.8
Mar	94	3.7		15	0.6		12.2	54.0		18.1	64.6
Apr	59	2.3		16	0.6		17.2	63.0		23.4	74.1
May	24	0.9		8	0.3		23.9	75.0		29.6	85.3
Jun	0	0.0		0	0.0		28.9	84.0		32.7	90.9
July	0	0.0		0	0.0		32.8	91.0		34.1	93.4
Aug	0	0.0		0	0.0		32.2	90.0		34.4	93.9
Sep	1	0.0		0	0.0		27.8	82.0		31.7	89.1
Oct	12	0.5		3	0.1		21.1	70.0		26.0	78.8
Nov	36	1.4		14	0.6		15.0	59.0		18.8	65.8
Dec	60	2.4		18	0.7		8.9	48.0		12.8	55.0
Total	408	16.1		112	4.4		—	—		—	—
Average	34.0	1.3		9.3	0.4		19.4	67.0		23.9	75.0

Source: USDA, World Agricultural Outlook Board; Major World Crop Areas and Climatic Profiles, Agr. Handbook No. 664.

[1]Note that 1 inch equals about 25.4 millimeter (mm).

[2]C = Centigrade; F = Fahrenheit.

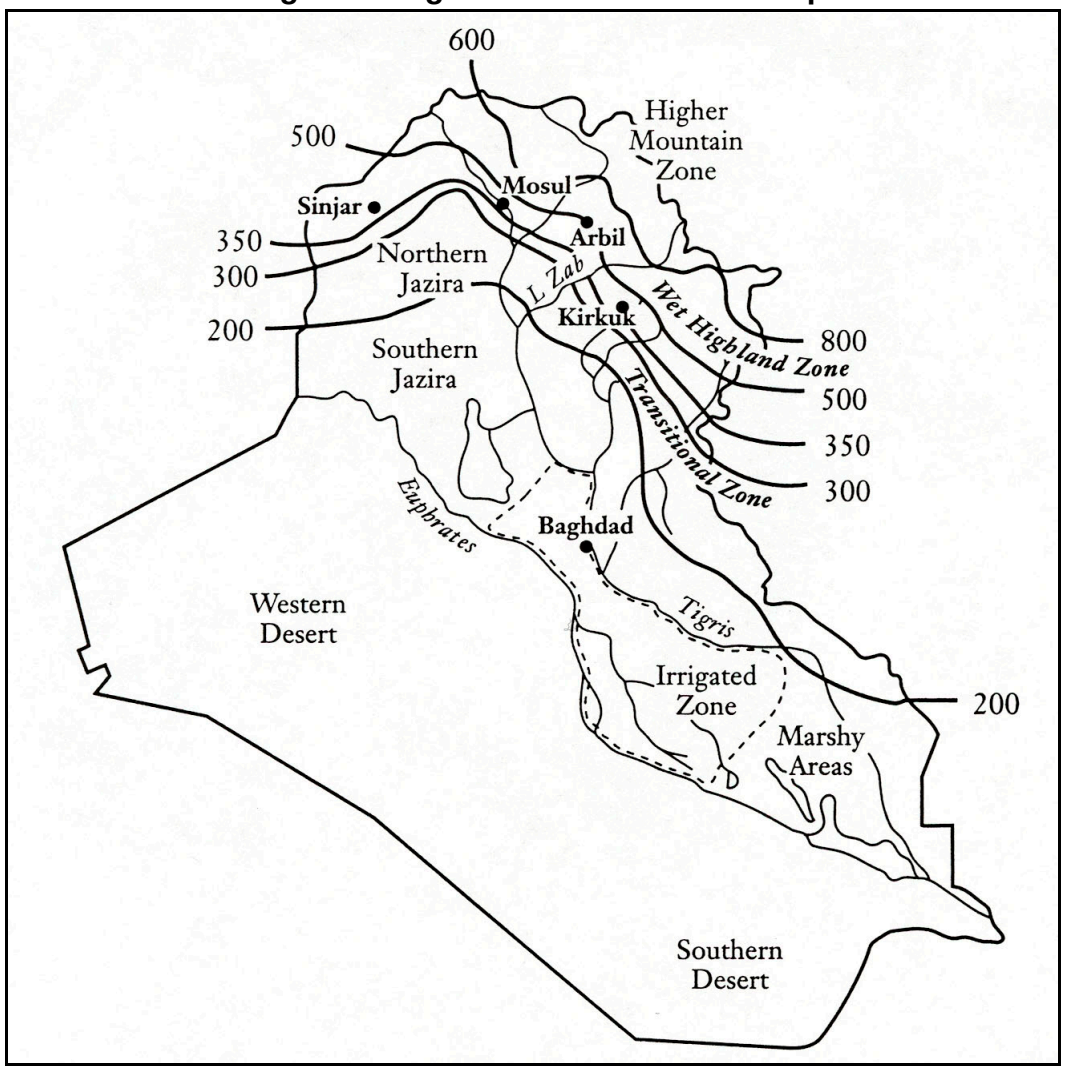
[3]Located in northern Iraq.

[4]Located in central Iraq.

During the dry period from May to October, extremely high temperatures and a dry north-westerly wind lead to very high evaporation rates from water surfaces,

irrigated land, and plants.[4] This exacerbates summer water shortages and soil salinization in irrigated areas.

Figure 1. Agro-climatic Zones in Iraq



Note: Isohyets show annual rainfall levels in millimetres (mm); 25.4 mm = 1 inch.
Source: K.A. Mahdi, "Agricultural Labor and Technological Change in Iraq" in Dennis Tulley (ed.), *Labor and Rainfed Agriculture in West Asia and North Africa*, Dordrecht: Kluwer Academic Publishers.

Iraq's soils are generally fertile and easily convertible to agricultural activity. Two major soil types predominate — heavy alluvial deposits of the Tigris-Euphrates Plain (brought and deposited by river water) containing a significant amount of humus and clay; and lighter soils which lack in humus and clay content but contain

[4] Kamil Mahdi, *State and Agriculture in Iraq*, "Chapter 1 — The Agricultural Resources and Population of Iraq," Exeter Arab and Islamic Studies Series, Ithaca Press; copyright(c)Kamil A. Mahdi, 2000, p.12-13.

wind-deposited nutrients.[5] Approximately 9% (about 4 million hectares) of Iraq's land is under cultivation, although it is estimated that as much as 21% (about 9.24 million hectares) of the total land could be used for crop production. Estimates of actual and potential grazing land vary widely. Iraq's Ministry of Irrigation, in a 1975 report, stated that nearly 73% of Iraq's land is potentially viable for grazing, although other studies suggest that potential grazing land is substantially less with significant seasonal variation.[6] The primary limiting factors for land use in agriculture are high summer-time temperatures, water availability (in the form of either rainfall or river flow), and the problem of salinity control in the alluvial plains of the Euphrates and Tigris Rivers.

There is some disagreement among experts as to Iraq's true agricultural potential since much of the country's soil is cultivable (weather and water permitting) and technical procedures exist for reclaiming prime farmland lost to salinization. Kamil Mahdi, an expert who has researched and published extensively on Iraq's agriculture, characterizes Iraq's agricultural land base as follows: "It would be true to say that cultivable land in Iraq is abundant, but that land of good quality is very limited. Much land could be reclaimed and improved but at too high a cost in relation to the yields that might be expected from prevailing agricultural practices."[7]

Land Use Patterns. Iraq has a total surface area of 43.7 million hectares (about the size of Wyoming and South Dakota combined) of which 34.0 million (77.7 percent) is not viable for agricultural use under current conditions.[8] Less than 0.4 percent is in forest and woodlands situated along the extreme northern border with Turkey and Iran. The remaining 22 percent (about 9.5 million hectares) are involved in agricultural activities, although almost half of this is very marginal and used only for seasonal grazing of Iraq's livestock population of predominantly goats and sheep.

The extreme northeastern frontier of Iraq bordering Turkey and Iran is mountainous with cold winters and cool summers. Elevations in the Zagros range of Iraq-Iran and the Taurus range of Iraq-Turkey exceed 3,000 meters. The Zagros mountains are attributed to be the location of the original domestication of sheep. Livestock grazing occurs throughout the country's agricultural zones, but is more widespread in the north where hillside grazing prevails. Small ruminants — sheep and goats — are the most prevalent livestock species. However, beef (from cattle) has been the traditional source of dietary protein for most Iraqis. Commercial poultry production has increased in importance since the 1960s and generally occurs in close proximity to urban centers (Table 5).

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[5] *Compton's Interactive Encyclopedia*, Copyright(c)1993, 1994 Compton's NewMedia, Inc.; and "Iraq," *Microsofts(R) Encarta(R) 98 Encyclopedia*. (c)1993-1997 Microsoft Corp.

[6] Ibid., pp.17-18.

[7] Ibid., p.17.

[8] United Nations (UN), Food and Agriculural Organization (FAO), FAOSTAT. (A hectare equals about 2.47 acres.)

The hill country of northern Iraq — sometimes called Kurdistan — has sufficient precipitation to support rain-fed agriculture (Figures 1 and 2). From the foothills of north-central Iraq, a broad, dry rolling plain (used primarily for desert grazing and marginal agriculture) sweeps downward to the fertile valley of the Tigris and Euphrates rivers where irrigated agriculture predominates. South-western and western Iraq is mostly desert, extending into Syria, Jordan, and Saudi Arabia. Some vegetable production under drip-irrigated plastic tunnels has been practiced in the western desert region, otherwise little other agricultural activity occurs in this zone.[9]

Area cultivated annually to field crops such as cereals, pulses, and vegetables varies with weather and market conditions, generally averaging between 3.5 to 4 million hectares.[10] Cereal production (mostly winter wheat and barley) is the principal agricultural activity in Iraq accounting for 70 to 85 percent of crop area in any given year (Tables 4 and 5).

Fruit orchards are well suited to Iraq's temperate hillsides and to more arid regions where irrigation water is available. Over 300,000 hectares are permanently in tree crops — mostly dates, but also some olives, grapes, oranges, apples, and other fruit orchards (Tables 7 and 9).[11] Date palms are the most important tree crop farmed in Iraq and have traditionally been Iraq's main export after petroleum.[12]

Mineral Wealth Favors Agriculture. In addition to its petroleum reserves, Iraq is endowed with abundant supplies of natural gas and phosphates. Natural gas is the major feed stock in the production of nitrogenous fertilizers. Nitrates and phosphates are essential ingredients for plant growth. Phosphate rock reserves are located mainly in the Akashat area northwest of Baghdad and were estimated in 1987 at 5.5 billion tons — enough to meet local needs for centuries.[13]

Following the oil boom of the 1970s, Iraq invested heavily in fertilizer production. During the 1970s and 1980s Iraq was a consistent exporter of nitrogenous and phosphate fertilizers, with annual fertilizer production running well ahead of domestic use (Table 7). During this same period, the government also invested in Iraq's domestic production capacity for agro-chemicals and farm machinery. However, both the agro-chemical and farm machinery industries were dependent on critical imports of raw materials, technology, and spare parts, and were particularly vulnerable to international trade restrictions.

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[9] Ahmad, Mahmood. "Agricultural Policy Issues and Challenges in Iraq: Short- and Medium-term Options," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2002, p. 172.

[10] In the early 1990s, cultivated area temporarily expanded to nearly 5.5 million hectares, due primarily to government incentives (see section "Iraq's Agriculture in the post-gulf War Era: 1001-2002" of this report), before returning to under 4 million.

[11] U.N. FAO, FAOSTAT.

[12] Europa Publications, "Iraq: Agriculture and Food," from *The Middle East and North Africa 2003*, 49th edition, pp 475.

[13] LOC, FRD, *Iraq: A Country Study*, "Chapter 3 — The Economy: Industrialization," May 1988, p. 153

Figure 2. Iraq's Agricultural Areas

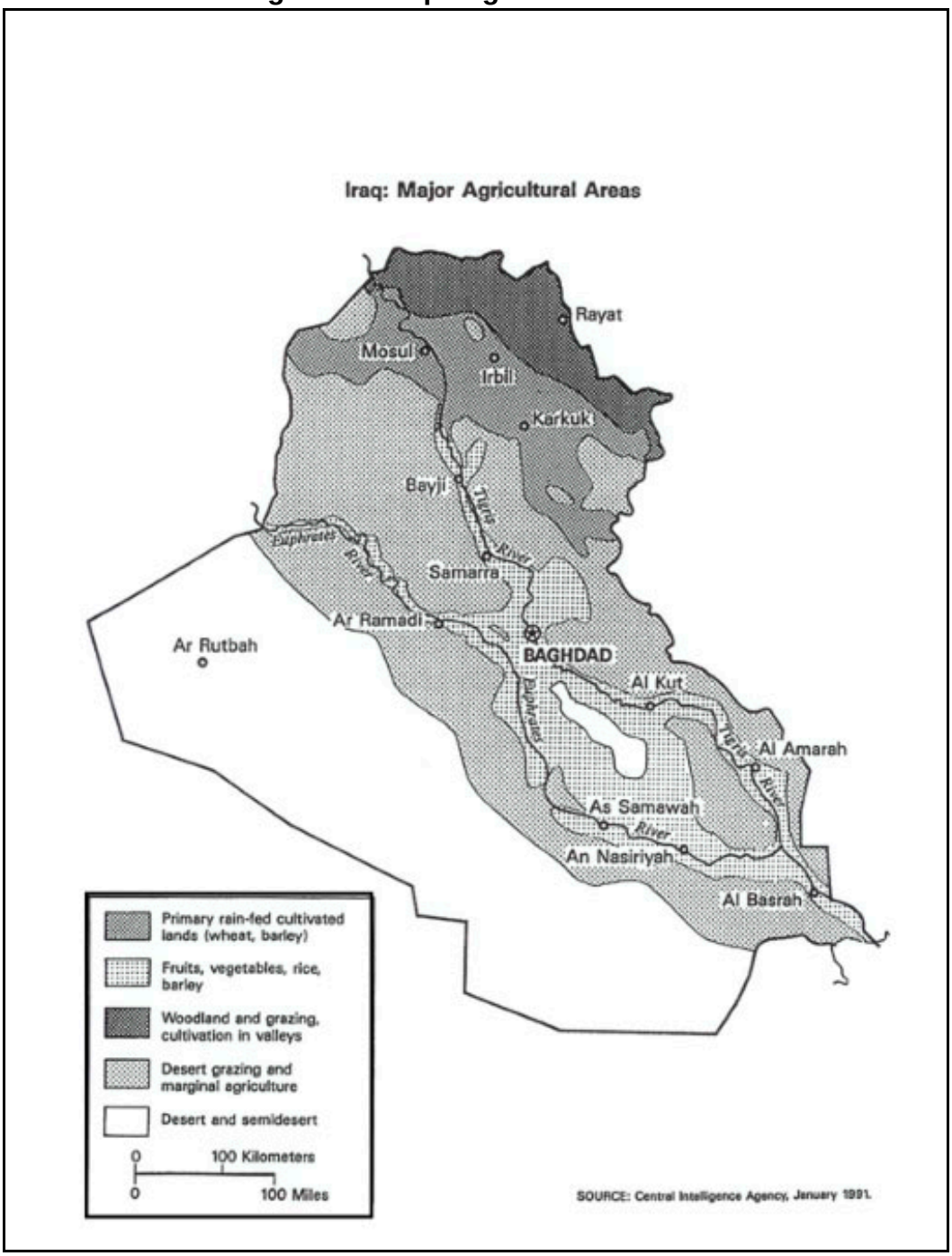
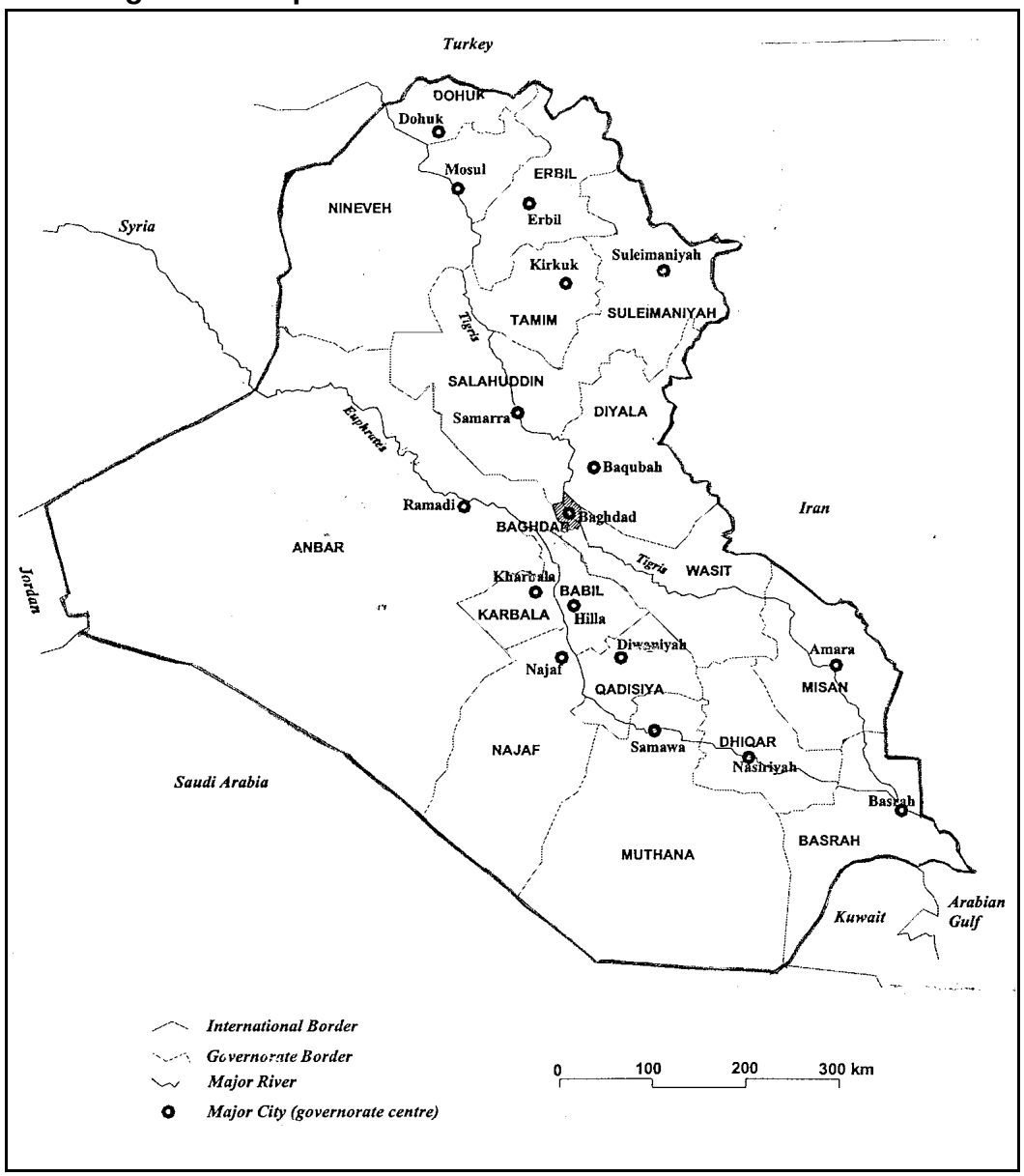


Figure 3. Iraq's Political Divisions: The 18 Governorates



Source: United Nations Development Program, Iraq Country Office, 1999-2000 Report, June 2000, p.4.

Crop Production Occurs in Two Major Zones

Wheat and barley have been Iraq's most important crops (Tables 3-5). In 2002, wheat and barley accounted for 73% of all planted area. With respect to crop production, Iraq's agricultural sector can be divided into two distinct regions: the predominantly rain-fed North and the predominantly irrigated Center-South (Figures 1 and 2). Agricultural production is generally characterized by smallholding, although the rain-fed farms of the North tend to be larger (averaging 10 to 30 hectares) than the irrigated farms of the Center-South (averaging 1 to 2.5 hectares).[14]

Rain-Fed Agriculture. About one-third of Iraq's cereal production — predominantly winter wheat and barley — is produced under rainfed conditions in the northern foothills. Rain-fed agriculture is practiced in the governorates of Ninevah, Erbil, Dohuk, and Sulaimaniya (Figure 3). The variegated topography of the region includes various micro-climatic zones, but basically the region can be divided into three rainfall regimes: high (700-1100 mm), medium (400-700 mm), and low (under 400 mm).[15] Vegetable production and fruit orchards predominate in the high-rainfall zone in the north, wheat occupies most of the medium-rainfall zone, and barley is the main crop in the low-rainfall zone. Winter wheat and barley are planted in the fall (October-November) and harvested in the late spring (April-June) in accordance with the rainfall pattern (Figure 4).

Yields on the rain-fed crops are generally poor and vary significantly with rainfall amounts. Traditionally, a biennial fallow system was used in rain-fed areas to regenerate depleted soils and provide protection against pests and diseases. Under this system, a winter crop of wheat or barley was grown once every two years and alternate halves of a field were left idle in successive years. Apart from crop rotation, very little inputs (fertilizers, pesticides, or herbicides) are used in rain-fed conditions, and generally poor crop management practices prevail.[16] Since the early 1990s farmers have been rotating previously mono-cropped cereals with leguminous forage crops such as alfalfa. This was done to partially offset the sharp decline in imported feed grains and to break a slump in productivity due to declining soil fertility.

Irrigated Agriculture. Iraq's irrigated production zone runs along and between the Tigris and Euphrates Rivers extending from the country's central region southeastward to the marshlands of the Tigris-Euphrates Delta. Very little rain falls in the center-south zone of Iraq and agricultural in this region is dependent on irrigation.

About two-thirds of Iraq's cereal production occurs within the irrigated zone. Irrigated agriculture includes both winter wheat and barley production and summer rice and corn crops. The other main irrigated summer crops include cotton and vegetables. Traditionally, the biennial fallow system was also practiced in the irrigated zone. The fallow period would permit the water table to drop sufficiently

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[14] Ahmad (2002), p. 170.

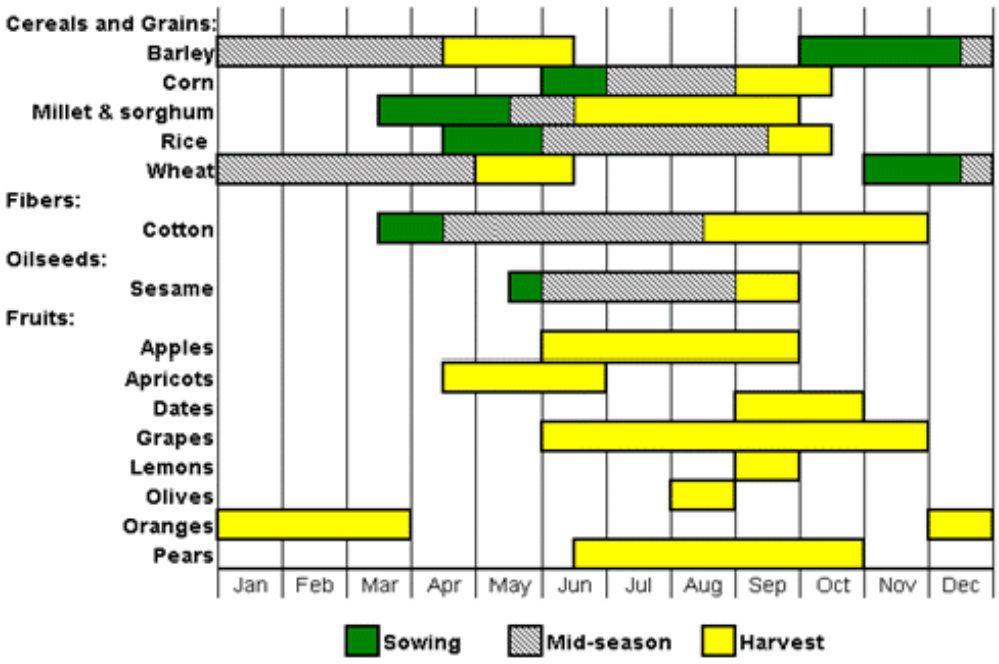
[15] Ibid., pp. 170-171. Note that 1 inch equals about 25.4 millimeters (mm).

[16] Mahdi (2000), p. 27.

to allow the salt accumulation in the topsoil to be leached downwards and prevent salinization. However, the biennial fallow system has declined in use for a variety of reasons including government policies in the 1990s encouraging more intensive land cultivation, and a land tenure system that encourages short-term exploitation over long-term investment in the soil.

In recent decades, a single crop is planted per year for the most part, often in a cycle of mono-culture that has encouraged plant disease and pests. Some double cropping of wheat/rice or barley/rice and multiple cropping of vegetables is occasionally practiced where and when irrigation water is available. Irrigated summer crops are planted in April-May and harvested in September-October, although this may vary by crop.

Figure 4. Iraq's Crop Calendar



Source: USDA, Foreign Agricultural Service, Production Estimates and Crop Assessment Division; http://fas.usda.gov/pecad/pecad.html

Historically Iraq has been one of the world's leading producers and exporters of dates, and dates have long been a staple of the Iraqi diet. Iraq is reputed to have some 411 varieties of dates.[17] In 1970, Iraq had an estimated 21 million palms, and supplied almost half of the world's date consumption.[18] Most date trees grow within the irrigated zone and benefit from summer-time irrigation. Iraq's extensive date

[17] Agence France Presse, February 11, 2003, copyright 2003

[18] IPR Strategic Business Information Database, September 18, 2000.

palm plantations are located in the center of the country, especially around Karbala, and southward in the area surrounding Basra.

Iraq Possesses Extensive Irrigation Potential

Surface Water Resources and Irrigation. Iraq has more water than most Middle Eastern nations due to the Tigris and Euphrates river systems. Both rivers are fed by snowpack and rainfall in eastern Turkey, while Tigris tributaries are also fed by water sources in northwest Iran. Iraq's irrigation development depends to a large extent on the volume of water from the Tigris and Euphrates rivers released by upstream countries Syria and Turkey. Both the Tigris and Euphrates originate in Turkey. The more southerly Euphrates travels through Syria before entering Iraq from the West with an average annual flow estimated at 30 km^3.[19] The more northerly Tigris briefly runs along Syria's most north-eastern border before entering Iraq from the North. The Tigris has a smaller flow capacity, estimated at slightly over 21 km^3, however, numerous rivers and streams running out of Iraq's northern foothills feed into the Tigris. As a result, the Tigris is less dependent on foreign sourcing. About 50% of the Tigris water comes from outside the country compared with 90% for the Euphrates.

Both the Tigris and the Euphrates experience significant water flow variation over the course of a year. The Euphrates' flow shows the greatest variation fluctuating annually between 10 and 40 km^3. Water discharges are highest for both rivers in April and May, coinciding with the winter crop harvest when irrigation requirements are very low and potential flood losses very high. The Tigris generally floods earlier and more violently than the Euphrates, and tends to carry more silt from the denuded hillsides of northern Iraq. Flood water levels decline rapidly and water supplies remain at a low level from July through November. Given the high rate of evaporation and transpiration, summer crops are heavily restricted, while winter cultivation is also restricted by extremely low river discharge levels at the beginning of the winter crop season in October and early November.[20]

The sourcing of water flow and international agreements governing the control of that flow are critical because water demand is expected to continue to grow for all three countries within the Tigris-Euphrates watershed (Iraq, Syria, and Turkey). In 1980, Iraq and Turkey created a Joint Technical Committee on Regional Waters to oversee the control and management of the Euphrates and Tigris. Although Syria joined this committee later, a more important agreement between Syria and Iraq was established in 1990. Under the 1990 Syria-Iraq agreement, the two countries agreed to share the Euphrates' waters at a rate of 58% (Iraq) and 42% (Syria) based on the flow received by Syria at its border with Turkey.[21] Turkey has unilaterally promised

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[19] U.N. AQUASTAT, "Country Profile: Iraq," — FAO's Information System on Water and Agriculture, Food and Water Development Division, 1997 version.
Note: 1 km^3 = 1 billion m^3.

[20] Mahdi (2000), p. 19.

[21] U.N., FAO, AQUASTAT (1997), p.

to secure a minimum flow of 15.8 km^3 per year at its border with Syria. This implies a de facto minimum flow of 9.2 km^3 per year for Iraq.

The realization of Iraq's irrigation potential will depend on the development of planned upstream irrigation and water management projects. The South-east Anatolian (GAP) project in Turkey and various irrigation projects in Syria will likely reduce Iraq's overall irrigation potential.

Within Iraq, early attempts at constructing barrages that channeled river water into natural depressions to control flood waters proved ineffective in supporting irrigated agriculture. The combination of high evaporation from the reservoirs and the absorption of salt residues in the depressions often made the water too brackish for agricultural use. However, a system of on-river water storage facilities — such as barrages or dam reservoirs at Samarra, Dukan, Darband, Khan, Mosul, and Al Hadithah on the Tigris, Habbaniyah on the Euphrates, and the Bakhma on the upper Zab — were successfully developed to help regulate the flow of both the Euphrates and Tigris and to expand the irrigation potential.

According to the United Nations' Food and Agriculture Organization (FAO), in 1990 Iraq's irrigation potential was estimated at over 5.5 million hectares — 63% in the Tigris basin, 35% in the Euphrates basin, and 2% in the Shatt al-Arab basin.[22] However, only 3.5 million hectares were estimated to be fully or partially equipped for control irrigation that same year. Of this total, a much smaller area was actually irrigated, since substantial area has been abandoned due to poor irrigation system maintenance leading to water-logging and salinity. In 1993, only 1.936 million hectares were estimated to be actually irrigated.[23]

Problems related to poor irrigation system management and low usage rates include the growing salinity problem for which no effective national-scale desalinization program has ever been developed; problems related to the evolution of land and water rights; difficulties experienced with silt and weed clearance from canal beds and silting up of flood-irrigated land; and labor shortages resulting from rural-urban migration and the expansion in cultivation of high-value labor-intensive crops. A further problem relates to the growing importance of pump-irrigated systems that have replaced previous flow-irrigated (i.e., gravity driven) systems. Pump irrigation can be more effective and reliable at delivering water to fields, but it is vulnerable to the availability of timely and inexpensive fuel and machine parts.

Salinity Has Been a Persistent Problem. Another important issue for Iraq's irrigation potential is water quality, particularly as measured by the water's salinity or salt content. High water salinity can produce salinization of the soil if not managed properly. Salinization is the process by which water-soluble salts accumulate in the soil. Excess salts hinder the growth of crops by limiting their ability to take up water. Increasing salinization eventually renders the land sterile. The water table of southern Iraq is saline and so near the surface that it only takes a bit of injudicious over-irrigation to bring it up to root level and destroy the crop.

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[22] Ibid.

[23] Ibid.

Throughout history the irrigated agriculture of Iraq's center-south region has been menaced by salinization. Iraq's historical records include accounts of salinization caused by canal irrigation between 2400 and 1700 B.C. and the problem has recurred at intervals through the present. In 1973, it was estimated that at least 2.5 million hectares of Iraq's irrigated cropland had become uncultivable due to excessive salinity, and that every year another 6,000 to 12,000 hectares were lost to salinization.[24] As a result, salinization represents both an immediate and long-term threat to Iraq's land resources and agricultural productive capacity.

Reducing the severity and extent of soil salinity is primarily a problem of water management — the usual "treatment" for salinization is to flush the soil with lots of water. As a result, good water flow and effective drainage are critical to salinity control. Irrigation diminishes water flow and increases the level of salinity, particularly during the dry season. In addition, proper drainage is not easily achieved because Iraq's terrain is very flat in the irrigated zone of the Center-South. Baghdad, for example, although 550 kilometers from the Persian Gulf, is only 34 meters above sea level. This slight gradient makes the plains susceptible to flooding and, although it facilitates irrigation, it also hampers drainage.

Technically, salinity is not an insurmountable problem, but would require heavy investment in an effective drainage system, as well as rebuilding and maintenance of existing canals. In addition to increased water flow and an effective drainage system, the degree of salinity can be improved by plant selection, tillage practices, and soil management.[25]

Ground Water Resources and Irrigation. According to FAO, good quality subterranean water exists in the foothills of northeastern mountains and along the right bank of the Euphrates. However, both aquifers become increasingly saline towards lower altitudes. FAO estimated that 220,000 hectares were irrigated in 1990 from approximately 18,000 wells.

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[24] Mahdi (2000), p.16.

[25] Okin (undated). [http://www.evsc.virginia.edu/~desert/]

Structural Evolution of Iraq's Agricultural Sector

Introduction. Over the past 150 years Iraq's agricultural sector has undergone numerous structural transformations, each marked by the degree and nature of state interference. Throughout this period, Iraq's system of land tenure, inefficient government implementation of land reform, and interventionist agricultural policies have had a profound impact upon agricultural relations and upon production, employment, and investment decisions. The net effect has been a perpetuation of low productivity of farmers, slow growth of the agricultural sector, and an ever-increasing dependence on imports to meet domestic food needs.

The first major transformation in Iraq's agricultural sector came in the late nineteenth century involving the break up of tribal landholdings and the creation of large privately-held estates. This was followed, in 1958, by the rise to dominance of the central state. During this period, which extended into the late 1970s, the agricultural sector underwent a radical land redistribution involving the breakup of the large land-holdings and the creation of state-enforced cooperatives and even some collectivization. In 1979, Saddam Hussein assumed power and immediately set out to recreate the state under his control. Under Hussein, agriculture's role in the economy has been heavily influenced by Iraq's involvement in military conflicts, particularly the 1980-88 Iran-Iraq War, the 1991 Gulf War, and the 2003 Iraq War, and by varying degrees of government effort to promote and/or control agricultural production. The early periods are discussed in the following two sections, followed by two sections that present in some detail the development of Iraq's agricultural sector under Saddam Hussein.

Early Structure of the Agricultural Sector: Pre-1958. Although urban settlements and irrigated agriculture have existed within Iraq for thousands of years, the traditional agriculture practiced throughout most of modern Iraq, until late in the nineteenth century, consisted of pastoral agriculture within a nomadic tribal setting. The initial modernization of Iraq's agricultural sector involved the transformation from traditional practices of livestock grazing and crop production to mechanization and consolidation of land holdings into vast estates during the hundred years or so preceding 1958.

While part of the Ottoman Empire, a system of tribal tenure — through which the state retained ownership of the land although tribes used it — predominated in Iraq. [26] During this period, accumulating pressure from urban-based capital, emerging international trade linkages, and the growing power of a central government placed substantial pressure on the traditional tribal-based agrarian system. Around 1870, large agricultural land holdings began to come under private individual title, frequently by former tribal shaikhs (chiefs), at a rapid pace. This transformation facilitated agricultural expansion and the settlement of what had formerly been grazing land. But it also played a significant role in the tenure conditions, the

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[26] Iraq was part of the Ottoman Empire from the mid-1500s until 1920 when it became a British Mandate. At that time, Britain established a monarchy in Iraq. Independence was achieved by Iraq in 1932, but Britain retained a role in defense and foreign affairs. A military coup in 1958 ended the monarchy and established Iraq as a republic.

organization of farm activities, the pattern of land use, and the associated agricultural production relations that emerged.

Under this informal system of tribal tenure, land titles were insecure. By the 1930s, large landowners had accumulated considerable political clout and began to lobby for greater security over their landholdings. In response, the government passed a law in 1932 empowering it to settle title to land and to speed up registration of titles. Under the law, a number of tribal leaders and village headmen were granted title to the land that had been worked by their communities. Even though agriculture was commercialized and farm surpluses could be directed to satisfying a growing urban demand, important elements of tribal organization remained. For example, traditional share tenancy (involving the rotation of plots to be cultivated and the strips to be assigned to tenants) was often based on customary rights of tribesmen, who tended to have a share of the land rather than rights to a specific plot. As a result, factor markets for land and labor were severely restricted — wage labor and cash rents were almost nonexistent. The number of sharecroppers and tenants increased over time under this system. This relationship was formalized in favor of landowners by a 1933 law which provided that a sharecropper could not leave the land if he were indebted to the landowner. Because landowners were usually the sole source of credit and almost no sharecropper was free of debt, the law effectively bound many tenants to the land.

Large landowners who were reliant on cheap labor and traditional social organization had no incentive to carry out investments in new technology or production practices that might have had unfavorable consequences for factor pricing and social organization. As a result, the intensity of cultivation and land productivity was very low, and the entire growth in output was due to rapid expansion in cultivated area. Emphasis was placed on resource development that reinforced the existing agrarian system and served the interests of the landlords. The limits to area expansion that were reached were due to salinization and seasonal water constraints in the irrigation zone, and to expansion into marginal lands in the rain-fed zone.

In the south-central irrigated zone, investment in water-storage and flood-control projects, along with adoption of irrigation pumps, served to expand cultivated area rather than to increase productivity. The tribal-based share tenancy system contributed to the poor upkeep of the irrigation system — irrigation and drainage networks were not maintained and salinity spread over large areas.

In the northern rain-fed zone, the arrival of tractors quickly pushed area expansion onto marginal grazing land. Such cultivation was ecologically unsustainable. Problems associated with geographic isolation were also compounded by the land-tenure system, and reinforced the low productivity, low investment nature of production.

Over time, many landowners sought the amenities of urban life, and absentee landlords whose incentive was to maximize short-term profits contributed to the failure to adopt better, but higher-cost land management and production practices. This agrarian system reinforced the practice of cereal monoculture to the detriment of varied and mixed farming that encompassed higher-valued activities such as vegetable and fruit production and livestock raising.

On the eve of the 1958 revolution, more than two-thirds of Iraq's cultivated land was concentrated in 2% of the holdings, while at the other extreme 86% of the holdings covered less than 10% of the cultivated land.[27]

Rise of State Dominance: 1958-1979. A period of heavy state dominance in the agricultural sector began in 1958 when the ruling regime was overthrown by sections of the Iraqi army.[28] The poor conditions of tenant farmers and the inequalities of the countryside juxtaposed against the wealth and political influence of the landlords placed agrarian reform high on the agenda of the new government. Land reform was initiated in October 1958 and resulted in the break-up of large estates whose owners were compelled to forfeit their 'excess' land to the government, which would then redistribute the land to new peasant owners.[29] This land was to be redistributed to individuals in parcels of between 7 and 15 hectares. Recipients would repay the government over a 20-year period. Under the law, the government was to pay for expropriated land, but by 1968 the government had absolved itself of all responsibility to recompense landowners.[30]

The government also began promoting the growth of cooperatives and collective farms in 1967. Farmers receiving expropriated lands were required to join a cooperative. The government provided heavily subsidized farm equipment to farmers through farmers' cooperatives. During this period, most government subsidies were directed to these state-sanctioned enterprises. However, this approach of heavy state control proved inefficient and unproductive. First, the government was slow to redistribute the expropriated land. By 1968, 1.7 million hectares of farmland had been expropriated, but less than a third of it had been redistributed. As a result, the government continued to hold a large proportion of arable land, which, because it was not distributed, often lay fallow.[31] Second, the previous system of input supply covering credit, seeds, pumps, and marketing services that had been performed by the landlords was not being fully undertaken by the state due to a lack of personnel, funds, and expertise. Agricultural production stagnated and rural-to-urban migration increased.

In 1970 the government continued its program of agrarian reform with legislation that further reduced the maximum size of permissible land holdings with expropriation of the excess. In 1975, a further reform law was enacted to target the large estates of Kurdish tribal owners in the North. An increasing share of agricultural land came under the direct control of the government.

During the 1970s Iraq experienced rapid urbanization accelerated by the oil boom. The urban share of Iraq's population grew from about 43 percent in 1960 to

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[27] LOC, FRD, *Iraq: A Country Study*, "Land Tenure and Agrarian Reform," 1990.

[28] Kamil A. Mahdi, *State and Agriculture in Iraq*, Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2000. p. 201.

[29] Europa Publications (2003), p. 474.

[30] LOC, FRD, *Iraq: A Country Study*, "Land Tenure and Agrarian Reform," 1990.

[31] Ibid.

66 percent by 1980 (Table 1).[32] Accompanying this development there was growing concentration of population in the central region, particularly inBaghdad city.[33] The indigenous agricultural labor force declined by one-half million workers from 1973 to 1977, causing agriculture's share of the total labor force to slide from 50 percent to 30 percent. The resultant labor shortage in the countryside necessitated importation of foreign laborers and technicians, mainly Egyptians.[34]

The original purpose of the land reform had been to break up the large estates and to establish many small owner-operated farms, but fragmentation of the farms made extensive mechanization and economies of scale difficult to achieve, despite the extensive cooperative system. Therefore, in the 1970s, the government turned to collectivization as a solution. By 1981 Iraq had established 28 collective state farms that employed 1,346 people and cultivated about 180,000 hectares.[35]

An upward trend in import dependence began during the 1970s as agricultural output failed to keep up with Iraq's rapidly growing population, and imports became increasingly important to meet domestic food demand. Rising petroleum revenues, food subsidy programs to improve consumer diets, and changes in trade policy paved the way for increased imports of cereals, livestock products, sugar, and oilseed products. By 1980 Iraq was importing about half of its food supply. Despite massive expenditures on imports, food shortages, particularly of fresh commodities including fruits, vegetables and eggs, plagued consumers.[36]

During the 1970's, the United States was effectively a residual supplier of Iraq's grain imports as other foreign competitors were able to take advantage of either geographic proximity or lower prices to garner most of Iraq's trade. However, Iraqi programs to diversify the sources of supply caused Iraq to continue purchasing U.S. rice and wheat even when supplies from other sources were abundant and lower in price.[37]

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[32] World Bank, World Development Indicators, 2003.

[33] Mahdi (2000), p.31.

[34] Springborg, Robert. "Infitah, Agrarian Transformation, and Elite Consolidation in Contemporary Iraq," *The Middle East Journal*, Vol. 40, No. 1, Winter 1986, pp. 33-52.

[35] LOC, FRD, *Iraq: A Country Study*, 2000.

[36] Ibid., p. 32.

[37] Kurtzig, Michael E. and John B. Parker. "World Agriculture and Trade: Iraq," *Agricultural Outlook*, November 1980, pp. 18.

Iraq's Agriculture during Saddam's Early Years: 1979-1990

Reforms Favor the Private Sector. In July 1979 Saddam Hussein assumed power from President Hassan Al Bakr. Almost immediately he set out to shift the economy (including the agricultural sector) away from State control and towards allowing a greater role for private-sector investment from both Iraqi and other Arab sources.[38] State intervention took the form of large subsidies to the sector. Surging oil revenues were used to acquire Western, as opposed to Soviet Bloc, technology and to lavish extensive government subsidies on the agricultural sector. In addition, marketing regulations were relaxed and the Government raised prices for virtually all commodities in the early 1980s in order to stimulate production and to expand the role of the private sector.[39] The result of the government largesse was the emergence of a system of cronyism and political patronage under the guise of privatization and capitalism. Agricultural reforms were given further impetus by the 1983 decline in oil prices which caused government policy to focus narrowly on agriculture.[40]

The large state-controlled enterprises that had dominated the agricultural sector the previous two decades were broken up and sold to the private sector or to public-private companies.[41] In 1982, the Iraqi government still controlled approximately 50 percent of all agricultural lands. However, in 1983, Law No. 35 was implemented. Under the provisions of this act, Iraqis or Arab nationals, acting individually or in companies, could apply to rent land from the Ministry of Agriculture and Agrarian Reform for a period of five to 20 years. No upper limit on the size of land parcels was specified in the act. Rents charged were well below prevailing market rates.[42] By January 1989, according to government sources, the ownership structure of land had changed considerably: 53 percent was privately owned; 46 percent was rented from the state by farmers and private investors; and the remaining 1 percent was state held.[43] In addition, a majority of very large poultry, dairy, and fishing enterprises had been sold to the private sector.

During this period, the government adopted a number of policies to remove the existing barriers to large industrial investments that had been in place since the nationalizations of 1964. In 1988, the government fully liberalized all imports for the private sector, provided that they were paid for with foreign exchange held

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[38] Ibid. Springborg suggests that at least a partial motivation for this behavior by Saddam was that, by weakening the Baath Party structure, he was able to enhance his own power base within the Party.

[39] Ibid., p. 40-41.

[40] Chaudhry, Kiren Aziz, "Consuming Interests: Market Failure and the Social Foundations of Iraqi Etatisme," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Ithaca Press, copyright©Kamil Mahdi, 2002, pp. 245.

[41] Ahmad (2002), p. 184.

[42] Springborg (1986), p. 37.

[43] Chaudhry (2002), p. 245.

outside the country. Previously, imports had been completely controlled by the state, either directly or through strict licensing procedures.[44]

Agricultural Inputs Highly Subsidized. Extensive government subsidies were provided to the agricultural sector throughout the 1980s. First and foremost was cheap fuel to run the agricultural machinery, and cheap electricity to run the irrigation pumps. After cheap energy, water was the main subsidy among agricultural inputs. Below-market fees were charged for water use. Poor demand management practices contributed to very low efficiency in water use. For example, water charges were area-based rather than crop- or production-based. The government's management focus was generally on upgrading irrigation technology, rather than on lowering unit-costs via conservation and reduced waste through maintenance.[45] The government invested heavily in the irrigation infrastructure — irrigation pumps were widely installed and the government assumed primary responsibility for maintenance activities such as cleaning out the irrigation ditches and drains. This maintenance was critical to allowing salts to be washed from the soil to prevent salinization.[46]

The government also distributed high-yielding seeds, and provided substantial and ever-increasing subsidies on fertilizers and agricultural chemicals. Vaccinations for poultry and livestock were available at subsidized prices. Credit was available to agricultural producers at below-market interest rates through Iraq's Agricultural Credit Bank (ACB).[47] Agricultural extension services were also available through more than 3,000 field-extension agents.[48] Government controlled storage and marketing facilities were widespread throughout the main agricultural areas. However, most of the agricultural subsidies were directed to irrigated agriculture and to commercial livestock activities such as chicken farms and a fledgling feedlot industry.

During this period, Iraq relied on foreign technology and imports for livestock vaccines. In addition, most raw materials were imported for crop pesticide production. To facilitate access to foreign technologies, the government import agency used an over-valued exchange rate (three times higher than the black market rate) to acquire pesticides and agricultural equipment such as combines, tractors, and irrigation pumps on the international market. Producers could then buy these agricultural inputs from the government import agency at the official exchange rate.[49] However, it is not clear how widespread access to these officially purchased inputs was. Observed production behavior suggests that they were mostly available to Party favorites or a privileged few.

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[44] Ibid., p. 247.

[45] Ahmad (2002), p. 191.

[46] USDA. January 1998. "Soil Quality Resource Concerns: Salinization," Natural Resources Conservation Service, USDA. [http://soils.usda.gov/sqi/files/Salinzation.pdf]

[47] Springborg (1986), p. 38-39.

[48] Ahmad (2002), p. 184.

[49] Ibid., p. 40.

Despite Extensive Subsidies, Trade Dependence Grows. Planted area and production expanded through the 1980s for cereals, vegetables, and fruit. During 1985-89, average cereal harvested area and production were up 28 and 14 percent, respectively from the average for 1970-79 (Table 4). However, cereal yields stagnated despite heavily subsidized inputs, due in large part to poor production practices and limited varietal development. In addition, the Iran-Iraq War gradually diverted labor and other resources away from agriculture, and the government's agricultural input subsidies were slowly reined in. During the 1980s, up to two million unskilled laborers, mostly originating from Egypt, Sudan, and South Asian countries, replaced the domestic labor force of Iraqi citizens away on military front duty.[50]

Population growth continued to outpace agricultural production, increasing the importance of trade. Despite Government efforts at stimulating agricultural production during the 1980s, average cereal and poultry imports as a share of domestic consumption nearly doubled from a decade earlier, jumping to 69% and 48% shares, respectively, over the decade (Table 12). By 1989 Iraq was importing over $2.5 billion in agricultural commodities annually including 78 percent of its cereals and nearly 100 percent of its vegetable oils and sugar (Tables 16 and 17).[51]

The growth in food imports helped total calorie availability rise steadily through the 1980s from 2,820 calories per capita per day in 1980 to average about 3,500 in 1988 and 1989 according to FAO. Cereals, mostly wheat and rice comprised 60 percent of calories consumed by the average Iraqi during the 1980s (Table 8).

Wheat has been Iraq's most important agricultural import in terms of both quantity and value for most of the past two decades. During the 1981-89 period, Iraq imported an average of 2.6 million metric tons of wheat annually (Table 13). The average annual value of total cereal (principally wheat) imports during this same period averaged over $750 million (Table 11). Australia was Iraq's primary wheat supplier with a 38% market share compared with 29% from the United States and 22% from Canada.

U.S. Provides Substantial Trade Assistance to Iraq. In the 1980's, U.S.-Iraqi trade expanded rapidly on the strength of large USDA export credit. From 1983 through mid-1990, Iraq received nearly $5 billion in U.S. GSM-102 and GSM-103 export credit guarantees to purchase significant quantities of U.S. agricultural commodities. In addition to the export credit, Iraq also participated in other U.S. agricultural export programs. Under the Export Enhancement Program U.S. exporters received an estimated $157.2 million in bonuses to facilitate Iraqi purchases of about $509.8 million in agricultural commodities (wheat, wheat flour, barley, barley malt, dairy cattle, poultry, and table eggs) during fiscal years 1986 through 1990. During those same years, the Targeted Export Assistance and Cooperator Foreign Market Development Programs together provided $1.9 million

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[50] Michiel Leezenberg,"Refugee Camp or Free Trade Zone? The Economy of Iraqi Kurdistan since 1991," from *Iraq's Economic Predicament,* Kamil Mahdi, Editor. Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2002, pp. 291.

[51] U.N., FAO, FAOSTAT.

in market development assistance to U.S. commodity groups targeting the Iraqi market.[52]

Virtually all of Iraq's purchases of U.S. agricultural commodities were made under U.S. government programs. By 1989, Iraq was the 12th largest foreign market for U.S. agricultural exports buying about 2% of all U.S. agricultural exports. Iraq had become the major destination for U.S. rice exports and also an important purchaser of U.S. wheat, feed grains, oilseed products, cotton, sugar, dairy products, poultry, and tobacco (Table 20).

Date Production and Trade Remain Important. During the 1970s, Iraq's production of dates averaged slightly more than 415,000 metric tons annually of which 68% was exported at an average annual export value of nearly $35 million. But Iraq's date industry reportedly experienced severe damage during the Iran-Iraq War.[53] Many palm plantations in the region surrounding Basra were destroyed by Iranian shelling and Iranian soldiers reportedly used thousands of palm trunks to build shelters during their occupation of parts of southern Iraq. In the early 1980s, Iraq's data production slumped to about 387,000 metric tons and the export share fell precipitously to only about 28%. However, a sharp rise in international date prices more than offset the decline in exports and kept export value near $35 million annually. In the latter half of the 1980s the international market price rose substantially and the value of annual date exports averaged over $55 million.[54]

During the 1980s, the government-managed Iraqi Date Administration initiated a major program to support date production by subsidizing the development of plants to industrially process dates into sugar, dry sugar alcohol, vinegar, and concentrated protein. The Iraqi Date Processing and Marketing Company was established to oversee date production and marketing. As a result, of their activity, domestic use gained a generally increasing share of Iraq's annual date production (Table 6).

Poultry Surpasses Beef as Primary Meat Source. In the 1970s the Iraqi government had started to emphasize livestock and fish production in an effort to add protein to the national diet. In the mid-1980s, British, West German, and Hungarian companies were given contracts to establish poultry farms. At the same time, the government expanded aquaculture and deep-sea fishing.[55] According to FAO data, calorie availability from meats — the principal source of dietary protein — peaked in 1984 at an estimated 139 calories per day per capita (Table 10). For the 1985-89 period, meat availability averaged nearly 132 calories/capita/day. Beef had been the

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[52] U.S. General Accounting Office (GAO), November 1990, p. 2. Note: under GSM-102 USDA's Commodity Credit Corporation (CCC) guarantees repayment for credit sales of three years or less; under GSM-103, CCC guarantees repayment for credit sales of more than three years but less than 10 years.

[53] IPR Strategic Business Information Database, "Iraq: 9 Million Palm Trees Lost in Wars," December 13, 2000; copyright©Info-Prod (Middle East) Ltd., 2000.

[54] FAOSTATS, FAO, United Nations.

[55] Library of Congress, FRD, *Iraq: A Country Study*, "The Economy — Cropping and Livestock," p.162.

traditional source of meat calories in Iraq. However, poultry meat had been making strong gains through the 1970s and 1980s. By 1989 poultry surpassed beef as the principal source of calories from meat in the Iraqi diet — 55.5 calories/capita/day for poultry compared with 51.3 for beef.[56]

Livestock production in Iraq has traditionally been dominated by small ruminants (sheep and goats). Large ruminant production (mostly cattle, but also draft animals — camels, buffaloes, horses, mules, and donkeys) comprise a much smaller share of the livestock sector (Table 5). Iraq's sheep and goat population peaked in 1970 at an estimated 15.4 million head, while the cattle population peaked in 1974 at over 3 million head. All ruminants have been in decline ever since as rapid human population growth and urbanization have increased pressure for higher-valued food crops on suitable grazing land, while limited investment and increasing feed-import costs slowly squeezed the profitability out of the sector.

[56] FAOSTATS, FAO, United Nations.

Iraq's Agriculture in the Post-Gulf War Era: 1991-2002

In the mid-1980s, agriculture accounted for only about 14 percent of Iraq's national GDP. However, after the imposition of U.N. sanctions in 1990 and the loss of oil revenues, the country's economy turned inward and agriculture's share of GDP is estimated to have risen to 35 percent by 1992.[57] This section discusses the government's policy shift behind the inward reorientation of the agricultural sector and the near catastrophic results of failed government programs and prolonged drought.

U.N. Sanctions Impact Agricultural Trade. In August 1990 the U.N. Security Council adopted resolution 661, imposing comprehensive sanctions on Iraq following that country's short-lived invasion of Kuwait.[58] Under U.N. sanctions, foreign companies were prohibited from investing directly in Iraq. The importation of agricultural products was not banned; however, the Iraqi government's unwillingness to participate in the U.N.'s 1991 Oil-for-Food plan cut off government oil export revenues needed to purchase foodstuffs and agricultural inputs on the international market.[59]

The sanctions and the Iraqi government's response to them, had devastating consequences for Iraq's agricultural sector and the country's food supply. The impact on Iraq's agricultural trade was immediate as exemplified by the initial forecast and subsequent revisions to USDA's estimate of Iraq's grain imports for the 1990/91 marketing year. In July 1990, a month prior to the Iraqi invasion of Kuwait, USDA forecast Iraq's 1990/91 grain imports at 4.6 million tons, down only slightly from the 5 million tons imported in 1989/90. Just a month later, in August 1990, USDA revised its forecast for 1990/91 imports downward to 2.85 million tons. USDA's final estimate of 1990/91 Iraqi grain imports was 492,000 tons — only 11% of the original forecast.[60]

From 1990 to 1994, Iraq's agricultural imports averaged slightly above $1 billion or less than half of the pre-war level (Table 11). USDA's export credit offers that had been so generously extended to purchase U.S. agricultural products during the 1980s were stopped, and USDA's Commodity Credit Corporation was forced to

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[57] Ahmad, Mahmood. "Agricultural Policy Issues and Challenges in Iraq" Short- and Medium-term Options," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Ithaca Press, copyright©Kamil Mahdi, 2002, pp. 179-180.

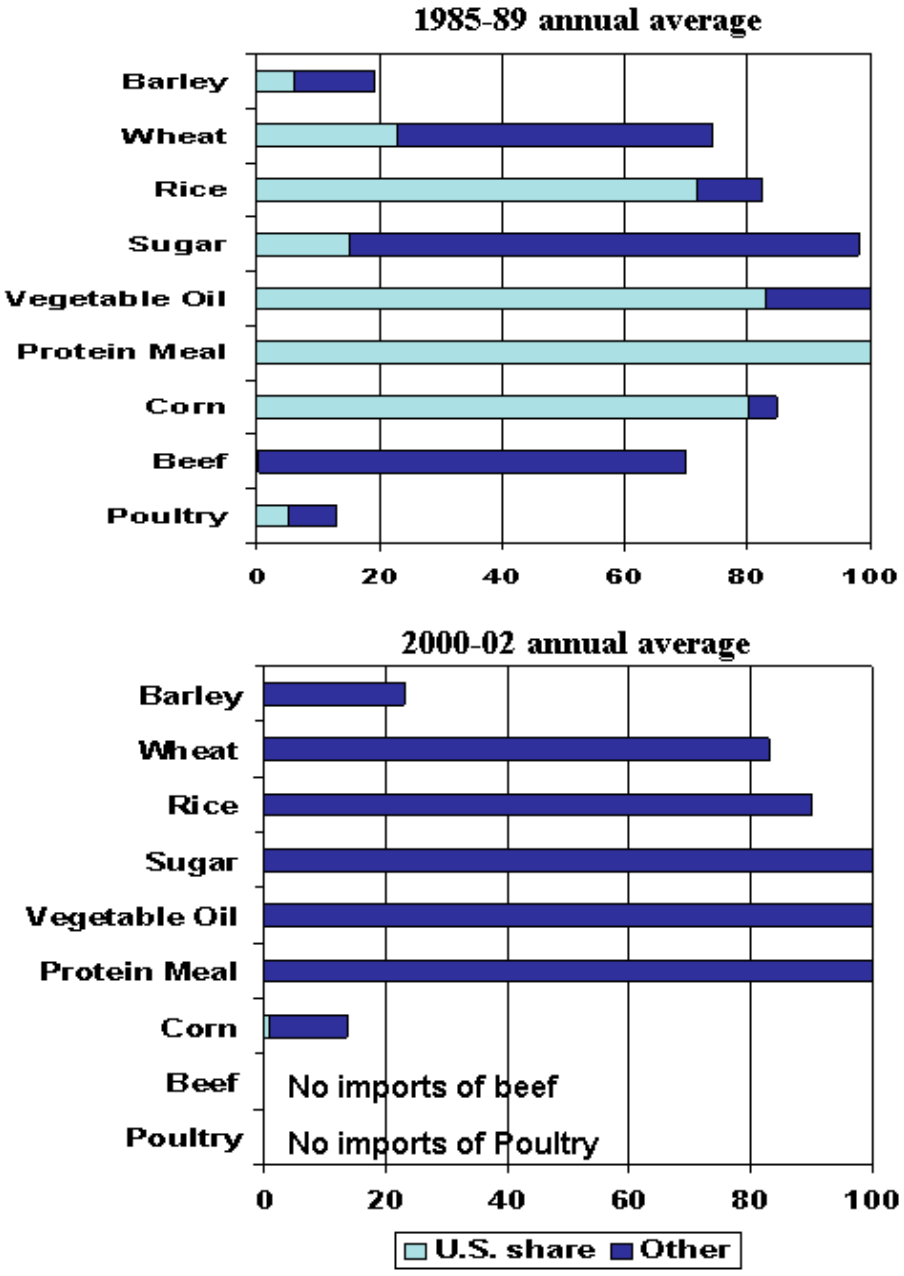
[58] For a discussion of Security Council resolutions and requirements on Iraq, see CRS Issue Brief IB92117, *Iraq: Weapons Programs, U.N. Requirements, and U.S. Policy*.

[59] For a discussion of Security Council resolutions related to the Oil-For-Food Program in Iraq, see CRS Report RL30472, *Iraq: Oil-For-Food Program, International Sanctions, and Illicit Trade*; and United Nations, Office of the Iraq Program — Oil for Food; "About the Program: In Brief." [http://www.un.org/depts/oip/background/inbrief.html]

[60] Parker, John, Michael Kurtzig, and Tom Bickerton. "Iraq Faces Embargo," *Agricultural Outlook*, ERS, USDA, September 1990, pp. 16.; and USDA "PSD online database."

cover over $2 billion in unpaid Iraqi credit guarantees.[61] U.S. agricultural trade with Iraq fell to nearly zero and has remained negligible even after the increase in agricultural imports associated with the OFFP (Figure 5).

Figure 5. Iraq Imports of Key Agricultural Commodities as a Share of Total Consumption, Annual Averages for 1985-1989 and 2000-2003



Source: FAOSTAT, FAO, United Nations; and PSD database, FAS, USDA, March 2003.

[61] U.S. General Accounting Office. *Iraq's Participation in U.S. Agricultural Export Programs*, NSIAD-91-76, November 1990, p. 2.

Gulf War Damage Difficult to Assess. Anecdotal evidence suggests that the short, but costly 1991 Gulf War resulted in significant damage to much of the country's infrastructure including telecommunications, transportation, and irrigation, all vital to Iraq's agricultural production and marketing system. However, it is difficult to evaluate the extent or severity of the damage.

In addition to the infrastructure damage, Iraq suffered a substantial loss of agricultural labor in the aftermath of the 1991 Gulf War. According to U.S. Census Bureau data, in 1991 Iraq experienced a 3.7% decline in total population (i.e., 1990 total population plus births and in-migration minus deaths and out-migration produced a net decline of an estimated 663,000 persons). Much of this decline was attributable to an exodus of refugees fleeing potential political or ethnic persecution. However, the exodus also likely included a substantial number of foreign guest workers from the agricultural sector.[62] Both infrastructure damage and loss of guest agricultural labor likely diminished Iraq's agricultural productivity during the years following the war.

Agricultural Sector Returns to State Control in the Center-South. Under the terms of Iraq's military defeat, the country was effectively partitioned into two distinct entities — three northern governorates (Erbil, Dohuk, and Sulaimaniyah) and the remaining fifteen governorates of central and southern Iraq (Figure 3). As a result of the partition, the central government's control over agricultural policy was limited to the 15 southern governorates. Unless specifically indicated, the following discussion refers to the central government's agricultural policies within its south-central zone of control.[63]

During the first year following the implementation of U.N. economic sanctions against Iraq in August 1990, the central government took several steps to increase both production and control of domestic food within its zone of control. First, it monopolized the marketing of all grain and oilseed crops in Iraq. Intervention in other crops (mostly vegetables) was limited to price controls. In addition, the government announced the introduction of a system of rationing of basic foodstuffs.

Food-Ration System Avoids Starvation. In light of Iraq's substantial dependence on trade for meeting domestic food needs by 1989, the sharp slow-down in agricultural imports under international sanctions placed the country's consumers in a precarious position. In an attempt to meet food security needs, the government introduced a food-ration system for basic food items. The system involved procuring strategic food crops from domestic producers at fixed prices, then selling them to consumers at much lower prices. The initial monthly allotment of the food-ration basket of goods included wheat flour (7 kilograms), rice (1.5 kg), vegetable oil (0.75 kg), sugar (0.5 kg), tea (0.1 kg), and some other non-food items. The basket of goods changed over time, and was substantially increased after larger food imports began in 1997 under the Oil-for-Food program.

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[62] U.S. Bureau of the Census, International Data Base (IDB), Iraq, Oct. 10, 2002.

[63] A later section, "Agricultural Situation in Northern Iraq: 1991-2002," describes the agricultural sector in the 3 governorates of Kurdish-controlled northern Iraq during the post-Gulf War period.

The food-ration system had three important features: it was based primarily on Iraq's domestic grain production; it was made available on a monthly basis to all individuals; and it was sold at only a fraction (3 to 5%) of its market value.[64] Consumer survey data from the 1992-96 period suggests the food ration was equitably available to all individuals irrespective of ethnic identity.[65] As a result, the basic food entitlement of all sections of the Iraqi population was protected by the ration system from falling below the point where mass starvation could have occurred.[66]

The value of a food basket was calculated on the basis of an adult ration valued at the average monthly market price of each commodity. As a result, its price varied with market conditions which, in turn, were highly dependent on domestic food production. In August 1991, shortly after the startup of the food ration program, an adult food basket cost 217 Iraqi Dinar (ID) at market prices, while the nominal purchase fee charged individual consumers was 11.1 ID (or about 5% of the market value). In May 1996, several months prior to the arrival of food imports under the OFFP, the market price for an adult food basket had climbed to over 19,000 Iraqi Dinar (ID), due in large part to significant domestic inflation, while the assessed fee was 600 ID (or about 3.2% of the market value).

Under the food-ration system, black market prices for food products rose substantially. Although government control was intended to keep food prices in check, the basic food ration was insufficient to fully meet individual daily calorie needs — the initial ration basket only covered an estimated one-third of daily food-energy needs.[67] As a result, consumers turned to other sources for the remainder of their calories. With domestic demand in excess of domestic food supplies, internal commodity prices rose quickly. Prices of a wide range of foods outside the rationing system, including meat, eggs, and dairy produce, exceeded the budget of the average Iraqi worker.

Field Crop Production Rises Initially Under State Control. In an attempt to expand planted area and boost agricultural production, the government launched a national agricultural campaign on 12 April 1991, involving new incentives for farmers, priority allocation of fuel and machinery, and the creation of a special committee to supervise the 1991 harvest and to maintain the state's monopoly of food sales.

As part of the new program the official purchase prices of major field crops were raised. In addition, the government also imposed several rules to reinforce its newly established monopoly over grain production and to ensure adequate supplies for the food-ration system. First, the government made it compulsory for cereal

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[64] Gazdar, Haris, and Athar Hussain, "Crises and Response: A Study of the Impact of Economic Sanctions in Iraq" Short- and Medium-term Options," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor, Ithaca Press, copyright©Kamil Mahdi, 2002, pp. 31-83.

[65] Ibid., p. 56-57.

[66] Ibid., p. 59.

[67] Ahmad (2002), p. 194

farmers to deliver their output to state collection centers within two weeks of harvesting. Furthermore, each farmer was obligated to supply a minimum quota based on an assessed crop area and an assigned yield. A farmer who failed to meet the quota had to purchase the shortfall from the market and supply it to the procurement agency. As a further penalty, the government took emergency steps to confiscate land from farmers who failed to fulfill production quotas. Finally, the government introduced the death penalty for hoarding of cereals.

Iraqi farmers responded to the mix of government and market incentives by expanding cropped area to include marginal pastureland and fragile hillsides. Cropped area expanded each year from 1991 through 1993. By 1993, Iraq's cereal harvested area hit a record 4.6 million hectares, 94 percent above the average cereal harvested area of 2.4 million hectares during 1985-89 (Table 4). However, the record area was not sustainable due to serious degradation of soil fertility on marginal rain-fed lands and increasing salinization in irrigated areas. By 1997 cereal harvested area had declined to 2.8 million hectares.

Iraq's Date Industry Focuses on Domestic Market. Iraq's date industry was reportedly heavily dependent on foreign workers and expertise, and suffered from their departure following the imposition of U.N. sanctions and the subsequent 1991 Gulf War.[68] In addition, palm tree populations were significantly damaged by war-related activity.[69]

However, anecdotal evidence suggests that the eventual economic downturn and widespread loss of jobs that occurred in the decade following the 1991 Gulf War, coupled with escalating food costs, particularly in urban centers, led to some urban-to-rural migration and a rebound in the rural labor force available for agricultural production. Iraq's date industry appears to have benefitted from these agricultural labor force dynamics. Although palm tree numbers declined sharply in 1991, FAO data indicate that rising productivity more than made up for lower tree populations (Table 6). From 1990 to 2002, date yields per hectare averaged about 20% above the 1985-89 level, while date production averaged almost 622,000 tons per year — 57% above the 1985-89 average. The dramatic rise in production for the date industry, while most other agricultural sectors were in decline, suggests that market incentives for date production remained strong relative to other agricultural activities. The sharp drop off in Iraq's sugar imports, particularly on a per capita basis, likely enhanced the value of dates as a sugar substitute in domestic markets and made them an attractive cash crop for producers (refer to sugar availability and importation data in Tables 13 and 16).

However, the international embargo had essentially cut off Iraq's official exports of dates. Despite an important outflow of dates through Iran and Turkey, average annual exports declined to only 54,000 tons or $10.2 million during the 1990s compared with about 200,000 tons during the previous two decades. In the

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[68] IPR Strategic Business Information Database, "Iraq: 9 Million Palm Trees Lost in Wars," December 13, 2000; copyright©Info-Prod (Middle East) Ltd., 2000.

[69] Agence France Presse, "War, embargo take their toll on Iraq's palm trees," Baghdad, Iraq, December 4, 1994; copyright©Agence France Presse 1994.

absence of Iraqi data exports, several other date exporting countries expanded their production and captured Iraq's lost market share. Tunisia is reportedly the world's leading date exporter followed by Pakistan and Iran.[70] Iraq's market share may prove difficult to recapture.[71]

Implicit Tax on Agriculture and Inherently Poor Incentives. To help finance the growing gap between rising market prices and the low fee charged for the food ration that developed through the mid-1990s, the government kept the rate of growth of procurement prices substantially below the growth of market prices. This implicit tax on agricultural producers was estimated to range between 20 to 35% of the value of production for various commodities in 1996.[72] The implicit tax provided a strong incentive for farmers to under-report cropped area. To minimize this problem the government linked its supply of subsidized agricultural inputs to reported cropped area.

As a result, Iraq's agricultural sector faced a highly distorted system of incentives that included subsidized agricultural inputs, mandatory production quotas, and an implicit tax on the sale of that production. The net subsidy-tax balance appears to have become increasingly negative over time. The balance was finally tipped against agricultural productivity in the mid-1990s due to increasing shortages of agricultural inputs.

Agricultural Input Availability Plummets. Iraq's fertilizer industry declined severely during the 1990s due to rising natural gas and energy prices, and a general lack of spare parts for production and maintenance of machinery. Total fertilizer production dropped from a high of 870,900 metric tons in 1989 to 125,000 tons in 1991 — an 86% decline in two years. Production averaged 325,000 tons through the rest of the decade (Table 7). Fertilizer use also dropped sharply early in this period declining from an estimated use rate of 89.5 kg/ha in 1989 to 33.8 kg/ha in1991.

As a result of the U.N. embargo, Iraqi fertilizer exports stopped in 1991 after having peaked at 530,100 tons in 1989. During 1985-89, net fertilizer exports averaged almost 250,000 tons annually. In the first half of 1990, prior to the international embargo, Iraq undertook 232,000 tons of net exports. After 1990, Iraq became a net importer of all fertilizers (including nitrogen).

The embargo dictated an inward focus for the fertilizer industry. By 1994 domestic production had recovered somewhat at over 300,000 tons. Fertilizer usage

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[70] Agence France Presse, "Iraqi date trade, pride of the nation, reeling under U.N. sanctions," Basra, Iraq, February 11, 2003; copyright©Agence France Presse 2003.

[71] The problem for dates is even more acute than simply reclaiming lost market share. Demand for dates in international markets is likely quite inelastic — i.e., not very price responsive. Therefore, any significant increase in supplies of dates on international markets is likely to lead to substantially greater declines in the international market price.

[72] Gazdar and Hussain (2002), p. 62.

rates began to rise dramatically hitting a record 97 kg/ha in 1997. By 2000, the reported fertilizer usage rate had climbed to 123 kg/ha.[73]

Comprehensive data are not available concerning Iraq's production or imports of agricultural chemicals such as fungicides, herbicides, and insecticides. However, the available FAO data on pesticide imports reveal that Iraq's imports of agricultural pesticides declined from an average annual import value of $11.8 million during 1985-89 to an estimated $5 million since 1990 — a 58% drop. Agricultural chemicals are often highly critical to the productivity of many vegetable and fruit crops.

Irrigation Support Lessened. Anecdotal evidence suggests that Iraq's irrigation infrastructure suffered significant damage during the 1991 Gulf War. However, as with other war damage concerns, little documentation is available to support claims or provide evidence. At any rate, given the importance of the country's irrigation infrastructure to the agricultural sector and national food security, it is likely that the government engaged in rebuilding the damaged canals deemed most essential to agricultural production.

In the absence of oil revenues, subsidies for irrigation water and canal maintenance were becoming a serious drain on the government budget. In 1995, the government raised water charges on irrigated land and shifted the burden of canal maintenance to growers who were obligated to maintain their on-farm drainage networks. If the farmer failed to do so, the government would undertake the work at the farmers expense.[74] However, this system does not appear to have been effective.

The encroaching drought of 1999-2001 (see section "Middle East drought of 1999-2001") meant reduced waterflows through the canal system, and made cleaning and maintenance to improve the flow of existing water all the more critical. If left alone, the rivers, streams, and canals that feed Iraq's irrigation network quickly clog with various sediments, herbs, straw, and papyrus. The government Irrigation Ministry complained of unfulfilled international contracts (negotiated prior to the Gulf War) to import irrigation equipment, pumps, and spare parts for the country's dilapidated fleet of old canal dredgers.[75] By the late 1990s, news reports indicated that widespread salinity had spread across much of the irrigated fields of central and southern Iraq, and that Iraq's agricultural productive capacity was being eroded.[76] Once severe salinization has occurred in soil, the rehabilitation process may take

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[73] These data should be viewed with caution. Although they are from FAOSTAT, they reflect the data officially reported by the Iraqi government to the FAO. Rising usage rates may be more a reflection of declining area to which fertilizer is applied, rather than increasing widespread availability.

[74] Ahmad (2002), p. 191.

[75] British Broadcasting Corporation (BBC), BBC Monitoring Middle East, "Iraq: Irrigation Ministry Official Says Current Drought Worst Since 1920s," June 8, 1999; Copyright©1999 BBC.

[76] *The Economist*, "Digging for defeat: Iraq," May 2, 1998, Vol. 348, No. 8066, p.44.

several years according to FAO officials.[77] The extent of salinization damage is uncertain; however, FAO has initiated rehabilitation efforts under the Oil-for-Food program.

Crop Productivity Declines. By the mid-1990s, agricultural productivity was becoming severely hampered by the over-exploitation of resources and the decline of essential inputs. Continuous cropping rather than the routine cereal/fallow rotation resulted in rapidly depleting soil fertility. In addition, government input subsidies were gradually reduced under severe macroeconomic pressures including budgetary shortfalls, rampant inflation, and a rapidly depreciating currency. By 1998, government distribution of high-yielding seeds and subsidized credit had ended and the state-run veterinary clinic had closed.

Strict price controls in an environment of both rapid inflation and a rapidly depreciating currency resulted in declining terms of trade for agriculture. Although the official purchase prices for most commodities were continually being raised, they did not rise as fast as the currency (the Iraqi dinar) depreciated in international exchange markets. This meant that the value of imported inputs such as pesticides and farm machinery was rising faster than the value of the crop being produced. As a result, any reliance upon imported inputs purchased at black market (unofficial) prices meant that producer returns were being squeezed. In the end, producers were discouraged from using the expensive imported inputs and productivity declined. The problem was compounded by the inability to import most chemicals used for production of fertilizers, herbicides, and pesticides, and spare parts for all manner of machinery — crop dusters, tractors, irrigation pumps, etc. — that might have some military purpose.

Livestock Output Declines. Iraq's livestock sector experienced a sharp decline during the first year following the 1991 Gulf War, due primarily to a nearly complete cut off of feed grains. In 1989, over 1.2 million tons of feed grains were imported by Iraq. Feed grain imports ceased during the first three years of sanctions, and only restarted in a significant manner in 2000 (Table 14). In addition, domestic supplies available for feed use declined as barley and corn production which had previously been used as animal feed was re-designated for human consumption. Under most circumstances, ruminants can rely partially or totally on grazing when feed grain supplies are unavailable. However, much of the area expansion that cereal planting experienced in Iraq during the 1991-93 period involved cultivating marginal rangeland. The smaller amount of rangeland could not support the same number of animals as before.

As a result of the loss of rangeland and the cut-off of feed grain imports, all of Iraq's livestock sectors underwent severe liquidation in 1991 (Table 4). Cattle inventories declined 34% in 1991. Small ruminant populations fell by over 38%. Draft animal populations — buffaloes, horses, mules and donkeys — declined by nearly 24%. Iraq's poultry industry, which had experienced very rapid growth the previous three decades, nearly disappeared in the 1991 liquidation. Unlike ruminants, commercial poultry operations depend almost totally on feed grains and

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[77] Ibid.

protein meals. As a result, the import cutoff of feedstuffs had the most severe impact among the livestock species on Iraq's poultry sector. Iraq's poultry inventories declined from an estimated 105 million birds in 1989 to only 3.6 million in 1991. The 1991 liquidation of the poultry inventory represented a major setback for poultry consumption, dropping the daily calorie per capita of poultry meat from over 55 in the 1989 to less than 4 in 1991.

Livestock populations were further hurt by the lack of veterinary medicines to combat routine parasites and diseases. An epidemic of screw worms broke out in 1997 that decimated cattle populations, and Foot-and-Mouth Disease (FMD) started to spread among livestock populations a year later.[78]

Middle East Drought of 1999-2001. Iraq's failing agricultural productivity and growing trade dependence was further aggravated by a severe drought that persisted throughout much of the Middle East from 1999 through 2001. U.N. personnel described the drought as the "most severe drought that has ever struck Iraq."[79] Cereal production in Iraq's rain-dependent northern zone was particularly hard it, but even the irrigated production of the center-south region suffered from diminished water availability (down to 43% of normal levels). Shortage of fodder resulted in forced slaughter of sheep, and compounded the impact of the FMD outbreak that had started in 1998. An estimated one million head of livestock died due to a lack of medicines.[80]

As a result of the drought, Iraq's annual cereal production per capita plummeted from its already low 1999-level of 77 kilograms to 39 by 2000 (Table 9).[81] U.N. nutritional programs administered through the U.N. Children's Fund (UNICEF) and the World Food Program (WFP) played a key role in sustaining vulnerable segments of the Iraqi population, particularly infants and pregnant or lactating women during the late 1990s.

Increasing Malnutrition Sparks International Concern

Prior to the start of food imports under the Oil-For-Food Program in 1997, a basic food ration in south-central Iraq comprised an estimated 1,200 calories per day.[82] This amount was far short of the recommended level of 2,000 to 3,000

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[78] Ibid., p. 44.

[79] United Nations Development Program (UNDP), Iraq Country Office, 1999-2000 Report, June 2000, p. 8.

[80] Ibid.

[81] USDA, PSD database, April 2003. Note that during 1960-69 annual cereal production per capita averaged 249 kilograms (kg). This fell to 177 kg/capita/year in the 1970s, and 130 in the 1980s, but had regained ground to 155 during the 1990-94 period.

[82] U.N. Office of the Iraq Program, Oil-for-Food, Fact Sheet; [http://www.un.org/depts/oip/background/fact-sheet.html]

calories per day for an individual.[83] Families were expected to fend for themselves in the marketplace for calorie supplements to the basic ration. However, the decline in domestic agricultural productivity observed through the 1990s resulted in falling food availability and rising prices, and was accompanied by reports of a rise in malnutrition, particularly in south-central Iraq.

The extent of this problem was later confirmed when UNICEF and the Government of Iraq, in August 1999, released the results of a survey on child mortality — the first since 1991. The survey showed that in the Baghdad-controlled Center-South, under-five child mortality had risen sharply from 56 deaths per 1,000 live births in the 1984-89 period, to 91.5 for 1989-94 and to 130.6 during 1994-99.[84] In the Kurdish-controlled northern region, the under-five mortality showed a very different pattern. It was much higher in 1984-89 and the rise to 90 per 1,000 in 1989-94 was less dramatic. More importantly, and in sharp contrast to the rest of the country, the rate had fallen to 72 per 1,000 during 1994-99, 45% lower than the Center-South's mortality rate.

The Iraqi government used the results of the UNICEF report to claim that the increased malnutrition in the Center-South was due to the international sanctions without taking any responsibility for its own role. In contrast, the U.S. State Department claimed that the decline in mortality rates made in northern Iraq during the 1990s compared with the pre-Gulf War levels demonstrated how proper implementation of the OFFP could meet humanitarian needs.[85] U.S. officials also pointed out the reluctance of the Iraqi government to implement measures to target special assistance to vulnerable groups — a tactic advocated by U.N. agencies for several years. However, UNICEF dismissed the idea that the difference between pre-Gulf War and post-Gulf War child mortality rates was attributable to the differing implementation of the OFFP. UNICEF claimed that since food imports under the OFFP did not begin until March 1997, they would have had little influence on the statistical mortality indicators for the 1994-99 period reported in its survey.[86]

U.N. Resolution 986 Initiates the Oil-For-Food Program. In response to the mounting humanitarian crisis in Iraq, the U.N. Security Council adopted (and the Iraqi government agreed to) Resolution 986 on April 14, 1995, to establish the OFFP.[87] Under the OFFP, Iraq could sell oil to finance the purchase of humanitarian

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[83] Individual calorie needs vary with age, sex, activity level, and a number of other factors. World Health Organization (WHO), *Energy and protein requirements*, Technical report Series 724, report of a joint FAO/WHO/UNU expert consultation, Geneva, 1985, pp. 76-78.

[84] Graham-Brown, Sarah. "Humanitarian Needs and International Assistance in Iraq after the Gulf War," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2002, p.283.

[85] For a discussion of the targeted nutrition program in northern Iraq see the discussion below under "Nutritional Status Improves," or see WFP, Office of the Iraq Program, Oil-for-Food, Background brief — Nutrition; [http://www.un.org/depts/oip/sector-nutrition.html]

[86] Ibid., p. 283-4.

[87] The Iraqi government had refused to agree to an earlier offer by the U.N. Security (continued...)

goods and various mandated U.N. activities concerning Iraq. OFFP implementation did not begin until December 1996 and the first OFFP-funded food shipments did not arrive until March 1997. The increased food imports under OFFP, allowed the government to gradually expand the calorie content of the food ration to an average of 1,993 kilocalories and 43 grams of protein per person per day by mid-1999.[88] By mid-2002, the nutritional value of the monthly food basket had risen to about 2,200 calories per person per day.

Once food imports started under the OFFP, compulsory procurement of cereal production was ended by the central government and market prices were subject to strong competition from imports.[89] As a result, domestic food prices softened. In addition, Iraq's currency strengthened substantially after oil exports resumed, but remained highly variable.[90] Between May 1996 and October 2002, the market-based value of an adult food basket tracked downward from over 19,000 Iraqi Dinar (ID) to under 7,000 ID.[91] The nominal fee charged for an adult food basket also varied over time, but was reported by the WFP to be 250 ID in June 2003.[92]

Food Imports Accelerate Under the OFFP. Initially humanitarian imports under the OFFP focused on acquiring food and health-related goods. From the arrival of the first food shipments in March 1997 through December 2002, roughly $10.8 billion of food was imported under the OFFP.[93] In the first year of the OFFP, the value of agricultural imports jumped to $1.370 billion in 1997 from $922 million a year earlier — an increase of nearly 49% — as oil revenues generated under the OFFP facilitated an increase in Iraq's international purchases (Table 11). The import volume of wheat — Iraq's principal food import — showed an even greater increase (over 62%) surging to nearly 2.5 million metric tons (mt) in the 1997-98

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[87] (...continued)
Council to establish a similar OFFP (Resolution 706; Aug. 15, 1991). For more information on the U.N. Oil-For-Food Program and trade during the decade of the 1990s see CRS Report RL30472, *Iraq: Oil-For-Food Program, International Sanctions, and Illicit Trade*.

[88] U.N. Office of the Iraq Program, Oil-for-Food, Fact Sheet.

[89] Kamil Mahdi (2002b), p. 338.

[90] The official exchange rate has been fixed at U.S. $1 = 0.311 ID since 1983. However, this official rate bears no relationship with the currency's true value. The black market rate has shown considerable variation over the past decade, often in relation to the U.N. sanctions status and international petroleum prices. During 1996 the dinar rose from its lowest value of ID3,000 per U.S. dollar to ID1,000, reportedly in anticipation of the adoption and implementation of the OFFP. [Ahmad (2002), p.174.] In March 2003, the black market rate was estimated to be U.S. $1 = 2,700 ID. [*The Economist*, Economist Intelligence Unit, Country Report: Iraq, April 2003 Updater.]

[91] According to Gazdar and Hussain (2002; p.49), the food basket's market value was 19,048 ID in May 1996. The food basket's value temporarily hit a low of 5,866 ID in June 2002 as cited in U.N., Office of the Iraq Program, "The Humanitarian Program in Iraq Pursuant to Security Council Resolution 986 (1995)," 12 November 2002, p. 13.

[92] WFP, Emergency Report No. 26, Iraq section, paragraph (c), June 27, 2003.

[93] U.N. Office of the Iraq Program, Oil-for-Food, Humanitarian Imports, "Status of ESB account on 31 Dec. 2002."[http://www.un.org/depts/oip/background/basicfigures2.html].

July-June international marketing year (Table 13). The food imports were supplemented by over $2 billion spent on improving or rehabilitating the food distribution system, and over $2.1 billion spent on medicines and other health-related materials.

Nutritional Status Improves. By 2000, malnutrition rates showed signs of abating throughout the country. The prevalence of underweight children had fallen from 23.4% in 1996 to 19.6% in 2000; chronic malnutrition (stunting) from 32% in 1996 to 30%; and acute malnutrition (low weight-for-height) from 11% to 7.8%.[94] By 2002, further nutritional improvements were reported by UNICEF survey data.[95] In the 15 central and southern governorates malnutrition rates for children under the age of five were half those of 1996. The number of underweight children had fallen to 10%; chronic malnutrition to 24%; and acute malnutrition to 5.4%. Similarly, in the 3 northern governorates malnutrition rates for 2002 were reported down sharply from 1996 rates: acute malnutrition was 20% lower, chronic malnutrition was 56% lower, and acute malnutrition was 44% lower.[96]

Advocacy efforts by UNICEF and the WFP reportedly helped convince the Ministry of Trade and Industry (the government agency in control of imports) to fortify wheat flour with iron, and locally produced salt with potassium iodate, to counter micronutrient deficiencies.[97] UNICEF and the WFP attribute the nutritional gains in the Kurdish-controlled northern governorates to combining a targeted nutrition program with food rations under the OFFP. The targeted nutrition program, which started in 1998, provided supplementary rations to an average of 75,000 people in the three northern governorates, including malnourished children and their families, pregnant women and nursing mothers, hospital in-patients, residents in social institutions, and children in nurseries. It also supplied high-energy biscuits to 350,000 primary school children in rural areas to supplement their micronutrient needs.

OFFP Reorients Focus to Rehabilitation. After higher food import levels had been achieved, the OFFP gradually expanded to include infrastructure rehabilitation and development, improvements to agricultural productivity, and projects addressing household food security. Between March 1997 and December 2002, just under half of the $24.9 billion outlay under the OFFP was for goods and services directed at meeting rehabilitation needs other than food and medicines. Nearly $2.2 billion was directed to a variety of activities intended to improve agricultural productivity.

According to the WFP, improvements to infrastructure in the food and agriculture sectors included the installation of cleaning, handling and fumigation

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[94] WFP, Office of the Iraq Program, Oil-for-Food, Background brief — Nutrition.

[95] Preliminary, unpublished findings of a 2002 U.N. survey of children under the age of five. WFP, Office of the Iraq Program, Oil-for-Food, Background brief — Food Basket; [http://www.un.org/depts/oip/food-facts.html].

[96] Ibid.

[97] WFP, Office of the Iraq Program, Oil-for-Food, Background brief — Nutrition.

equipment in grain silos to reduce storage and handling losses; the installation of generators and the maintenance and repair of flour mills; improvements to the port of Um Qasr to facilitate unloading of cargo; and some railway rehabilitation and expansion. Household food security projects generally targeted female-headed households and included distributing small ruminant livestock and beekeeping for honey production.

According to the WFP, support for agricultural productivity under the OFFP provided direct assistance to about 374,000 farmers during its initial phases, including the provision of agricultural machinery, seeds, agro-chemicals, veterinary supplies, and poultry feed. OFFP funds also supported the establishment of reforestation nurseries in the 3 northern governorates. In addition, program funds supported irrigation rehabilitation and development including canal cleaning, new canal construction, and lining earth irrigation and drainage canals. OFFP funds were used to purchase irrigation pumps, equipment for drilling wells, equipment for operation and maintenance of irrigation projects as well as necessary spare parts. WFP reported that these activities resulted in significant land recovery and improved irrigation water flows.

By 2002, the decline in agricultural productivity had been reversed — probably due mostly to improved rainfall patterns — although cereal yields remained well below historical yields (Table 4). Iraq's primary agricultural production zones were still recovering from the prolonged drought of 1999-2001, and the region remained vulnerable to recurrence of below normal rainfall. Soil moisture reserves had been badly depleted and water flow levels in the Tigris and Euphrates rivers and their tributaries were still inadequate for full use of Iraq's irrigation potential. A return to normal weather patterns in 2003 and beyond remained critical for domestic cereal production in Iraq.

Agricultural Situation in Northern Iraq: 1991-2002[98]

De Facto Independence. Several events occurred in 1991 that resulted in *de facto* independence from the rest of the country for the three northern governorates of Erbil, Dohuk, and Sulaimaniyah (Figure 3), referred to as Kurdish-controlled northern Iraq. Shortly after President George H. W. Bush announced a cease-fire on February 28, 1991, ending the Gulf War ground offensive, regional uprisings against Baghdad's control emerged in northern and southern Iraq. These uprisings were brutally suppressed by the central government and a major refugee crisis emerged along the Turkish and Iranian borders. On April 5, 1991, the United Nations Security Council adopted Resolution 688 which demanded that Iraq immediately end repression of its civilian population.[99] President Bush ordered the U.S. European Command to assist Kurds and other refugees in the mountains of northern Iraq. On April 10, 1991, U.S. officials warned Iraq not to interfere with relief operations.[100] No Iraqi planes were to fly north of the 36th parallel, thereby establishing the northern "no-fly" zone.

The Kurdish-controlled region's *de facto* independence was further expanded in October 1991, when peace talks between the Kurdish parties and Baghdad collapsed, and all central government security personnel and civil servants were withdrawn. On October 23, 1991, Baghdad imposed an economic blockade on the Kurdish-controlled area. The shipment of food rations by the central government to northern Iraq was cut in half and further reduced in 1992 when medicines were included in the U.N. embargo. In July 1992, delivery of subsidized petroleum products stopped altogether. These cut-offs made illegal trade between the Baghdad-controlled Center-South and the Kurdish-controlled North more profitable and substantial smuggling of goods between the two regions is reported to have developed.

Large Humanitarian Relief Operation Directed to Northern Iraq. In the spring of 1991, the population in the Kurdish-controlled area was estimated in excess of 3 million, and included many displaced persons and refugees lacking both food and shelter. The looming humanitarian crisis was worsened by the poor state of the region's infrastructure which had reportedly been badly damaged over the years by Iraqi government policies, and during the Gulf War by allied bombing.

In April 1991, the U.N. signed a Memorandum of Understanding with the Iraqi government for carrying out a relief operation in Iraq as a whole. The U.N. directed a disproportionate amount of its humanitarian effort towards the Kurdish region, in large part to provide relief from the blockade on foodstuffs and petrol. Ultimately,

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[98] Most of the information in this section relevant to the agricultural sector of northern Iraq (unless otherwise indicated) is from Leezenberg's chapter "Refugee Camp or Free Trade Zone? The Economy of Iraqi Kurdistan since 1991," from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2002, pp. 289-319.

[99] UN Security Council, Resolutions: [http://www.un.org/Docs/sc/unsc_resolutions.html]

[100] U.S. Department of Defense (DOD), European Command, Operation Norther Watch, Chronology of Significant Events. [http://www.defendamerica.mil/iraq/iraq_nofly.html]

humanitarian aid organizations resorted to buying petrol products and foodstuffs for the North from the Baghdad-controlled central government. The international relief effort directed towards northern Iraq that evolved over the following years would eventually assume such a scale that it suppressed agricultural incentives in the region.

As part of the central government's economic blockade on northern Iraq, assets of the regional branches of all Iraqi banks were frozen, thereby paralyzing the entire banking system in the North. What little formal banking services that existed were largely taken over by foreign Non-Governmental Organizations (NGOs) and the local black market became the main locus for monetary transactions. Foreign aid agencies and expatriate Kurds sent substantial flows of money through this informal NGO banking system. The limited banking system inhibited agricultural investment flows.

The two main Kurdish factions — the Kurdistan Democratic Party (KDP) and the Patriotic Union of Kurdistan (PUK) — initially attempted to coordinate their efforts at governing the region, but this devolved into internecine fights by May 1994. In 1996, the two factions had established separate governments in the areas under their control. The regional governments had very restricted budgets and lacked trained personnel. The resulting state of affairs in Iraqi Kurdistan was a market economy essentially left alone by a very weak governing structure, but heavily influenced by substantial international humanitarian aid flows.

Free Market Agriculture? The agricultural policy environment in Kurdish-controlled northern Iraq was very different from policy in the regions under the control of the central government. Agricultural production was primarily in response to market signals, and farmers were not obliged to sell their crops to government authorities. There was no government intervention in cereal and oilseed production and no provision of subsidized agricultural inputs by the government.

Prior to the startup of food imports under the OFFP, shortages of foodstuffs and agricultural inputs existed in northern Iraq as in the rest of the country. However, observed market prices for most goods were lower in the North suggesting that the large influx of food aid was meeting a substantial portion of local demand, and that some trade was probably occurring with outside regions through Turkey and Iran. Trade in agricultural products within the northern zone was generally free and substantial trade is reported to have occurred with the Baghdad-controlled south-central region. Both sides gained from this trade as cheap oil was exported by the central government in order to import northern wheat at half of international prices.[101] In addition, the authorities in the North used the trade as a revenue source by imposing certain local taxes on wheat exported out of the region.

The bulk of the reconstruction efforts by foreign NGOs working in the North was directed towards rural villages and the agricultural sector. However, significant problems existed in the agricultural production zones of northern Iraq. Due to high petrol costs and the absence of adequate transportation infrastructure, it was often unprofitable to bring locally-grown goods to the local markets. In addition, lack of both infrastructure and security prevented agricultural laborers from returning to

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[101] Ahmad (2002), p. 187.

isolated rural areas to resume farming. Only 43% of arable land was reportedly under cultivation in northern Iraq in 1992, whereas the total cultivated area of Iraq as a whole had expanded sharply in that year.[102]

Land conflicts also emerged as a major impediment to increased agricultural production. As refugees and formerly deported peasants returned to an "independent" northern Iraq, many farmers found that their villages and land had been seized by neighboring tribes or local landowners that had remained loyal to the central government. In most cases the landowners, many with tribal backing, emerged victorious. In addition, the prevalence of large-scale mechanized commercial farming in the North strengthened the position of the landowning elite. The regional government was too weak to implement a new land-redistribution law. Instead, rival Kurdish parties sought alliances with the influential landowners, thereby giving the landowners opportunities to assert greater control over their land holdings.

Despite *de facto* independence from the central government, the Kurdish-controlled region's food production and supply remained strongly influenced by conditions in the Center-South, particularly U.N. sanctions and the cut-off of oil revenues and critical imports.

Agricultural productivity in northern Iraq suffered from lack of pesticides and fertilizers under the economic blockade by the central government. The lack of petrol forced many villagers to search more widely for firewood, thereby accelerating an already acute deforestation problem with all of its negative implications for erosion, soil fertility and local watersheds. A localized drought struck northern Iraq in 1996 and 1997 badly affecting the harvests.

The Oil-for-Food Program in the North. With the implementation of the OFFP, the central government once again regained a considerable degree of its former economic influence over northern Iraq. Although the physical distribution of food rations within Kurdish-controlled northern Iraq was handled entirely by U.N. workers, the principal storage points were in Baghdad-controlled territory. From the OFFP inception until February 21, 2003, about $4 billion of civilian goods were delivered into Kurdish-controlled northern Iraq compared with goods worth $24.4 billion delivered to the rest of Iraq.[103] In addition, about $600 million in locally produced goods and contracts were acquired in the North during that period.[104]

According to a report from the U.N. Secretary General to the U.N. Security Council, dated November 12, 2002, no food shortages were reported in any of the 3 Kurdish governorates. This is consistent with press reports and observed market price behavior, all of which suggest that food had become relatively abundant in Kurdish-controlled regions, to the detriment of local agricultural production. Thus, while the OFFP is view by international aid workers as having considerably relieved

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[102] Leezenberg (2002), p., 303.

[103] CRS Report RL30472, p. 3.

[104] Ibid., p. 5.

suffering in the Kurdish-controlled North, it was little short of a disaster for the agricultural sector.[105] Producers from northern Iraq were often left to smuggle their harvest into Iran in an attempt at obtaining higher prices.

In the aftermath of the spring 1991 uprising, an increasing number of reports emerged of predatory acts against infrastructure materials and other state-related resources, and against the civilian population.[106] These predatory acts appeared to intensify following the security breakdown that occurred in 1994 when the two principal Kurdish factions engaged in armed combat. Favorite items for predation included electricity cables, agricultural and irrigation machinery, and cars. Some groups closely following events in Kurdish Iraq expressed fears that the "predatory" economy would become institutionalized by small groups of individuals, backed by force of arms, while the bulk of the population remained poor, weak, and dependent on external support.

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[105] Leezenberg (2002), p. 314.

[106] Ibid., p. 311.

Outlook and Issues for Iraq's Agricultural Production and Trade

Growing Importance of Food Imports. Food imports under the OFFP made Iraq's trade dependence nearly complete for many basic foodstuffs. According to the WFP, by early 2003 nearly 60 percent of Iraq's population was totally dependent on food rations sustained in large part by OFFP imports. For cereals, the major staple, nearly 80% of all consumption during the 2000-02 period came from imported grain (Table 9).

Furthermore, the country's long-run food deficit still confronts the perennial problem of a population growth rate that has continued to exceed growth in agricultural productivity. Iraq's population growth rate has showed some signs of slowing[107] — it grew at an annual rate of about 2.3% from 1995 to 2000, down dramatically from the pre-1990 rate of 3.3% (Table 1), but domestic cereal production actually declined during the 1990s.

Despite its recent poor performance, Iraq's agricultural production potential has likely been clouded by several factors that occurred in the period leading up to the Iraq War of 2003. Together these factors have tended to understate Iraq's agricultural potential.

- First, Iraq was only beginning to emerge from a three-year drought that devastated agricultural production in much of the Middle East during 1999-2001.

- Second, a growing dependence since early 1997 on the U.N. OFFP for basic foodstuffs exaggerated Iraq's dependence on food imports and understated its ability to feed itself.

- Third, the low agricultural productivity of the previous two decades was exacerbated by the central government's focusing of resources and productive capacity on its military sector. Agricultural productivity suffered from limited investment and resources, shortages of inputs, deteriorating irrigation infrastructure, and increasing soil salinity.

- Fourth, for most of the previous 30 years, production and investment decisions in Iraq's agricultural sector were subject to a maze of often contradictory policy signals (including explicit input subsidies and implicit output taxes) that likely resulted in significantly less than optimal cropping patterns and levels of investment.

- Fifth, serious land ownership and water rights issues contributed to the degradation of Iraq's agricultural resource base. Widespread control of land and water based on cronyism and tribal connections are reported to have encouraged over-exploitation of land and water

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[107] World Bank, WDI 2003.

> resources for short-run profits, rather than encouraging investments in the long-run productivity of the soil and its supporting irrigation network.[108]

Problems Remain for Agricultural Productivity in Iraq. In the post-2003-Iraq-War environment, national issues such as political stability and internal security will likely have to be addressed, before sector-specific problems can be tackled in a systematic manner. The agricultural sector confronts enormous challenges to investment and growth. Settlement of unresolved land and water rights issues, renovation of Iraq's irrigation infrastructure, development of a coordinated national program of de-salinization, as well as the rebuilding of infrastructure for handling, storing, and distributing agricultural inputs and outputs will all likely be needed to fully restore producer and investor confidence in market processes.

The status of Iraq's national agricultural research and extension program is uncertain, but has likely become dysfunctional due to lack of government support and the cut-off from international technology under the U.N. sanctions. Re-establishment of a national capacity for providing agricultural research, extension, and veterinary services will be important for improving long-term agricultural productivity for both crops and livestock. In the past, such extension and veterinary networks served as the principal conduit for information on improved crop and animal husbandry practices, as well as for distributing crop and livestock inputs such as improved seeds and veterinary medicines.

Full integration into the international agricultural research network of the Consultative Group on International Agricultural Research (CGIAR) and possibly collaborative research with USDA and/or other institutions could foster gains in productivity through access to improved seed and production technology. Modern agricultural research has much to offer Iraq's agricultural sector — for example, improved plant genetics; selective breeding to local conditions; and identification of improved production practices. In addition, if acceptable to the Iraqi populace, modern agricultural biotechnology might bring additional benefits including reduced use of agricultural inputs, often higher yields, and the addition of specific nutrients.

Trade Dependence Likely to Continue. Such developments would likely result in a significant improvement in Iraq's agricultural productivity. However, Iraq's large population relative to its arable land base ensures that agricultural imports will remain a vital component of the country's ability to meet all of its food needs for the foreseeable future. Iraq's historical trade and food consumption patterns suggest that food grains such as wheat and rice, as well as vegetable oil, sugar, meat, dairy products, and feedstuffs including corn, barley, and protein meals, are all likely to be important imports into Iraq (Table 11).

In the near term, while political and economic structures are being rebuilt, Iraq's trade pattern will likely depend on foreign assistance and food aid programs. Imports

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[108] Kamil Mahdi, "Iraq's Agrarian System: Issues of Policy and Performance," Chapter 9 from *Iraq's Economic Predicament*, Kamil Mahdi, Editor. Exeter Arab and Islamic Studies Series, Ithaca Press, copyright©Kamil Mahdi, 2002, p. 337.

during this recovery phase are likely to continue to focus on cereals, sugar, and vegetable oils as they did during the decade of the 1990s under international sanctions. However, due to existing circumstances, U.S. agricultural exports will likely play a more important role in this first phase than they did during the 1990s.

For example, since the 1991 Gulf War, Australia has dominated Iraq's wheat trade accounting for 67% of all wheat imported by Iraq (Table 13). When OFFP-funded food imports first began in 1997, the United States captured the largest share of the increase in wheat imports during the first year (754,000 metric tons).[109] However, this proved temporary as U.S. wheat shipments to Iraq declined to 262,000 mt in 1998, before falling to zero during 1999-2002. Australia, Canada, and Argentina captured the market share lost by the United States. Spokespersons from the U.S. wheat industry have announced their intentions to regain this market share.

Also, international aid agencies and U.S. and Australian officials have noted their intentions to rebuild Iraq's poultry industry. Poultry production in Iraq had nearly shut down during the 1990s for lack of feed imports. During the 1980s when Iraq's poultry sector was booming, the United States was the principal supplier of coarse grains (principally corn) to Iraq (Table 14). Iraqi coarse grain imports will likely resume step-for-step with growth in its poultry sector.

In the longer term, after Iraq's economy has regained its viability and vibrancy, market forces and international competition will likely be the driving forces behind Iraq's agricultural trade patterns.

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[109] During calendar 1997.

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Table 3. Iraq Field Crop Area, by Major Crop, 1981-2002

	Crop area								Share of crop area				
	Total	Cereals	Vege-tables[1]	Fruit[2]	Oil-crops	Pulses	Other		Cereals	Vege-tables[1]	Fruit[2]	Oil-crops	Pulses
	1,000 hectares								Percent				
1981	2,656	2,257	249	56	32	43	10		85	9	2	1	2
1982	2,773	2,356	272	56	30	40	9		85	10	2	1	1
1983	2,878	2,479	259	55	33	33	9		86	9	2	1	1
1984	1,526	1,083	285	54	37	32	18		71	19	4	2	2
1985	3,667	2,977	335	240	45	36	17		81	9	7	1	1
1986	3,470	2,777	312	262	49	41	14		80	9	8	1	1
1987	2,593	1,938	300	246	50	25	17		75	12	9	2	1
1988	3,075	2,462	273	240	47	18	18		80	9	8	2	1
1989	2,322	1,625	310	261	68	16	21		70	13	11	3	1
1990	4,002	3,256	313	261	108	22	21		81	8	7	3	1
1991	3,912	3,343	208	254	55	20	16		85	5	6	1	1
1992	4,630	3,920	260	277	107	32	16		85	6	6	2	1
1993	5,370	4,588	288	302	104	34	26		85	5	6	2	1
1994	4,351	3,570	277	321	92	33	28		82	6	7	2	1
1995	3,966	3,168	281	329	96	33	29		80	7	8	2	1
1996	4,134	3,336	273	335	100	32	28		81	7	8	2	1
1997	3,546	2,766	280	315	95	32	29		78	8	9	3	1
1998	3,592	2,809	288	307	98	34	28		78	8	9	3	1
1999	3,494	2,716	288	307	98	34	26		78	8	9	3	1
2000	2,889	2,137	284	309	90	33	18		74	10	11	3	1
2001	3,468	2,712	284	309	94	33	18		78	8	9	3	1
2002	3,464	2,707	284	309	95	33	18		78	8	9	3	1
Period averages													
1960-69	2,562	2,268	166	16	62	47	2		89	6	1	2	2
1970-79	2,364	2,008	200	36	51	48	10		85	8	2	2	2
1980-84	2,507	2,093	262	55	34	40	11		83	10	2	1	2
1985-89	3,025	2,356	306	250	52	27	17		78	10	8	2	1
1990-94	4,453	3,735	269	283	93	28	22		84	6	6	2	1
1995-99[3]	3,746	2,959	282	319	97	33	28		79	8	9	3	1
2000-02	3,274	2,519	284	309	93	33	18		77	9	9	3	1

1. Includes melons. 2. Excludes melons. 3. Imports under the Oil-for-Food program began in March 1997.
Source: U.N., FAO, FAOSTAT.

Table 4. Iraq Cereal Area, Production, and Yields, by Type, 1981-2003

	Area harvested						Production						Yield				
	Total[1]	wheat	barley	rice	corn		Total[1]	wheat	barley	rice	corn		Total[1]	wheat	barley	rice	corn
	1,000 hectares						1,000 metric tons						metric tons per hectare				
1981	2,265	1,193	984	55	18		1,989	902	925	108	39		0.88	0.76	0.94	1.96	2.17
1982	2,357	1,160	1,110	60	12		2,019	965	902	109	28		0.86	0.83	0.81	1.82	2.33
1983	2,483	1,191	1,217	49	15		1,790	841	836	74	28		0.72	0.71	0.69	1.51	1.87
1984	1,112	493	550	39	19		1,068	471	482	73	31		0.96	0.96	0.88	1.87	1.63
1985	2,982	1,540	1,357	53	21		2,888	1,406	1,331	99	41		0.97	0.91	0.98	1.87	1.95
1986	2,784	1,240	1,456	50	27		2,240	1,036	1,046	94	53		0.80	0.84	0.72	1.88	1.96
1987	1,943	859	972	70	31		1,668	722	743	131	61		0.86	0.84	0.76	1.87	1.97
1988	2,467	1,041	1,314	51	50		2,546	929	1,437	94	75		1.03	0.89	1.09	1.84	1.50
1989	1,629	587	913	73	45		1,425	491	663	155	105		0.87	0.84	0.73	2.12	2.33
1990	3,280	1,200	1,920	79	70		3,384	1,200	1,850	153	170		1.03	1.00	0.96	1.94	2.43
1991	3,307	1,800	1,300	86	110		2,677	1,500	800	126	240		0.81	0.83	0.62	1.47	2.18
1992	3,944	1,700	2,010	95	130		2,899	1,000	1,510	120	260		0.74	0.59	0.75	1.26	2.00
1993	4,579	2,000	2,315	110	145		3,186	1,200	1,560	137	280		0.70	0.60	0.67	1.25	1.93
1994	3,567	1,800	1,535	163	60		2,714	1,350	970	255	130		0.76	0.75	0.63	1.56	2.17
1995	3,189	1,550	1,390	175	65		2,449	1,250	890	210	90		0.77	0.81	0.64	1.20	1.38
1996	3,339	1,500	1,650	120	60		2,914	1,300	1,300	180	125		0.87	0.87	0.79	1.50	2.08
1997	2,790	1,400	1,200	121	60		2,192	1,100	800	163	120		0.79	0.79	0.67	1.35	2.00
1998	2,799	1,400	1,200	130	60		2,844	1,300	1,200	200	135		1.02	0.93	1.00	1.54	2.25
1999	2,719	1,300	1,220	130	60		1,744	800	700	120	115		0.64	0.62	0.57	0.92	1.92
2000	2,569	1,200	1,200	100	60		904	450	350	40	55		0.35	0.38	0.29	0.40	0.92
2001	2,579	1,220	1,200	100	50		1,344	650	550	85	50		0.52	0.53	0.46	0.85	1.00
2002	3,269	1,800	1,300	110	50		2,969	1,800	1,000	100	60		0.91	1.00	0.77	0.91	1.20
2003	3,274	1,800	1,300	115	50		3,319	2,000	1,150	100	60		1.01	1.11	0.88	0.87	1.20
Period averages		1,000 hectares					1,000 metric tons						metric tons per hectare				
1960-69	2,303	1,400	800	88	4		2,000	1,009	845	132	3		0.87	0.72	1.05	1.42	0.92
1970-79	2,094	1,400	604	64	17		1,884	1,143	580	116	36		0.89	0.80	0.96	1.78	1.89
1980-84	2,097	1,082	932	52	18		1,721	831	744	95	37		0.84	0.79	0.81	1.84	2.10
1985-89	2,361	1,053	1,202	59	35		2,153	917	1,044	115	67		0.91	0.86	0.86	1.92	1.94
1990-94	3,735	1,700	1,816	107	103		2,972	1,250	1,338	158	216		0.81	0.75	0.73	1.49	2.14
1995-99[2]	2,967	1,430	1,332	135	61		2,429	1,150	978	175	117		0.82	0.80	0.73	1.30	1.93
2000-03	2,923	1,505	1,250	106	53		2,134	1,225	763	81	56		0.70	0.76	0.60	0.76	1.08

1. Total includes small quantities of miscellaneous other grains. 2. Imports under the U.N. Oil-for-Food Program began in March 1997.
Source: USDA, PSD data base, April 2004.

Table 5. Iraq Livestock Populations and Egg Production, 1970-2002[1]

	Large Ruminants					Small Ruminants				Poultry	
	Total	Cattle	Equine[2]	Other[3]		Total	Sheep	Goats		Chickens	Eggs
	1,000 head										mt[4]
1970	3,104	1,830	720	288		15,400	13,099	2,301		11,861	14,500
1971	3,095	1,860	720	270		14,305	11,955	2,350		12,400	15,000
1972	3,068	1,880	718	250		13,210	10,810	2,400		13,000	15,600
1973	3,065	1,900	715	240		12,170	9,670	2,500		13,900	15,750
1974	3,130	2,048	708	184		11,110	8,526	2,584		14,700	15,800
1975	2,823	1,850	647	161		11,255	8,470	2,785		15,404	15,900
1976	2,646	1,804	556	146		11,390	8,401	2,989		15,500	22,500
1977	2,622	1,804	543	160		11,820	9,500	2,320		15,395	35,450
1978	2,496	1,698	538	170		11,782	9,723	2,059		20,500	53,380
1979	2,468	1,698	531	170		11,835	9,775	2,060		22,000	50,175
1980	2,437	1,702	495	170		13,080	11,000	2,080		27,000	47,850
1981	2,453	1,670	533	175		13,700	11,750	1,950		30,000	47,060
1982	2,462	1,675	533	174		12,545	10,865	1,680		70,000	47,810
1983	2,473	1,685	533	175		12,291	10,491	1,800		50,000	41,164
1984	2,441	1,698	503	170		11,333	9,723	1,610		55,000	41,472
1985	2,345	1,635	500	155		10,050	8,500	1,550		65,000	61,440
1986	2,264	1,578	503	141		10,457	8,981	1,475		70,000	81,800
1987	2,270	1,580	505	140		10,500	9,000	1,500		75,000	74,100
1988	2,302	1,600	511	141		10,550	9,000	1,550		76,000	63,700
1989	2,306	1,578	526	145		10,457	8,981	1,476		105,000	91,850
1990	2,259	1,520	530	150		11,150	9,600	1,550		80,000	81,550
1991	1,534	1,000	410	110		6,870	5,800	1,070		3,600	18,100
1992	1,794	1,260	419	105		8,775	7,525	1,250		11,000	19,750
1993	2,019	1,480	423	108		11,050	9,500	1,550		10,500	25,150
1994	1,890	1,354	442	87		9,825	8,400	1,425		15,500	26,250
1995	1,720	1,190	454	70		8,850	7,400	1,450		16,800	20,800
1996	1,530	1,050	425	50		6,405	5,300	1,105		17,300	21,850
1997	1,808	1,300	439	62		8,050	6,584	1,466		15,500	12,500
1998	1,837	1,320	446	64		8,200	6,700	1,500		13,000	1,131
1999	1,829	1,325	432	64		8,300	6,750	1,550		22,000	9,450
2000	1,861	1,350	438	65		8,380	6,780	1,600		23,000	14,000
2001	1,861	1,350	438	65		8,380	6,780	1,600		23,000	14,000
2002	1,861	1,350	438	65		8,380	6,780	1,600		23,000	14,000
Period Averages											
1960-69	2,786	1,567	762	246		13,337	11,171	2,166		5,954	12,000
1970-79	2,852	1,837	640	204		12,428	9,993	2,435		15,466	25,406
1980-84	2,453	1,686	519	173		12,590	10,766	1,824		46,400	45,071
1985-89	2,297	1,594	509	144		10,403	8,892	1,510		78,200	74,578
1990-94	1,869	1,301	445	112		9,534	8,165	1,369		24,120	34,160
1995-99	1,751	1,249	439	62		7,961	6,547	1,414		16,920	13,146
2000-02	1,861	1,350	438	65		8,380	6,780	1,600		23,000	14,000

[1]Livestock populations are inventory averages for the period. [2]Includes donkeys, horses and mules. [3]Includes buffalo and camels. [4]mt = metric tons.

Source: U.N., FAO, FAOSTAT.

Table 6. Iraq's Date Production and Export Data, 1970-2002

					Exports		
	Area Harvested	Yield	Production		Quantity	Value	Share of Production
	ha	mt/ha	mt		mt	1,000	%
1970	na	na	300		350	26	116.8
1971	na	na	450		279	19	62.1
1972	na	na	310		314	31	101.4
1973	na	na	385		336	33	87.2
1974	na	na	360		242	29	67.3
1975	na	na	496		254	39	51.3
1976	na	na	372		286	40	76.8
1977	na	na	578		203	37	35.1
1978	na	na	389		170	46	43.7
1979	na	na	519		207	44	39.9
1980	na	na	597		228	53	38.2
1981	na	na	370		122	29	33.0
1982	na	na	374		120	43	32.1
1983	na	na	345		89	35	25.8
1984	na	na	251		24	14	9.7
1985	105	3.7	390		110	66	28.2
1986	122	3.6	434		111	56	25.6
1987	108	3.0	324		157	52	48.5
1988	103	3.4	356		120	36	33.7
1989	120	4.1	488		248	66	50.8
1990	124	4.4	545		190	37	34.9
1991	116	4.9	566		20	6	3.5
1992	116	3.9	448		22	7	4.9
1993	136	4.5	613		10	2	1.6
1994	165	4.1	676		30	6	4.4
1995	168	5.2	881		40	6	4.5
1996	176	4.5	797		50	9	6.3
1997	156	4.0	625		90	16	14.4
1998	144	4.4	630		100	20	15.9
1999	145	3.0	438		30	5	6.8
2000	150	4.0	600		30	5	5.0
2001	150	4.3	650		30	5	4.6
2002	150	4.3	650		30	5	4.6
Period averages							
1960-69	na	na	348		270	18	80.4
1970-79	na	na	416		264	35	68.2
1980-84	na	na	388		117	35	27.7
1985-89	112	3.6	399		149	55	37.4
1990-94	137	4.5	621		52	11	9.0
1995-99	155	4.0	623		68	12	10.8
2000-02	150	4.2	633		30	5	4.7

'na=not available; ha=hectares; mt=metric tons.
Source: U.N., FAO, FAOSTAT.

Table 7. Iraq Fertilizer Production and Use, by Selected Period

	Total	Nitrogenous	Phosphate	Potash
Production, 1,000 metric tons				
1988	397.4	81.4	316.0	na
1989	771.0	364.0	407.0	na
1990	870.9	539.4	331.5	na
1991	449.0	242.0	207.0	na
1992	125.0	95.0	30.0	na
1993	210.0	130.0	80.0	na
1994	308.0	218.0	90.0	na
1995	308.0	218.0	90.0	na
1996	308.0	218.0	90.0	na
1997	325.0	235.0	90.0	na
1998	325.0	235.0	90.0	na
1999	325.0	235.0	90.0	na
2000	328.0	238.0	90.0	na
Production, 1,000 metric tons				
1960-69	na	na	na	na
1970-79	83.2	83.2	na	na
1980-84	164.3	126.7	92.4	na
1985-89	557.9	226.6	331.3	na
1990-95	284.7	186.8	97.8	na
1996-99	325.8	235.8	90.0	na
2000	328.0	238.0	90.0	na
Consumption, 1,000 metric tons				
1960-69	6.1	4.3	1.6	0.2
1970-79	41.4	31.1	9.2	1.2
1980-84	90.3	64.9	23.0	2.3
1985-89	209.5	140.6	65.6	3.3
1990-95	269.6	174.0	92.5	4.6
1996-99	370.7	247.3	120.1	3.3
2000	371.3	250.6	117.2	3.5
Net Exports, 1,000 metric tons				
1960-69	-6.2	-4.4	na	-0.2
1970-79	27.7	38.5	-9.6	-1.1
1980-84	45.3	9.4	26.3	-4.4
1985-89	247.5	67.3	185.2	-5.0
1990-95	13.5	11.6	5.2	-3.4
1996-99	-44.9	-11.5	-30.1	-3.3
2000	-43.3	-12.6	-27.2	-3.5

na = not available.
Source: U.N., FAO, FAOSTAT.

Table 8. Iraq Food Calorie Availability per Capita per Day, 1975-2000

	Total	Cereals	Sugar[1]	Veg-etables	Fruits	Veg. Oils	Pulses	Roots & Tubers[2]	Meat	Other
	Calories per capita per day									
1975	2,333	1,368	354	72	106	139	52	10	69	163
1976	2,360	1,380	350	81	115	142	46	12	63	172
1977	2,435	1,401	358	83	130	168	43	11	71	170
1978	2,607	1,511	351	87	141	210	49	17	74	167
1979	2,735	1,628	343	70	125	240	44	16	78	191
1980	2,820	1,713	328	84	101	246	49	17	94	189
1981	2,970	1,757	335	90	114	304	55	17	110	189
1982	3,086	1,840	330	100	117	320	56	19	119	185
1983	3,156	1,900	326	93	115	339	54	18	133	176
1984	3,299	1,958	331	107	129	370	56	17	139	193
1985	3,401	2,024	337	120	132	400	54	19	135	179
1986	3,493	2,082	380	108	127	422	56	16	133	168
1987	3,513	2,124	372	99	118	436	55	20	133	158
1988	3,500	2,129	345	97	120	438	52	17	133	169
1989	3,496	2,113	351	101	116	450	55	25	126	160
1990	3,295	2,088	258	100	126	392	52	16	107	155
1991	2,387	1,684	167	68	144	137	33	26	33	96
1992	2,289	1,484	175	79	136	215	34	36	47	84
1993	2,316	1,377	182	85	137	327	29	43	48	89
1994	2,274	1,276	189	80	124	421	25	34	39	85
1995	2,234	1,218	140	79	125	510	21	30	32	79
1996	2,191	1,188	120	76	125	515	21	34	27	84
1997	2,099	1,185	162	72	122	390	25	27	29	85
1998	2,073	1,244	130	72	122	345	19	23	29	91
1999	2,173	1,426	109	54	108	320	18	20	31	87
2000	2,197	1,499	105	43	96	308	15	12	31	88
Calories per capita per day, period average										
1960-69	2,109	1,229	228	93	61	130	45	10	79	175
1970-79	2,378	1,398	341	86	97	158	46	11	71	170
1980-84	3,066	1,834	330	95	115	316	54	18	119	186
1985-89	3,481	2,094	357	105	123	429	55	19	132	167
1990-94	2,512	1,582	194	82	134	298	35	31	55	102
1995-99	2,154	1,252	132	71	120	416	21	27	30	85
2000	2,197	1,499	105	43	96	308	15	12	31	88
Calorie shares by food group, period average										
1960-69	100	58	14	4	3	6	2	0	8	8
1970-79	100	59	14	4	4	7	2	0	7	7
1980-84	100	60	11	3	4	10	2	1	6	6
1985-89	100	60	10	3	4	12	2	1	5	5
1990-94	100	63	8	3	5	12	1	1	4	4
1995-99	100	58	6	3	6	19	1	1	4	4
2000	100	68	5	2	4	14	1	1	4	4

[1]Includes other sweeteners. [2]Dry equivalent.

Source: United Nations (U.N.), Food and Agricultural Organization (FAO), FAOSTATS.

Table 9. Iraq Population and per Capita Calorie Production, Consumption, and Imports of Cereals, 1970-2002

	Population		Cereals		
			Production	Imports	Consumption
	million		kilograms per capita		
1970	9.356		219.3	27.1	245.2
1971	9.665		153.8	56.0	209.7
1972	9.985		381.7	2.9	295.2
1973	10.317		150.4	77.1	256.4
1974	10.662		181.8	100.8	259.1
1975	11.020		121.9	70.4	224.5
1976	11.391		181.3	108.4	269.4
1977	11.777		117.0	156.5	264.0
1978	12.175		141.5	140.1	280.3
1979	12.585		118.6	246.6	336.7
1980	13.007		133.5	158.8	332.6
1981	13.440		148.0	178.1	334.2
1982	13.882		145.4	180.5	315.3
1983	14.338		124.8	291.0	406.6
1984	14.815		72.1	290.6	364.0
1985	15.317		188.5	154.9	317.9
1986	15.840		141.4	242.8	389.6
1987	16.382		101.8	289.8	397.0
1988	16.938		150.3	265.2	411.5
1989	17.505		81.4	287.9	378.8
1990	18.078		187.2	27.2	225.4
1991	18.643		143.6	154.5	299.3
1992	19.197		151.0	55.6	189.6
1993	19.739		161.4	41.2	201.7
1994	20.267		133.9	39.0	189.2
1995	20.779		117.9	36.1	154.4
1996	21.313		136.7	88.4	213.4
1997	21.847		100.3	152.7	253.1
1998	22.328		127.4	125.7	250.9
1999	22.797		76.5	172.1	240.1
2000	23.264		38.9	197.5	244.8
2001	23.750		56.6	181.1	220.4
2002	24.247		66.8	171.2	231.7
Period averages					
1960-69	8.010		249.0	20.6	257.2
1970-79	10.893		176.7	98.6	264.1
1980-84	13.896		124.8	219.8	350.5
1985-89	16.396		132.7	248.1	379.0
1990-94	19.185		155.4	63.5	221.0
1995-99	21.813		111.8	115.0	222.4
2000-02	23.754		54.1	183.2	232.3

Source: Population data are from the World Bank's World Development Indicators database, 2003. Production, consumption, and import data are from USDA's PSD database, April 10, 2003.

Table 10. Iraq Calories from Meat by Type and Share, 1970-2000

	Calories from meat						Meat calorie shares				
	Total	Bovine	Mutton & Goat	Poultry	Other		Total	Bovine	Mutton & Goat	Poultry	Other
	— Calories per capita per day —						—— percent——				
1970	77	33	34	7	3		100	43	44	9	4
1971	74	33	31	7	3		100	44	41	10	4
1972	70	32	27	9	3		100	45	39	12	4
1973	67	31	24	9	3		100	46	36	14	4
1974	69	32	25	10	3		100	46	36	14	4
1975	69	30	27	10	2		100	44	38	15	3
1976	63	31	20	10	2		100	49	32	16	3
1977	71	30	27	13	2		100	41	37	19	3
1978	74	34	22	16	2		100	46	30	22	2
1979	78	32	25	20	1		100	41	32	26	1
1980	94	33	28	31	1		100	35	30	33	1
1981	110	39	33	37	1		100	35	30	34	1
1982	119	44	29	45	1		100	37	24	38	1
1983	133	56	32	44	1		100	42	24	33	1
1984	139	57	30	51	1		100	41	22	37	1
1985	135	58	26	51	1		100	43	19	38	1
1986	133	56	24	52	1		100	42	18	39	0
1987	133	56	23	54	1		100	42	17	41	0
1988	133	60	19	54	1		100	45	14	40	0
1989	126	51	19	56	1		100	41	15	44	0
1990	107	51	18	38	1		100	47	17	35	1
1991	33	21	8	4	0		100	63	25	12	1
1992	47	30	11	6	0		100	64	23	13	0
1993	48	28	13	7	0		100	58	27	15	0
1994	39	20	11	7	0		100	52	29	19	0
1995	32	15	10	7	0		100	47	31	22	1
1996	27	13	7	7	0		100	48	26	26	0
1997	29	15	8	6	0		100	53	28	20	0
1998	29	15	8	5	0		100	54	29	17	0
1999	31	15	8	8	0		100	48	26	26	0
2000	31	15	8	8	0		100	48	26	26	0
Period averages											
1960-69	79	34	38	3	4		100	43	48	4	4
1970-79	71	32	26	11	2		100	44	37	16	3
1980-84	119	46	30	42	1		100	38	26	35	1
1985-89	132	56	22	53	1		100	43	17	40	0
1990-94	51	28	12	12	0		100	55	25	19	0
1995-99	29	15	8	6	0		100	51	27	22	0
2000	31	15	8	8	0		100	48	26	26	0

Source: U.N., FAO, FAOSTAT.

Table 11. Iraq Agricultural Imports, Selected Periods

($ millions)

	Total Ag. Imports	Cereals	Sugar[1]	Bovine Meat	Poultry Meat	Veg. Oils	Dairy	Fruit & Veg.	Coffee Tea Cocoa	To-bacco	Other[2]
Value	$1,000,000										
1975	777	221	250.6	5.3	17	72	63	39	33	5	70
1976	592	234	124	3	6	17	60	49	41	14	43
1977	808	278	137	4	22	60	65	61	78	11	90
1978	1,019	432	115	20	28	80	65	70	70	24	115
1979	1,470	605	158	27	82	110	130	78	86	40	152
1980	2,030	816	367	35	169	48	158	119	81	61	172
1981	2,107	693	214	66	268	129	213	161	48	61	252
1982	2,174	672	234	206	200	116	188	171	85	60	238
1983	1,932	786	96	146	129	96	180	153	98	54	194
1984	2,708	994	143	150	110	167	277	142	185	106	429
1985	2,093	629	116	252	82	135	268	130	99	94	284
1986	1,663	568	145	105	77	104	199	125	86	47	205
1987	1,7196	563	170	114	76	130	177	122	85	51	226
1988	2,720	899	223	327	29	164	286	138	94	59	429
1989	2,524	1,003	284	241	7	149	162	116	76	153	304
1990	1,852	619	204	127	8	145	174	91	81	133	197
1991	824	302	73	22	1	25	53	89	74	57	103
1992	1,182	437	196	47	9	90	39	75	37	45	178
1993	991	349	109	35	24	106	28	72	31	56	147
1994	764	205	99	10	4	115	18	42	23	49	186
1995	1,065	246	93	0	6	267	31	37	28	37	310
1996	922	227	111	0	3	143	21	47	25	42	287
1997	1,370	634	150	0	3	209	17	40	26	13	264
1998	1,388	682	100	0	3	138	24	31	45	11	290
1999	1,317	668	100	0	3	184	17	34	35	11	211
2000	1,818	1,177	115	0	3	183	24	30	34	11	175
2001	1,596	980	119	0	3	187	23	30	53	34	128
Period averages		$1,000,000									
1960-69	90	14	22	0	na	8	5	12	19	2	9
1970-79	606	221	119	7	16	46	47	40	42	11	58
1980-84	2,190	792	211	121	175	111	203	149	99	68	257
1985-89	2,144	732	188	208	54	136	219	126	88	81	290
1990-94	1,113	382	136	48	9	96	62	74	49	68	162
1995-99	1,249	491	111	0	4	188	22	38	32	23	272
2000-01	1,707	1,078	117	0	3	185	23	30	43	23	151
Share	Percent										
1960-69	100	16	24	0	na	9	6	13	22	2	10
1970-79	100	36	20	1	3	8	8	7	7	2	10
1980-84	100	36	10	6	8	5	9	7	5	3	12
1985-89	100	34	9	10	3	6	10	6	4	4	14
1990-94	100	32	12	4	1	11	6	7	4	6	15
1995-99	100	44	9	0	0	14	2	3	3	2	23
2000-01	100	63	7	0	0	11	1	2	3	1	9

na = not available. [1]Raw equivalents. [2]Includes eggs, pulses, beverages, and various other.

Source: U.N., FAO, FAOSTAT.

Table 12. Iraq Food Imports as Share of Domestic Consumption, Selected Commodities, 1970-2000

	Cereals	Sugar[2]	Beef	Poultry	Vegetable Oils
	Percent [1]				
1970	4.5	77.9	1.5	0.8	196.4
1971	52.5	92.5	0.7	3.2	148.2
1972	3.8	64.0	0.2	3.6	153.0
1973	7.3	135.3	3.1	0.7	146.9
1974	35.4	112.8	7.6	2.6	120.7
1975	30.5	82.5	8.2	41.2	193.4
1976	30.6	81.5	4.1	16.6	55.8
1977	37.7	112.2	5.4	40.0	130.1
1978	49.8	99.4	21.6	35.7	120.9
1979	65.6	117.5	26.8	75.7	118.4
1980	70.5	150.2	28.5	85.6	56.0
1981	57.0	92.9	45.6	120.5	126.9
1982	60.8	127.7	112.8	78.4	107.5
1983	69.6	82.4	58.9	46.6	82.8
1984	88.1	111.4	65.4	49.3	102.5
1985	58.6	114.1	108.4	32.7	84.8
1986	55.6	102.9	44.6	24.7	100.8
1987	64.9	110.7	38.5	28.2	101.6
1988	72.4	111.5	90.2	9.8	97.9
1989	77.8	118.5	67.5	1.9	89.7
1990	47.3	106.3	38.5	3.2	85.5
1991	34.7	59.9	34.8	2.6	42.3
1992	48.6	176.1	41.4	22.3	85.7
1993	35.9	93.7	26.0	54.8	71.7
1994	26.5	70.7	9.1	4.9	54.5
1995	30.0	79.8	0.1	7.5	78.7
1996	23.7	97.9	0.2	5.2	43.6
1997	69.5	102.1	0.1	6.0	74.0
1998	71.9	123.6	0.0	7.0	57.6
1999	57.0	179.1	0.1	4.1	71.9
2000	94.1	177.9	0.1	4.0	73.2
Period averages					
1960-69	8.9	113.7	1.1	0.0	87.2
1970-79	31.8	97.6	7.9	22.0	138.4
1980-84	69.2	112.9	62.2	76.1	95.1
1985-89	65.8	111.5	69.9	19.5	95.0
1990-94	38.6	101.3	29.9	17.5	68.0
1995-99	50.4	116.5	0.1	6.0	65.2
2000	94.1	177.9	0.1	4.0	73.2

[1]Import share in excess of 100 percent implies re-exports. [2] Raw equivalent.
Source: Calculated using data from U.N., FAO, FAOSTAT.

Table 13. Iraq Wheat and Wheat Flour Imports by Source, 1981-2003

	Total	Australia	United States	Canada	EU	Turkey	Argen-tina	Other
	1,000 metric tons							
Volume								
CY1981	1,844	751	75	230	0	236	277	40
CY1982	2,006	444	762	310	0	0	50	276
CY1983	3,308	832	1,167	632	0	0	0	440
CY1984	2,686	1,243	852	367	0	0	0	676
CY1985	1,648	765	397	364	0	1	0	224
CY1986	2,562	1,034	798	691	0	38	0	122
CY1987	2,860	970	919	823	0	48	0	0
CY1988	3,265	1,427	790	784	0	0	0	100
CY1989	3,189	1,388	948	843	10	0	0	264
CY1990	180	89	0	60	31	0	0	0
CY1991	1,512	989	0	9	483	25	0	0
CY1992	106	105	0	0	1	0	0	7
CY1993	477	215	0	5	256	1	0	0
CY1994	691	226	0	0	150	314	0	0
CY1995	467	50	0	0	3	414	0	0
CY1996	1,540	832	16	0	340	253	99	0
CY1997	2,498	1,275	770	0	319	29	105	0
CY1998	1,752	1,179	262	3	99	0	209	0
CY1999	2,729	2,265	0	262	0	0	167	34
CY2000	3,253	2,589	0	310	0	0	319	35
MY2000/01[1]	3,300	2,417	0	155	0	0	333	395
MY2001/02[1]	2,700	2,245	0	0	0	0	347	108
MY2002/03[1,2,3]	1,700	752	82	0	0	0	0	867
MY2003/04[1,3]	2,200	740	192	0	0	0	110	1,158
Period average:								
1981-89	2,596	984	745	560	1	36	36	234
1990-2000	1,382	892	95	59	153	94	82	7
1997-2000	2,557	1,827	258	144	105	7	200	17
2000/01-2003/04	2,457	1,539	68	39	0	0	198	632
Share	Percent							
1980-89	100	38	29	22	0	1	1	9
1990-2000	100	65	7	4	11	7	6	1
1997-2000	100	71	10	6	4	0	8	1
2000/01-2003/04	100	62	38	2	0	0	8	26

Note: wheat flour is in wheat equivalents.

1. The Total is estimated from USDA PSD data for the July-June international marketing year; April 2004. Individual country allocations are from new storites & the International Grains Council.

2. U.S. wheat exports to Iraq in 2002/03 are donations from the Bill Emerson Humanitarian Trust ($39.4 million).

3. Breakout by exporter is incomplete. The "Other" category includes all unknown sources.

Source: U.N., FAO, FAOSTAT for calendar years (CY) 1980-2000; USDA PSD data is for marketing years (MY) 2000/01-2003/04.

Table 14. Iraq Coarse Grain Imports by Source, 1981-2003

	Total	United States	Canada	EU	Turkey	Russia	Ukraine	Other
	1,000 metric tons							
Volume								
1981	1	0	0	0	0	0	0	59
1982	219	82	92	0	20	0	0	1
1983	588	381	206	0	0	0	0	25
1984	791	573	135	0	0	0	0	1
1985	86	71	0	0	7	0	0	83
1986	497	492	0	0	5	0	0	8
1987	823	688	111	0	24	0	0	0
1988	648	588	58	0	2	0	0	0
1989	1,248	862	338	48	0	0	0	0
1990	62	62	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	1	0	0	0	1	0	0	0
1995	41	0	0	0	9	0	0	0
1996	0	0	0	0	0	0	0	32
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	351	81	0	161	0	57	49	0
Period average:								
1981-89	544	415	104	5	6	0	0	13
1990-1999	10	6	0	0	1	0	0	3
1997-2001	88	20	0	40	0	14	12	1
2000/01-2003/04	93	20	0	0	0	0	0	72
Share	Percent							
1980-89	100	76	19	1	1	0	0	2
1990-1999	100	59	0	0	2	13	11	7
1997-2001	100	23	0	46	0	16	14	0
2000/01-2003/04	100	22	0	0	0	0	0	78

1. The Total is estimated from USDA PSD data for the July-June international marketing year; April 2004. Individual country allocations are from new storites & the International Grains Council.
2. Breakout by exporter is incomplete. The "Other" category includes all unknown sources.
Source: U.N., FAO, FAOSTAT for calendar years (CY) 1980-2000; USDA PSD data is for marketing years (MY) 2000/01-2003/04.

Table 15. U.S. Agricultural Exports to Iraq, 1984-2001

	Total Agriculture	Total grains & feeds	Wheat	Flour	Rice	Barley	Corn	Feed & fodder	Pulses	Cotton	Sugar	Veg. Oil	Soybean Meal
Quantity, 1,000 metric tons													
1984	na	2,236	1,120	0	448	0	339	53	na	0	0	0	204
1985	na	1,285	532	0	407	0	240	7	na	0	12	6	103
1986	na	1,539	711	117	373	0	323	15	13	12	86	32	142
1987	na	2,168	910	130	509	66	542	68	19	2	180	39	163
1988	na	2,364	895	0	513	153	617	156	27	31	99	19	272
1989	na	2,362	1,011	79	392	187	565	122	22	27	95	6	320
1990	na	1,133	335	0	222	104	413	56	21	0	42	12	99
1991	na	0	0	0	0	0	0	0	0	0	0	0	0
1992	na	0	0	0	0	0	0	0	0	0	0	0	0
1993	na	0	0	0	0	0	0	0	4	0	0	1	0
1994	na	0	0	0	0	0	0	0	0	0	0	0	0
1995	na	0	0	0	0	0	0	0	0	0	0	0	0
1996	na	16	16	0	0	0	0	0	0	0	0	0	0
1997	na	372	372	0	0	0	0	0	33	0	0	0	0
1998	na	595	595	0	0	0	0	0	16	0	0	0	0
1999	na	65	65	0	0	0	0	0	0	0	0	0	0
2000	na	31	0	0	31	0	0	0	0	0	0	0	0
2001	na	81	0	0	0	0	81	0	0	0	0	0	0
Value, $1,000,000													
1984	535	466	171	0	182	0	48	26	na	0	0	0	41
1985	326	272	78	0	149	0	29	3	na	0	2	5	17
1986	360	245	87	17	102	0	34	5	8	13	22	17	28
1987	532	294	84	18	119	4	41	29	11	5	42	20	34
1988	808	488	112	0	199	11	72	94	14	49	30	14	74
1989	749	497	170	18	133	23	64	87	14	36	32	3	71
1990	329	236	58	0	77	13	48	39	13	0	18	7	17
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	3	0	0	0	0	0	0	0	2	0	0	1	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	3	3	3	0	0	0	0	0	0	0	0	0	0

	Total Agriculture	Total grains & feeds	Wheat	Flour	Rice	Barley	Corn	Feed & fodder	Pulses	Cotton	Sugar	Veg. Oil	Soybean Meal
1997	82	60	60	0	0	0	0	0	22	0	0	0	0
1998	96	86	85	0	0	0	0	0	10	0	0	0	0
1999	9	9	9	0	0	0	0	0	0	0	0	0	0
2000	8	8	0	0	8	0	0	0	0	0	0	0	0
2001	8	8	0	0	0	0	8	0	0	0	0	0	0

na = not available. Source: USDA, ERS, Foreign Agricultural Trade of the United States (FATUS), various calendar year summaries.