

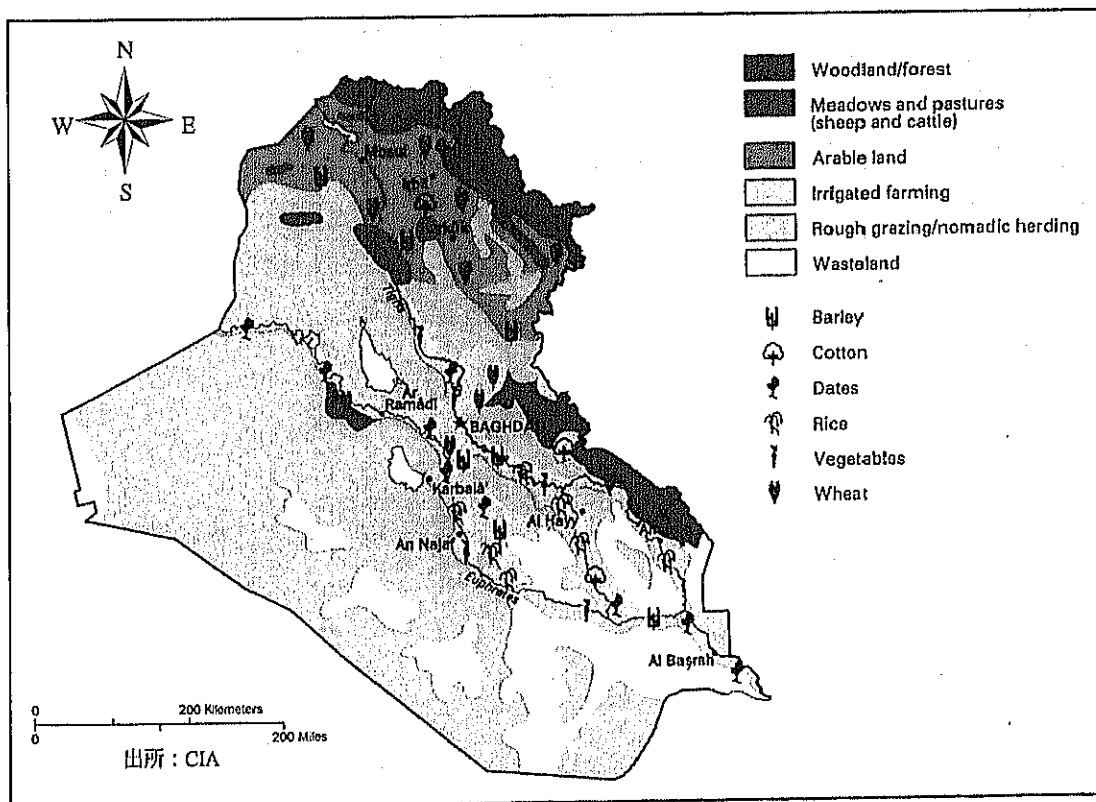
### 5.3.3 Agriculture

#### (1) Background

Crude oil production has been the key source of income for the Iraqi economy since the 1950s. The oil revenues shared some 61% of the 13.7 billion dinar GDP by 1989, while the agriculture sector shared only 5%. The Iraqi economy suffered devastating damage through the Gulf War in 1991, followed by the UN sanctions in 1990 subsequent to the invasion of Kuwait. By the end of 1991, the oil export embargo reduced the GDP by about 75%, which resulted in a GDP of only 3.3 billion dinar. After 1991, the share of the agriculture sector to total GDP increased to 13-14%, which finally became 29% as of 2003.

#### (2) Land Use

Roughly 27% of the total land area (43.3 million ha) is considered as cultivable land, of which 50% is said to be irrigable area. The rain-fed area represents the remaining 50%, of which about half is sown every year depending on rainfall and fallowing patterns. The figure below shows the outline of land use in Iraq.



**Figure 5.3.9 Outline of Land Use Map**

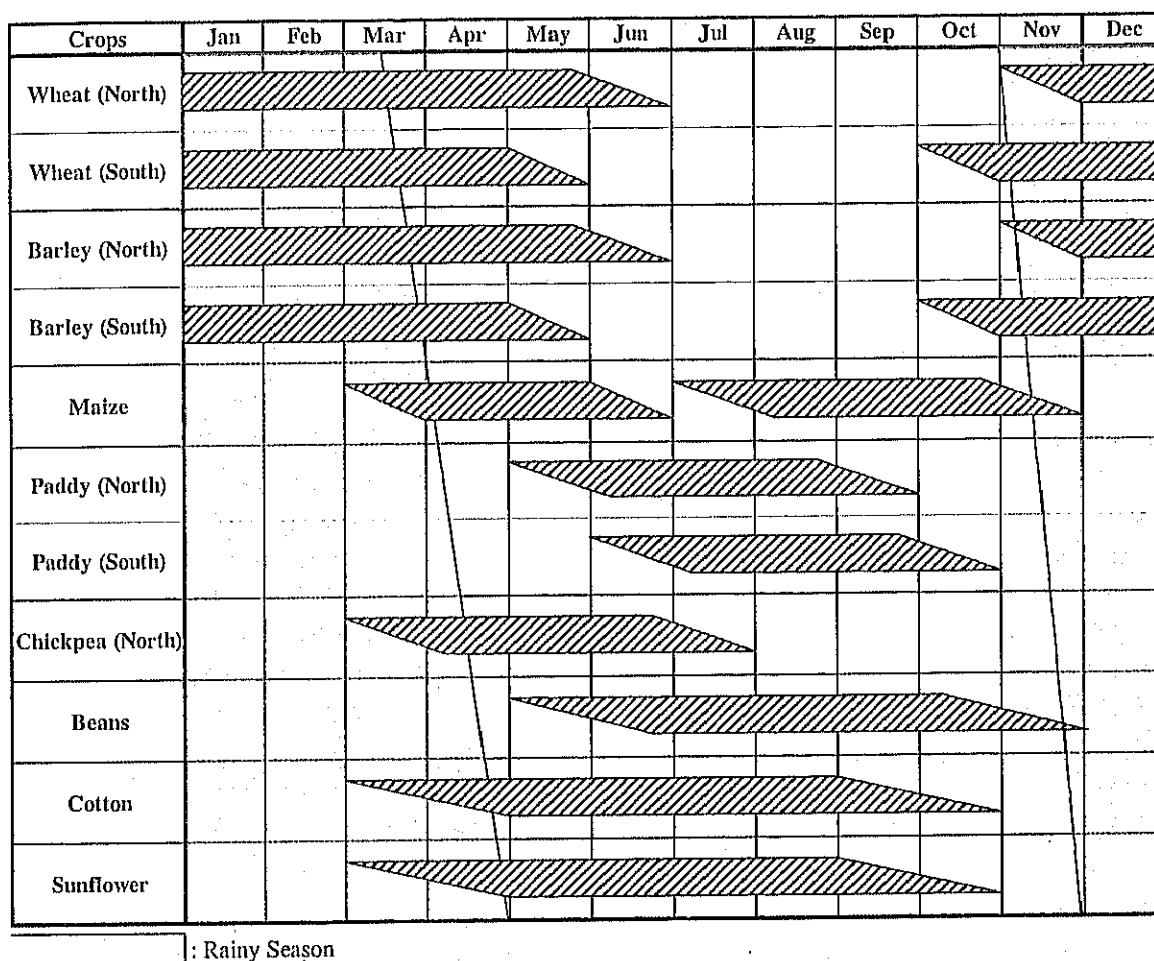
As shown in the figure, in the northern highland area, a wood/forest area lies along

the border with Turkey, and intensive rain-fed cultivation of wheat and barley is popular. In the central area surrounding Baghdad, and the south along with the Tigris and Euphrates rivers, irrigated farming of wheat, barley, dates, cotton and vegetables is undertaken. The western and southwestern area under the dry steppe and desert climates is subject to nomadic herding instead of cultivation.

### (3) Rain-fed / Irrigated Agriculture

About 40% of the rain-fed cultivation area is located in the northern governorates of Dohuk, Erbil and Suleimaniya while the remaining 60% is in the central governorates of Nineveh, Tameem and Salah Al Din. Annual rainfall in the country varies depending on regions, ranging from 350mm to 1,100mm, increasing to the north. The rainy season also slightly differs by regions. However, it generally continues from November to April. The irrigated agriculture along the Tigris and Euphrates rivers contributes about 70% of the total domestic production in the agriculture sector.

Cropping patterns in Iraqi agriculture are essentially quite similar over the country, as intercropping wheat with fertilizers and barley / fallow rotation, which generally does not include fertilizer application. In particular, the irrigated farming usually includes pesticide application with a subsidized price besides fertilizers. The irrigated land can be represented by 2.5~3.4 million ha of wheat and barley, 0.34 million ha of perennial crops such as dates, citrus, and alfalfa. The other crops such as paddy rice, maize, vegetables, cotton, and sunflower are cultivated as summer crops. The figure below shows the typical cropping calendar in Iraq.



**Figure 5.3.10 Cropping Calendar in Iraqi Agriculture**

(4) Agriculture Input / Machinery

According to the survey conducted by FAO in June-July 2003, the situation with fertilizer distribution in the three southern governorates: Basrah , Missan, and Muthanna is as shown in Table 5.3.8.

**Table 5.3.8 Fertilizer Distribution Situation for Wheat and Barley Production in 2002/2003 (Three Southern Governorates)**

	Compound (ton)	Urea (ton)	Wheat & Barley Area Planted (ha)	Compound (kg/ha)	Urea (kg/ha)
Basrah	900	2,722	16,393	50	170
Missan	3,500	15,000	95,190	40	160
Muthanna	502	3,000	56,104	10	50
<b>Total</b>	<b>4,902</b>	<b>20,722</b>	<b>167,687</b>	<b>30</b>	<b>120</b>

Source: Special Report: FAO/WFP Crop, Food Supply and Nutrition Assessment Mission Sep. 2003

The table shows that the compound fertilizer use is low at an average of 30 kg/ha, and urea use at 50 kg/ha in Muthanna, compared with the FAO recommended level

of 100 kg/ha. It suggests that farmers are likely to be in difficulty when it comes to obtaining agricultural inputs due to limited access to available credit services.

The same data in the three central governorates surrounding Baghdad is shown in Table 4.2.2. The fertilizer distribution in those three governorates tends to suggest an excess supply, as noted by the fact that the unit application rates are far above 100 kg/ha for both compound and urea at 140 and 190 kg/ha respectively. The previous war disabled two fertilizer factories in Iraq, which may be one of the reasons for uneven distribution over the country.

**Table 5.3.9 Fertilizer Distribution Situation for Wheat and Barley Production in 2002/2003 (Three Central Governorates)**

	Compound (ton)	Urea (ton)	Wheat & Barley Area Planted (ha)	Compound (kg/ha)	Urea (kg/ha)
<b>Baghdad</b>	12,000	10,000	90,000	130	110
<b>Babylon</b>	11,358	19,575	100,000	110	200
<b>Wassit</b>	31,819	42,728	200,000	160	210
<b>Total</b>	<b>55,177</b>	<b>72,303</b>	<b>390,000</b>	<b>140</b>	<b>190</b>

Source: Special Report: FAO/WFP Crop, Food Supply and Nutrition Assessment Mission Sep. 2003

On the other hand, the FAO estimates that there are 61,000 units of tractor and 6,000 units of combine harvester, of which 14% are owned by farmers. The farmers with no such machinery contract with farmers with machines for their sowing and harvesting. The recent Oil for Food Program (OFFP) provided some of the new agricultural machines, reducing the average age of the existing ones. However, more than half of the machines are over 15 years old exacerbating the lack of spare parts. Table 5.3.10 summarizes the recent condition of use of agricultural inputs and machinery in the three regions with respect to wheat production.

**Table 5.3.10 Agricultural Input and Machinery Use for Wheat Production**

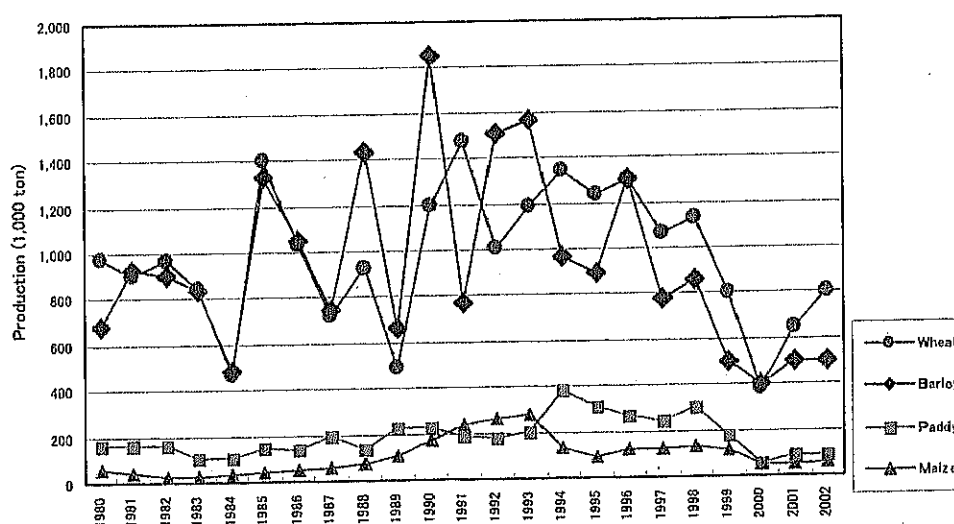
Item	North	Central	South
Farmers % hiring machine	-	-	70-90
Machine charge for hiring	US\$ 8- 40 per operation	-	US\$ 10 per ha
Farmers' % using wheat seed from last year's harvest	97%	50%	90%
Seed rate	100-170kg/ha	140kg/ha	200kg/ha
Fertilizer rate			
Compound	Mean 85kg	Mean 140kg/ha	Mean 30kg
Urea	Mean 110kg	Mean 190kg/ha	Mean 120kg

Source: Reproduced from "Special Report: FAO/WFP Crop, Food Supply and Nutrition Assessment Mission Sep. 2003"

90% of farmers in Basrah and Muthanna, and 70% in Missan employ agricultural machines on a contract basis for sowing and harvesting. In the central region, certified wheat seeds are available through national seed agencies, and about 50% of the demand for such seed is satisfied, while more than 90% of farmers in the northern and southern governorates use the seed from last year's harvest. The seed rate per hectare is generally higher than the recommended 100kg/ha, which implies that farmers are planting manually, which is more economical instead of using sowing machines.

(5) Agriculture Production

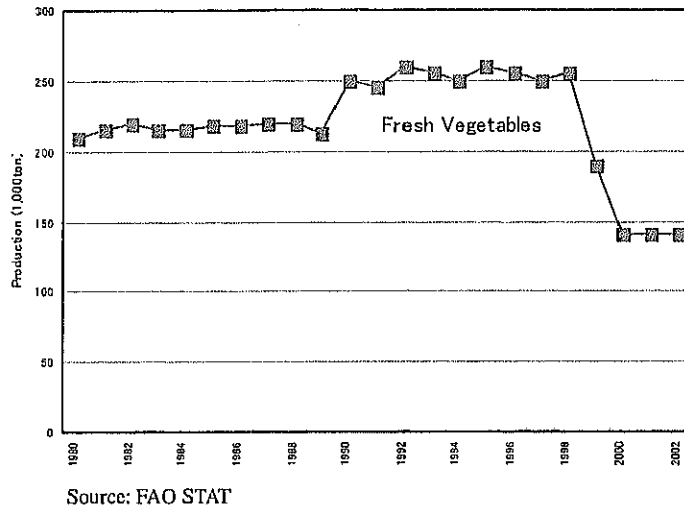
Figure 5.3.11 shows major cereal production during 1980-2002. Though production depends on annual rainfall, there was an increasing trend from 1980 to the early 1990s. The drought in crop year 1999/2000 seriously affected the overall production, recording the worst for wheat and barley production. After 2000 cereal production recovered slightly, while introduction of the OFFP in 1997 has led to a decreasing trend.



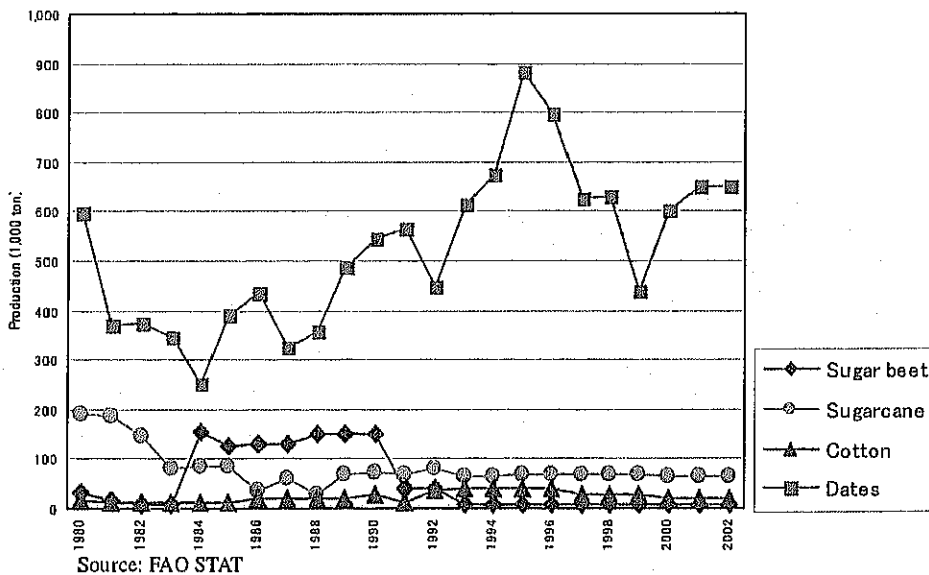
Source: FAO STAT

**Figure 5.3.11 Major Cereal Production (1980-2002)**

Figures 5.3.12 and 5.3.13 represent productions for vegetables and cash crops during 1980-2002. Apart from dates, from around 1997 or 1998 the production trends for each crop turned to decreasing



**Figure 5.3.12 Production Trend of Vegetables**

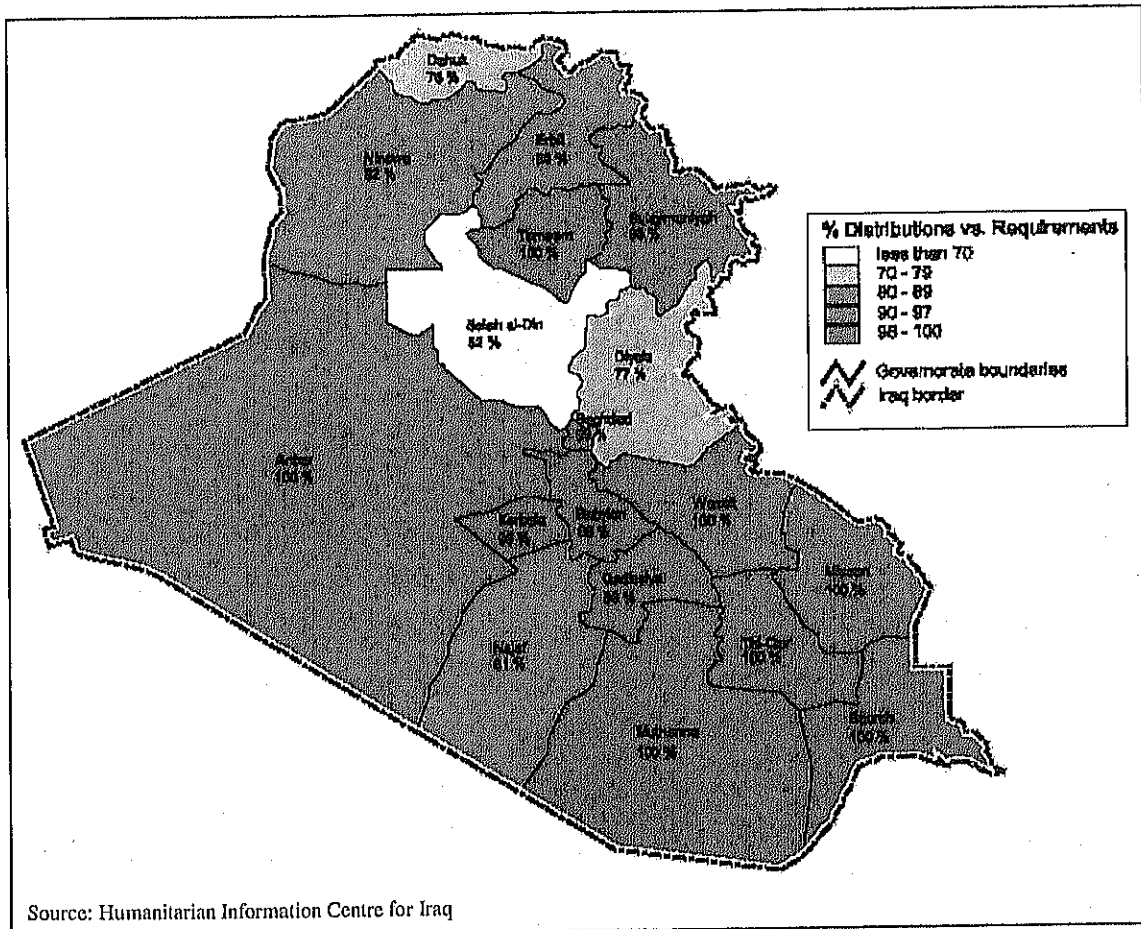


**Figure 5.3.13 Production Trend of Cash Crops (1980-2002)**

(6) Food Supply System and Food Balance

The sources of food supply in Iraq can currently be divided into three categories: 1) domestic production, 2) food aid through WFP, 3) food import by OFFP. Domestic food distribution is served by the Public Distribution System (PDS), which started from June 2003. The actual distribution of the food ration is undertaken by a country-wide network of about 44,000 food and flour agents, while the Ministry of

Trade (MOT) is responsible for the distribution of humanitarian needs. Figure 5.3.14 shows the PDS situations by governorates as of July 2003.



**Figure 5.3.14 Food Supply Condition through Public Distribution System as of July 2003**

According to the figure, the rates of food ration are relatively lower in part of the north and the central (Salah al Din, Dohuk, and Dyala) and Najaf in the south. Generally, such rates vary depending on the condition of regional security, silos and grain / food storage facilities throughout the country.

WFP observes that food rations originated from both domestic production and food aid / import in order to fairly meet the food demand from a total population of 26 million. However, food aid or humanitarian assistance from the outside can be effective only when considering short term, while it is inappropriate as a medium / long term strategy since it possibly has a negative impact on the domestic food market. It tends to create a lowering pressure on food prices, discouraging the

production incentive for farmers, which results in lowering the domestic production amount. Given such considerations, increasing domestic food production should be a major medium / long term strategy so as to give a fundamental solution for food security in Iraq, while gradually reducing the level of dependence on food aid. Consequently, it will require continuous aid providing agricultural inputs in the short term. Therefore, it is desirable to implement a master plan study on integrated agricultural development focusing on the medium and long term agricultural production, establishing a stable agricultural market and capacity building for stakeholders such as farmers, private traders of inputs and outputs, and government staff.

(7) Needs for Reconstruction Assistance by the Iraqi Government

Table 5.3.2 shows the list of priority projects in the agriculture sector required for foreign assistance, which was submitted by the Ministry of Planning and International Cooperation of Iraq at the Abudabi donor meeting in February 2004.

There are eight projects in the agriculture sector with a total project cost of 330 million US dollars. The priority projects are i) Animal and plant quarantine (8 million \$), ii) Fisheries (9 million \$), iii) Pest management (25 million \$), iv) Fertilizer (134 million \$), v) Pesticides (40 million \$), vi) Animal production (40 million \$), vii) Seeds (3 million \$), and viii) Farm equipment (72.8 million \$).

Among the priority projects, Fertilizer, Pesticides, Seeds, and Farm equipment are considered as farmers' support projects taking into account the introduction of a market economy in the agriculture sector.

(8) Approach to Support Program Formulation in the Agriculture Sector

Urgent and important issues in the agriculture sector would be to increase agriculture production and increase the food self-sufficiency rate, and to support and protect farmers through the movement to a market economy in the agriculture sector.

In order to increase agriculture production, it would be effective to improve the existing irrigation system, improve the soil condition, crop diversification and so on. At the same time, strengthening the farmers' organization is quite important to facilitate further movement to a market economy in the agriculture sector.



**Table 5.3.11 List of Priority Projects in Agriculture Sector submitted in  
Abudabi Donor Meeting (February 2004)**

Project No.	Project Title	Project Description	Project Cost	Governorate
439	Animal and Plant quarantine	1) Rehabilitation and re-operation of 10 plant and 16 animal quarantine station. 2) Establishing 4 plant and 3 animal quarantine stations 3) Training of staff on quarantine international standard 4) Provision of basic lab. Equipment pants quarantine and animal quarantine	8,000,000	Various
440	Fisheries	1) Rehabilitation of existing aqua culture facilities including hatcheries and rearing facilities 2) Establishment of appropriate resource management 3) Capacity building of staff	9,000,000	Wassit
441	Integrated pest management (IPM) (including aerial spraying)	1) Determination of IPM policy and development of legal frame work 2) Reconstruction of laboratories and facilities for research control and mass rearing of natural enemies 3) Establishment of reliable monitoring and forecasting	25,000,000	Various
442	Fertilizers	As Iraq moves from controlled to a market base economy, price support continues to be needed as the new scheme is implemented. These costs represented the anticipated value of subsidized inputs required for calender year 2004 over the next period. These fertilizers will support the farmer and secure food for the next season.	134,000,000	Various
443	Pesticides	As Iraq moves controlled to a market base economy, price support continues to be needed as the new scheme is implemented. These costs represented the anticipated value of subsidized inputs required for calender year 2004 over the next period. This pesticides will support the farmer and will secure food for the next seson.	40,000,000	Various
444	Animal Production	1) Establish priorities and up to date policies to increase animal production. 2) Re-establish laboratory facilities for disease control programs meet inspection service quality control artificial insemination programs to support the re-establishment of 3) Rehabilitation of veterinary hospitals and clinics. 4) Rehabilitation of vaccine production facility for (FMD).	40,000,000	Various
445	Seeds	As Iraq moves controlled to a market base economy, price support continues to be needed as the new scheme is implemented. These costs represented the anticipated value of subsidized inputs required for calender year 2004 over the next period. These seeds will support the farmer and will secure food for the next seson	3,000,000	Various
446	Farm Equipment	As Iraq moves controlled to a market base economy, price support continues to be needed as the new scheme is implemented. These costs represented the anticipated value of subsidized inputs required for the calender yr 2004 over the next period. This farm equipment will support the farmer and will secure food for the next seson.	72,800,000	Various
Total in Agriculture Sector			331,800,000	

Source: Ministry of Planning and International Cooperation

### 5.3.4 Mesopotamian Marshland

#### (1) Present Conditions and Issues

Downstream of the confluence of the Tigris and Euphrates rivers in Iraq, a large expanse of marshland, about 9,000 km<sup>2</sup> in area, existed until the 1970s. A population of about 400,000 “Marsh Arabs”, a traditional tribe, existed in this area. However, the area of marshland has dramatically decreased to 1,300 km<sup>2</sup> as of the year 2000, mainly due to development of drainage networks in and around the marshland. Of the three marshlands, Central and Hammar marsh have completely dried up and only Hawizeh marsh remains, though the area has decreased to 1,000 km<sup>2</sup>.

The ministries of Water Resources, Agriculture and Environment have identified restoration of the marshland environment and livelihood of Marsh Arabs as a top priority.

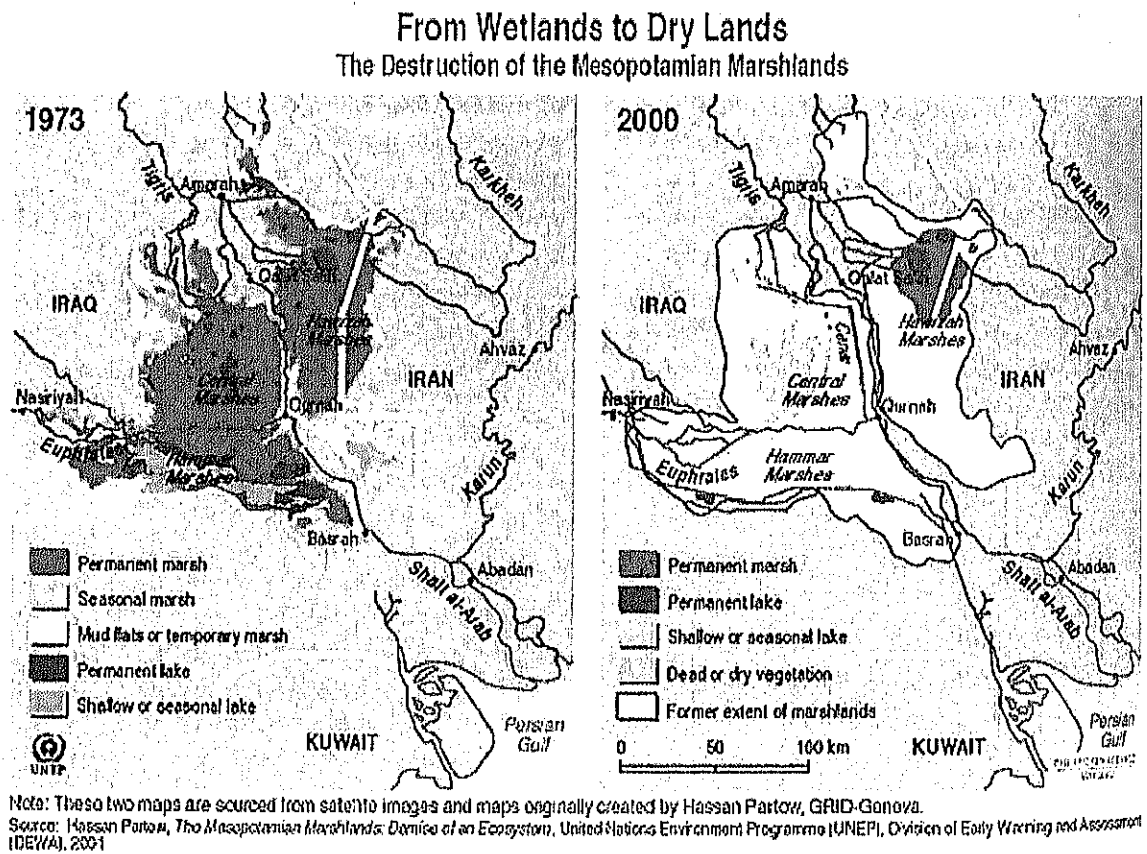


Figure 5.3.15 Comparison of Marshland Conditions in 1973 and 2000

General information on the three Mesopotamian marshlands is provided below.

(a) Hammar Marsh

Hammar Marsh was located along the right bank of the Euphrates River between Nasiriyah and Basra. The area was about 2,800 km<sup>2</sup> under normal conditions and 4,500 km<sup>2</sup> in maximum during the flood season. Before the 1970s, Hammar Lake occupied most of the marshland and the channel of the Euphrates River was disconnected at Hammar Lake.

(b) Central Marsh

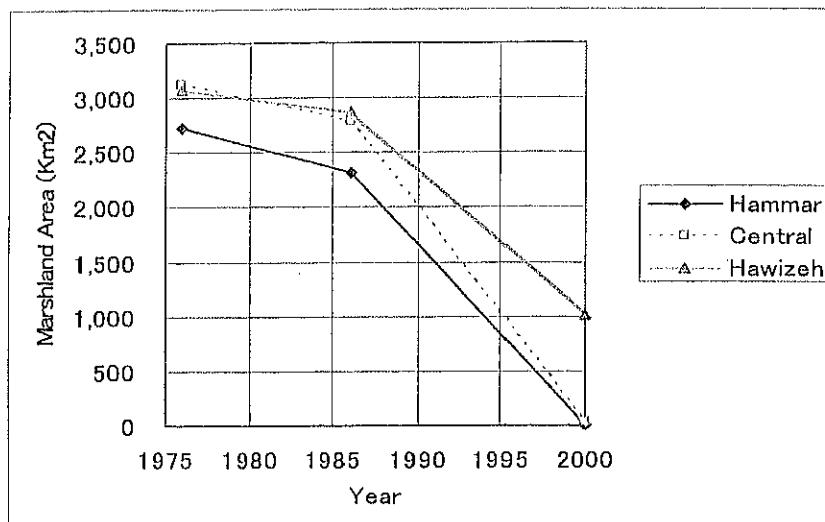
Central Marsh was located at the confluence of the Tigris and the Euphrates rivers at Qurna to the north. The area was usually 3,000 km<sup>2</sup> with a maximum of 4,500 km<sup>2</sup> during the flood season. In this area, large scale irrigation development of 1.39 million hectares was planned by the Ministry of Agrarian Reform in the 1970s to solve the shortage of food in Iraq by producing rice, wheat, dates, vegetables, and so on. Though the irrigation development was not realized, the drainage schemes were carried out and the area completely dried up in the 1990s.

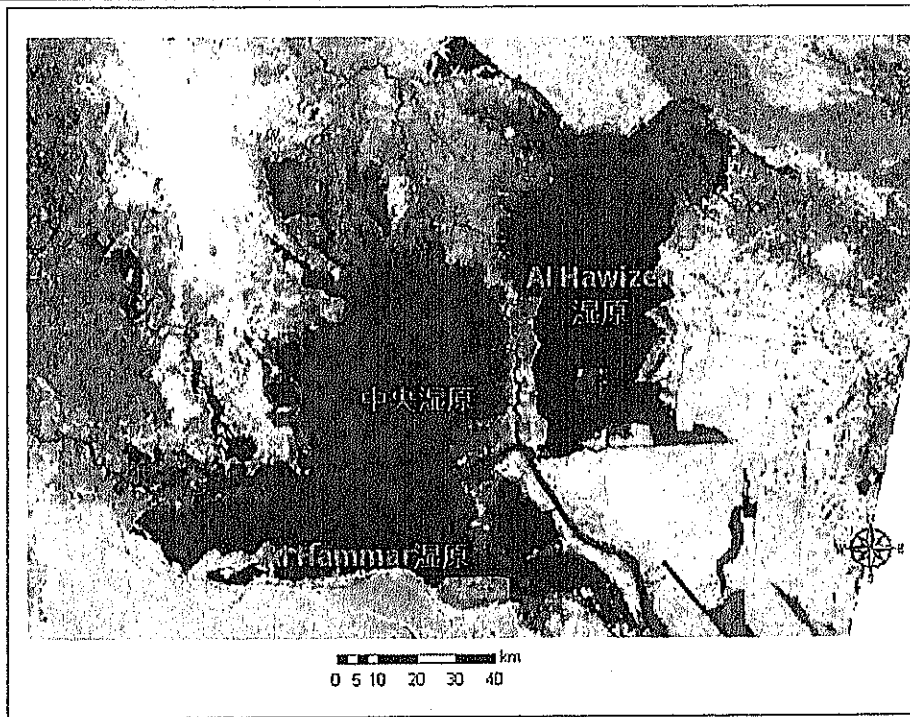
(c) Hawizeh Marsh

Hawizeh Marsh is located on the north of the Tigris River between Amarra and Basra. The marsh extends across the border between Iraq and Iran, and it is called Azim Marsh in Iran. The area was normally 3,000 km<sup>2</sup> with a maximum of 5,000 km<sup>2</sup> during the flood season. The sources of water for the marsh are the Tigris River and Karhe River.

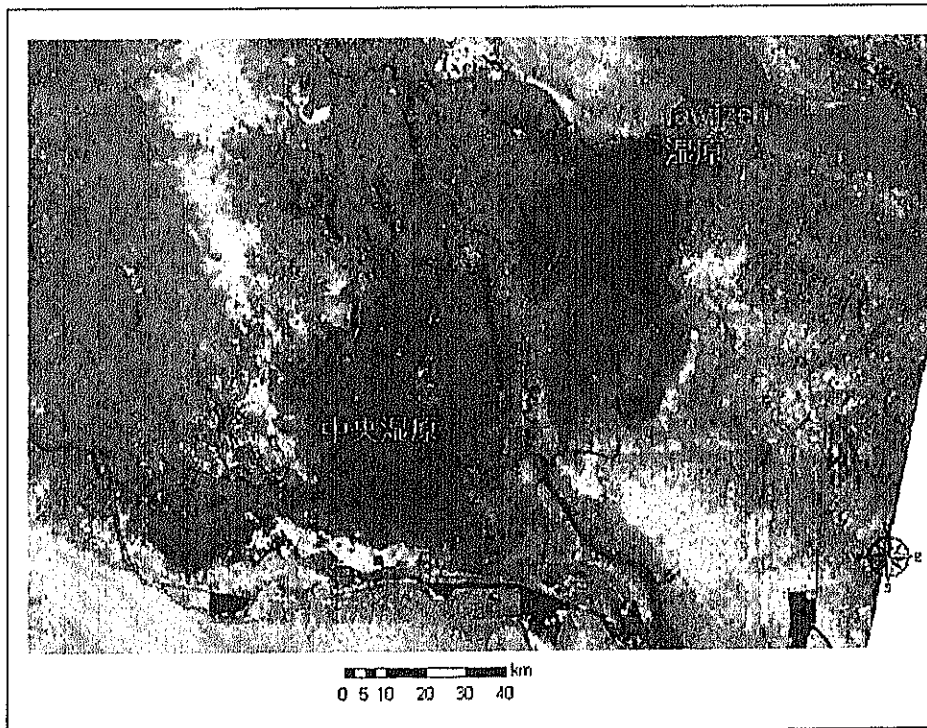
**Table 5.3.12 Trend of Mesopotamian Marshland Area (Unit : km<sup>2</sup>)**

Marsh	Hammar	Central	Hawizeh	Total	Remaining Area (%)	Source
River	Euphrates	Tigris	Tigris, Karhe			
1976	2,729	3,121	3,076	8,926	100%	UNEP
1986	2,320	2,784	2,874	7,978	89%	JICA
2000	4	25	1,005	1,033	12%	JICA
2002			890			UNEP





Satellite Image of Mesopotamian Marsh 1986



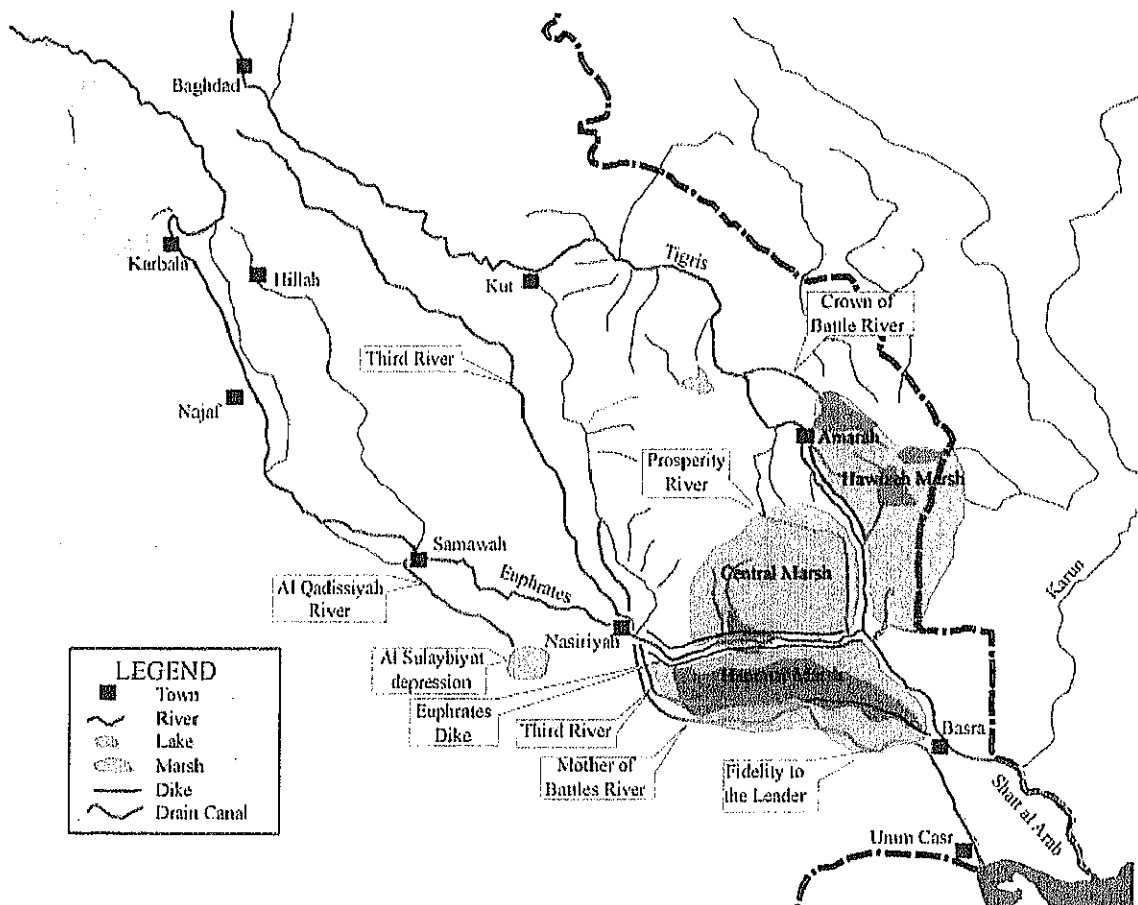
Satellite Image of Mesopotamian Marsh 2000

Figure 5.3.16 Decreasing Trend in Marshland Area

Table 5.3.12 and Figure 5.3.16 show the reduction in marsh areas of the three marshlands over time. It indicates that the area decreasing between 1976 and 1986 was not as significant as between 1986 and 2000. Based on the above, it is assumed that the various drainage works of the Mesopotamian marsh area performed in the 1990s are the direct reason for the drastic decrease in marsh land area.

On the other hand, it seems that large scale dam development in the upper Euphrates River, such as Keban Dam (31BCM, 1975) and Tabaqa Dam (11.7BCM, 1975), might have contributed greatly to the decrease in the Mesopotamian marshes. (Refer to Figure 5.3.4 Change of Monthly Flow of the Euphrates River).

Figure 5.3.17 shows the location of major drainages and dike construction works completed in the 1990s related to the Mesopotamian Marshland.



**Figure 5.3.17 Major Drainage and Dike Construction works related to Mesopotamian Marsh**

The development of drainage networks in and around the Mesopotamian marshland were carried out in the following manner.

In 1992, Third River (Saddam River) with a total length of 560 km from Mahamudia to Shatt al Arab River was completed. The canal collects all the saline drainage water from the irrigation area on the left bank of the Euphrates River and keeps it separated from the river flow for downstream use.

In 1993, The Prosperity River with a channel width of 2 km and length of 50 km was completed. It connects the tributaries of the Tigris River that flowed into the Central marsh directly to the Euphrates River with the effect of drying up the Central Marsh. The outlet of the Prosperity River is just upstream of the Qurna confluence on the Euphrates River.

In 1994, the Mother of Battle River from Nasiriyah to Shatt al Arab River was completed with a total length of 108 km. The canal diverts floodwater from the Euphrates River directly to the Shat al Aran River and improves the drainage condition of the whole Hammar Marsh. Hammar Lake completely dried up after the completion of the Mother of Battle River.

Crown of Battle River was also completed in 1994 to divert the flood water of the Tigris River to Hawizeh Marsh, which will contribute to protect flooding on the Central Marsh. It was expected to increase the area of Hawizeh Marsh and to decrease the area of Central Marsh. However, the Hawizeh Marsh also decreased due to the river improvement works of Al Musharrah and Al Kahala, and the construction of a separation dike between the Tigris River and the Hawizeh Marsh on the left bank.

## (2) Movement of the Other Donors

Many international donors, including UNEP, FAO and others, have shown a high interest in cooperation with the restoration of Mesopotamian Marsh. Some donors have already formulated action plans for the restoration. The current activities related to the Mesopotamian Marsh by major donors are summarized below.

### 1) UNEP

UNEP initially carried out an investigation of the Mesopotamian Marshland through satellite images obtained before the Iraq War, and they have publicly warned that the Mesopotamian Marsh is in critical condition to become extinct

soon if no countermeasures are immediately taken. They published “The Mesopotamian Marshlands: Demise of an Ecosystem” in 2001.

After this, UNEP conducted a follow up study was and published the results as “Desk Study on Environmental in Iraq” in 2003. In this report, UNEP presented the trend of decreasing marshlands area since the 1970s, the change in land use condition, affects on the living condition of the people in and around the marshlands, changes to the eco-system of the marshlands and so on.

Currently, it is reported that the UNEP is mainly active in the preservation of the only remaining marsh, Hawizeh Marsh, through coordination with the local communities in Iraq and Iran. At the same time, technical investigation on soil condition, water quality, and monitoring with satellite images is being carried out. In the course of such field activities, UNEP is coordinating the activities of all donors that have expressed an interest to participate in the restoration of Mesopotamian Marsh.

Regarding the extinguished Central and Hammar marshlands, the possibility of restoration is currently assessed by UNEP in view of water quantity, water quality, soil condition, flora and fauna, function of eco-system and so on. They are planning to formulate an ecosystem restoration and integrated management plan in future.

## **2) FAO**

FAO is focusing on providing assistance to people directly affected by the extinction of the marshlands. Also they are planning to participate in the restoration activities of the extinguished marshlands through an integrated approach for environmental preservation and rural development.

A characteristic of the FAO approach is that they consider not only the environmental viewpoint, but also agriculture and fishery development for the Marsh Arabs in and around the marshlands.

So far no field activities by FAO have been observed, but it is reported that they are ready to start their actions at the field.

## **3) USAID**

USAID is currently conducting “Marshland Restoration and Management



Program” from June 2003 for 1 year. Objectives of the program are as follows:

- a) Baseline survey on environment, sociology, and economy in Mesopotamian marshlands area.
- b) Urgent assistance for those who return to and move out from the marshland area.
- c) Study on improvement of marshland management and measures for restoration of vanished marshlands.
- d) Formation of mutual consensus of stakeholders of the Mesopotamian marshlands for the long-term restoration integrated with sustainable regional development.

The work progress as of February 2004 was open to the public through the Internet, and this is summarized as follows:

- i) The overall marshland investigation including the dried up area and restored marsh land through ground works and observation by helicopter.
- ii) Soil and water quality investigation for the original and restored marshland. The results indicated that the salinity concentration was about 1,000 ppm, which was much lower than expected.
- iii) Interview survey of people in and around the marshlands. It was found that there is a lack of medical services and nourishing food.
- iv) The USAID team has cooperated with Basra University for the study. It was reported that the researchers from Basra University are eager to learn through the program, and it is highly expected that there will be further target groups for technology transfer.
- v) The USAID team has coordinated with MOWR for implementation of the study. It was reported that the staff of MOWR are willing to participate in data collection and interview survey.

USAID have planned to conduct the Phase-2 study with a budget of US\$4 million. The Phase-2 study would include socio-economic assistance to the people in the marshlands, restoration of the marshlands, and capacity building for Iraqi counterpart agencies. The scope of the Phase-2 study is as follows:

- i) Hydraulic modeling of river basins and marshland area for formulation of water distribution plan.
- ii) Provision of equipment for soil analysis and water quality analysis to the Center for Restoration of Iraqi Marshland (CRIM), which is planned to be established under MOWR.

- iii) Implementation of a pilot project for improvement of the treatment of drinking water and sewage in the restored marshland area.
- iv) Income generation for the people in the area through fishery, aqua-culture, livestock production, and date production.
- v) Water quality monitoring in the restored marshland.
- vi) Provision of health care services to the people in and around the marshlands in cooperation with AMAR (an NGO).
- vii) Implementation of a study tour to Europe or America for marshland management targeting the staff of the Iraqi government.
- viii) Formation of a partnership and conducting capacity building to the stakeholders of Iraqi marshland restoration such as MOWR, Ministry of Environment, Basra Agriculture Institute, AMAR (NGO for assistance to Marsh Arab), and the Iraq Foundation.

#### **4) Iraq Foundation**

The Iraq Foundation is registered in Iraq as a Non Profit Organization (NPO) for political stability and economic development of the Middle East. For the Mesopotamian Marshlands, they commenced “Eden Again Project” in 2002 with the financial assistance of the Italian Government.

The goal of the “Eden Again Project” was defined as to restore the Mesopotamian Marshlands, which was an Eden for the Marsh Arab people, and various ecological elements. The objectives of the project are as follows:

- i) To form the international specialist group for the technical assessment of marshland restoration.
- ii) To prepare technical reports for the marshland restoration plan.
- iii) To disseminate the importance and necessity of marshland restoration in the view of regional and global environmental aspects.
- iv) To implement projects for sustainable marshland restoration in cooperation with international agencies, the Iraqi government and local governments.
- v) To support activities at the grass roots level for marshland restoration.

The Iraq Foundation has carried out the hydrological analysis, analysis and evaluation of current marshland conditions, formulated marshland restoration scenarios and identified technical constraints.

Under the Eden Again Project, further study would be continued to take into

account urgent issues, hydrology, soil conditions, ecology, social environment and integrated issues based on the formulated marshland restoration scenarios.

### **5) Other Donors**

Current activities of other donors regarding the Mesopotamian marshland are introduced by USAID through their home page as summarized below:

**United Kingdom** : UK has provided specialists to “Marshland restoration and management program” of USAID for technical assistance.

**Australia** : The Australian government is considering to send specialists in marshland and salinity issues to the “Marshland Restoration and Management Program” of USAID.

**Canada** : The Canadian government will send biologists, botanists and zoologists to “Marshland Restoration and Management Program” of USAID.

**Italy** : The Italian government is assisting the Iraq Foundation through financial support for environmental evaluation, modeling, and water budgeting.

**Japan** : The Japanese government is expressing an interest in participating in the restoration program, particularly infrastructure rehabilitation and provision of equipment to villages in and around the marshlands.

### (3) Restoration Plan by Government of Iraq

The Minister of Water Resources of Iraq expressed in the Madrid donor meeting in October 2003 that the restoration of the Mesopotamian Marshlands is a priority issue of MOWR and welcomes the restoration activities by all those countries, international agencies and NGOs.

The minister’s presentation regarding the restoration of marshland is summarized as follows:

- a) Restoration of Mesopotamian marshlands is a priority issue for MOWR.
- b) MOWR will implement the reservation activities for the marshland environment, ecological system, and socio-cultural heritage.
- c) All those countries, international agencies and NGOs who are interested in restoration of the marshlands are welcome to participate in the restoration activities,

- d) MOWR recognizes the regional and global importance of the marshlands and highly appreciates the international cooperation with the process of the marshlands restoration.
- e) MOWR is responsible for restoration of Iraqi marshlands, and is obliged to explain to the Iraqi people that the restoration activities are essential as regional and global environmental issues.
- f) MOWR requires various analytical equipment for activities related to the restoration of the marshlands, and would welcome denotations of same by various countries.
- g) MOWR will arrange institutions to implement marshland restoration program under cooperation with all the related agencies.

As mentioned above, many donors expressed an interest in participation in the restoration activities of Mesopotamian marshlands after 2000. Currently, MOWR, USAID and the Iraq Foundation are the major players to perform the activities in the field. Though various approaches have been assessed by each agency, MOWR preliminarily listed the following 15 projects to conserve the remaining marshland and restore the dried up marshlands as below:

- ①~③ Alternative plans for Prosperity River
- ④~⑤ Rehabilitation of Sweet Water Canal (Basra Canal)
- ⑥ Rehabilitation of Al-Darmaji Lake
- ⑦ Provision of additional river flow into Hawizeh marsh through Al Musharaha-Al Kalaha River inlet canal
- ⑧ Restoration of Abu Razk Marsh
- ⑨ Restoration of Al-Karmashia Marsh
- ⑩ Restoration of Al-Adel Marsh
- ⑪ Establishment of the Center for Restoration of Iraqi Marshland and Marshland Museum
- ⑫ Provision of flow regulating structures from Hawizeh Marsh at Al-Kasara & Al-Suweeb
- ⑬ Provision of culvert structures under both banks of the Euphrates dike
- ⑭ Restoration of Auda Marsh

In the course of the study, MOWR suggested to the study team that Japan participate in the restoration activities, particularly ⑫ flow regulating structures for Hawizeh Marsh, and ⑬ provision of culvert structure under both banks of the Euphrates dikes.

However, it appears that the plans for the restoration activities need more investigation, study, and workshops to achieve consensus of all the stakeholders. In fact, there are many dimensions to the restoration activities as they will impact upon environment, socio-culture, agriculture, land-use, oil industry, rural development, and so on. Accordingly, it is recommended that the Japanese assistance to the Mesopotamian Marsh be performed together with other donor agencies from a long-term viewpoint.

On the other hand, the preservation of Hawizeh Marsh needs urgent actions to prevent it from drying up completely. Once the marshland dries up, the ecological system in the area would be heavily damaged and full recovery would be very difficult.

#### (4) Current condition of Implementation Agency and Human Resources

Data on the Mesopotamian Marsh was collected through the marshland investigation team of MOWR and USAID/DAI. At the same time, interviews with 20 MOWR engineers in Baghdad were conducted regarding the marshland restoration. Based on this, it is wondered that the necessity and importance on the marshland restoration would not be well recognized in the MOWR yet. In addition, no specific department has been established to be responsible for marshland restoration issues. A "Center for Restoration of Iraq Marshlands (CRIM)" should be established in MOWR for implementation of marshland restoration activities.

#### (5) Proposed Reconstruction Supporting Program

##### **1) Integrated Environmental Preservation and Sustainable Rural Development in Mesopotamian Marshlands**

As mentioned above, MOWR has suggested projects to which Japan could contribute. Prior to committing to specific projects, however, it is first necessary to grasp the present environmental, technical and socio-cultural conditions. Currently, USAID and Iraq Foundation are conducting the overall study to identify the latest conditions of the whole marshlands. It is therefore recommended that a Japanese team conduct a basic study of the marshland based on the results of the said studies once they are completed to provide full information for assessing and determining a long-term support program.

It is also recommended that some assistance to CRIM should be provided for capacity building of the implementation agency; this could be the first step to participate in the supporting activities of an international cooperation program.

Provision of analytical equipment and sending experts to CRIM would be another effective form of short-term support.

The following is an outline of the proposed support activities:

- a) **Basic Study on Natural Environment and Land Use in the Mesopotamian Marshlands:** A basic study to cover the whole marshlands area should be carried out to identify the necessity and viability of the two projects that have been suggested to the Study team by MOWR. The scope of the study would be ① Baseline survey of villages in the marshlands, ② Current land use investigation, ③ Water quality and soil condition and agriculture activity survey, ④ Natural and social environmental investigation in and around the existing marshland, ⑤ Alternative study for preservation of Hawizeh Marsh, ⑥ Detailed topographic survey and land use investigation of the Euphrates Dike and the backyard areas (Central and Hammar marshlands), ⑦ Pilot project formulation for interrelated rural development with marshland preservation, and so on.

Taking into account the current difficulties for Japanese experts to enter the field, or even to enter Iraq, the basic study should be carried out by a joint operation of a Japanese expert team, local consultant team, and the Iraqi government team. It would be required to hold workshops in neighboring countries for direct communication with all the stakeholders of the marshland restoration. (Short/Mid Term, Study, Study cost: about 500 million yen).

- b) **Sending Experts and Provision of Analytical Equipment to CRIM of MOWR:** CRIM is scheduled to be established in March 2004. After establishment, analytical equipment should be provided by Japanese ODA to indicate Japanese interest to participate in the marshland restoration activities. When the security condition in Iraq is improved, some experts shall be sent to CRIM to provide capacity building to the MOWR engineers, to assist in project management, and to cooperate with the other international donor's activities as the Japanese project coordinator. Environmental specialists and Agriculture experts are the most appropriate experts to be assigned. (Mid/Long Term, Technical cooperation, Cost: about 1 billion yen).

## **5.4 Water Supply, Sewerage/Sanitation and Waste Management**

### Preface

No quantitative data of water supply, sewerage/sanitary and waste management are collected. The report below is mainly by reference to "Working Paper UN/WB Joint Iraq Needs Assessment for Water and Sanitation, October 2003", and "Assessment Project of the Water and Sanitation Sector in Iraq, August 2002 by SAFEGE".

### **5.4.1 Current situation with Water Supply, Sewerage/Sanitary and Waste Management and Associated Problems**

#### **(1) Water Supply**

##### **(a) Deterioration of water supply**

Prior to the 1991 Gulf War, it is reported that the water and sanitation sector in Iraq was operating efficiently, utilizing then-current technology. According to several sources, including UN reports, safe potable water was accessible by over 95 % and 75 % of the urban and rural populations, respectively. The average water supply planning figures were 330 liters per capita per day (L/C/d) in Baghdad, 250–300 L/c/d in other cities and towns, and 180 L/c/d in rural areas. A total of 218 conventional water treatment plants and 1,191 compact water treatment units were in operation.

Between 1990 and 2000, the urban water service coverage declined to 92 %, while the rural coverage dropped to 46 %, with the daily per capita water supply dropping 150 liters in Baghdad, 110 liters in other cities and towns, and 65 liters in rural areas.

**Table 5.4.1 Water Supply Coverage in Iraq in Year 2000 (WSC)**

	Urban Population	Coverage in Urban	Rural Population	Coverage in Rural
	SUP 2000	Area UWSC (%)	SRP 2000	Area RWSC (%)
Mayorality of Baghdad	4,753,378	100	15,694	100
Total GCWS	8,234,575	88	2,926,597	43
Total ARNI	2,191,136	87	749,160	78
Total	15,179,089	91.6	3,691,451	50.3

Remarks:

UNICEF estimates of population in 2000.

WSC: Water Service Coverage

SUP/SRP: Urban/rural population served by public utilities (excluding public wells and public standpipes)

UWSC/RWSC: Urban/Rural water supply coverage in % of urban population/rural population

GCWS: General corporation for water and sewerage

ARNI: Autonomous region in the North of Iraq

As a result of the 2003 conflict, the situation in the water sub-sector has deteriorated further. UNICEF in collaboration with the government authorities conducted a quick assessment of major water and sanitation facilities and found that in general the plant performance efficiencies of the water facilities had deteriorated by 50 % compared to the pre-war situation.



Treated pump in Saba Nissan WTP in Baghdad city

Many small towns and villages are served by tankers traveling many miles to provide potable water with an average frequency of once every 5 days.

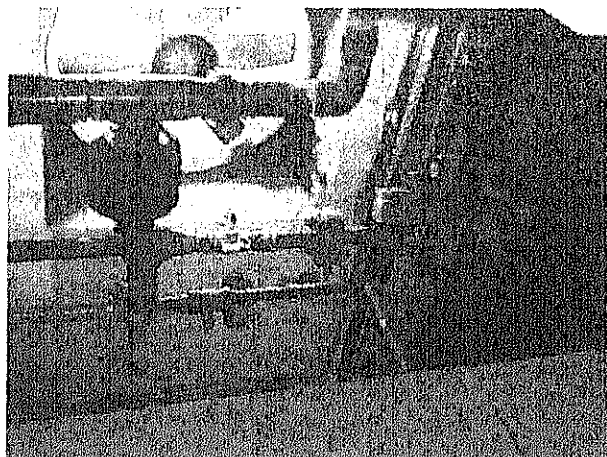
**(b) Deterioration of water quality**

As a result of the 1991 Gulf War and the international sanctions, the water and sanitation sectors suffered dramatically, resulting in a drop of plant performance efficiencies by 30 % in the water and sanitation sectors.

According to assessments undertaken by UNICEF and Care prior to the 2003 conflict in coordination with ICRC, not all water and sewerage treatment plants were providing an acceptable level of treatment. The assessments show that of the 177 water treatment plants assessed, 34 were classified as good, 98 as acceptable, and 45 as poor.



During the period of 1990-2000, diseases related to unsafe water and poor sanitation reached alarming rates. According to humanitarian reports, one-third of all children in the South and Central Governorates were suffering from malnutrition, and mortality rates more than doubled in the last decade. UNICEF estimated a rise of 160 % in the mortality rates in children under 5 years old, of which 25 % was due to diarrhea.



Chemical pumps in Saba Nissan in Baghdad city

(2) Sewerage/Sanitation

(a) Low service rate of sewerage

The sewerage collection and treatment system serves mainly the city of Baghdad, where 80 % of its population is served, whereas only 10 % of the remainder of the urban population in central-southern areas of Iraq and 0 % of the three Autonomous Regions in the North of Iraq are served by sewerage systems. On-site sanitation systems such as septic tank, cesspits etc. are used in the areas where sewerage systems are not developed. In rural areas in the Central-Southern and Northern Regions, even the availability of on-site systems is low, remaining at approximately 40 %.

**Table 5.4.2 Sanitation Adequacy Performance Indicators**

Parameter	CSR (%)	MB (%)	ARNI (%)	Comment
Percentage of urban population with sewers	10	80	0	
Percentage of urban population served by on-site sanitation	79	20	66	
Percentage of rural population served by on-site sanitation	36	100	38	There are no sewers or sewage treatment in rural areas

CSR: Central south region

MB: Mayoralty of Baghdad

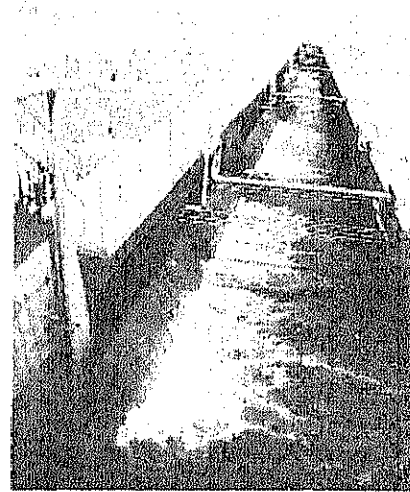
ARNI: Autonomous region in the North of Iraq

According to estimates in 2002, the sewerage treatment rate is only at 22 %, even if all treatment plants are normally in operation. (Refer to Table 5.4.3)

There are four (4) sewerage treatment plants in Baghdad city with a total capacity of 789,200m<sup>3</sup>/day. The service rate is estimated at 55 % with the assumption that the population is 4,750,000 and unit sewerage generation is 300 L/day/person.

(b) Deterioration of service and quality of services

Sewerage systems were damaged by the conflict and they are barely operational with priority power supply and generators. In addition, the supporting standby generators need continuous repairs, resulting in the drop of the plant performances by 30 – 50%. Unstable operation results in biologically untreated conditions and the untreated sewerage is discharged into rivers and waterways.



Discharge of untreated wastewater from Kerth WWTP in Baghdad City

The operations of pumping stations are in the same situation. Therefore, sewerage is also discharged to rivers and waterways without treatment. Furthermore, collected wastewater from septic tanks is also illegally dumped into rivers or on land.

The deteriorated leaking sewer pipes that are contaminating the potable water networks and the underground water are adding to the health and environmental problems.

In the Central and Southern governorates, excluding Baghdad city, all existing treatment plants have collapsed or are generally inoperable due to war damage or the inability to maintain them or rehabilitate the facilities.

In Basrah , the main sewerage treatment plants are not operating properly, leading to the discharge of untreated sewerage into a canal leading to the desert. Along the way, sewerage seeps into the irrigation canal that communities are using for drinking and bathing purposes.

**Table 5.4.3 Sanitation Infrastructure**

Province	Province capital	Estimated Population in2002 (thousand)	Sewerage Sources (m <sup>3</sup> /day)		STPs		
			Urban <sup>1)</sup>	Rural <sup>2)</sup>	No.	Installed Cap (m <sup>3</sup> /day)	Status
<b>Governorate</b>							
1. Al Anbar	Ar Ramadi	1,200	136,040	76,903	1	16,000	Not working
2. Al Basrah	Al Basrah	1,700	328,276	52,157	1	35,200	Not working
3. Al Muthanna	As Samawa	500	54,556	38,196	0	0	NO STP
4. Al Qadisiyah	Ad Diwaniyah	800	117,236	58,156	1	12,000	Not working
5. An Najaf	An Najaf	1,000	161,856	38,401	1	43,000	Not working
6. At Tamin	Kirkuk	800	155,879	35,915	0	0	NO STP
7. Babil	Al Hillah	1,400	140,302	94,916	1	12,000	Not working
8. Baghdad	Baghdad	6,300	1,426,013	2,354	4	789,200	Not working
9. Dhi Qar	An Nasiriyah	1,300	183,792	78,222	4	17,400	Not working
10. Diyala	Baqubah	1,300	120,154	102,570	0	0	NO STP
11. Karbala	Karbala	700	110,537	32,425	1	116,000	Not working
12. Maysan	Al Marah	700	117,642	35,508	1	30,000	Not working
13. Ninevah	Mosul	2,400	370,728	134,118	0	0	NO STP
14. Salah ad Din	Samarra	1,000	99,270	80,003	2	87,840	Not working
15. Wasit	Al Kut	600	113,121	60,463	0	0	NO STP
<b>Autonomous Region</b>							
16. As Sulaymaniyah	Sulaymaniyah	1,400	301,033	69,479	0	0	NO STP
17. Dahuk	Dahuk	400	96,370	31,707	0	0	NO STP
18. Erbil	Erbil	1,000	225,508	51,920	0	0	NO STP
<b>Total</b>		24,500	4,258,313	1,073,413	17	1,158,640	
<b>Rate of WWTP service %</b>							21.7

### (3) Waste Management

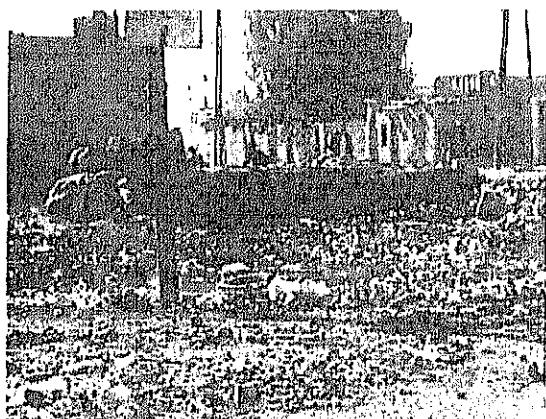
There is no comprehensive waste management in Iraq.

Solid waste collection in Baghdad and major cities was developed around the technology of collection of domestic waste with expensive garbage collection vehicles and dumping it into dumpsites. No proper sanitary landfill is in existence.

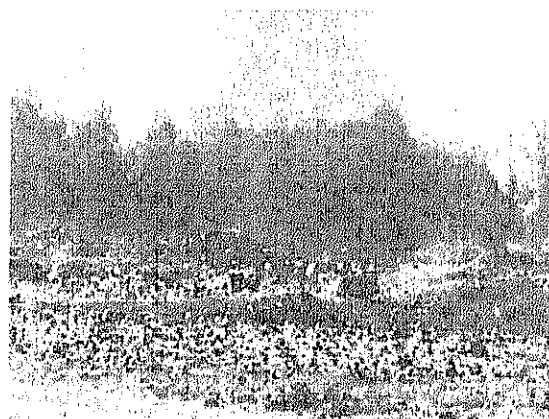
This sector also witnessed extensive deterioration during the war and sanctions. Prior to 1991, 800 garbage collection vehicles existed in the city of Baghdad. After the Gulf War and sanctions period, the number of vehicles declined to 80, not including compactors, bulldozers and other machinery for waste processing and management of dumpsites.

Under the OFFP, the city of Baghdad received large quantities of equipment, including a total of 960 garbage collection containers and 1,100 collection vehicles, which substantially improved garbage collection in the city. Other major cities also received similar vehicles, but not in the same proportion.

After the conflict, the parts of collection vehicles were plundered or stolen or resold. The current garbage collection rate is extremely low as shown in the table below. Even in Baghdad, the garbage collection rate is only at 25 %. Garbage is only shifted from right to left, resulting in garbage being scattered throughout the city.



Scattered garbage in Baghdad City



Garbage landfill in Baghdad

**Table 5.4.4 Sanitation Adequacy Performance Indicators**

Parameter	CSR (%)	MB (%)	ARNI (%)	Comment
Garbage collection performance indicator	2	25	8	Defined as the value of recent equipment/value of equipment

#### (4) Problems

Land devastation, financial deterioration due to the Iran-Iraq Conflict, the Gulf War, economic sanctions and the Iraq War since 1980 caused the stop to infrastructure development and triggered deterioration of water supply, water quality, sanitation services and waste management. The common problems among the sectors are as follows.

##### (a) Lack of electric power and fuel

Electrical power supply, crucial for the efficient operation of water and sanitation facilities, fell from 4,400 megawatts (MW) per day to 3,500 – 3,000 MW after the recent war in the country. Currently 50 percent cuts of power supply occur through the country, reducing power availability to about one third of the pre war situation. Baghdad City alone required approximately 2,400 MW per day before the war, while currently only 50 % of this is available.

In addition, transmission lines collapsed, substations were severely damaged, cables were looted, and many essential spare parts such as cables and joints are

in short supply.

The unavailability of continuous power supply and lack of security has also crippled the ability of the ministries and water and sanitation authorities to manage and operate basic services. Unsatisfactory operation of basic processes such as coagulation, sedimentation, filtration and chemical feeding resulted in no change through the turbidity removal process and inadequate chlorine feeding is causing health problems. The pressures in the water network are low and water cannot normally reach the elevated water tanks at residential homes.

Power outages are forcing shutdown of many of the water treatment plants, sewage treatment plants, and sewerage pumping stations, causing sewerage to back up in the sewers. This has promoted sewerage flooding, and the deposition of solids, which has led to further blockages of sewage flow.

Inability to secure fuel for generators also results in unstable operation of the facilities.

(b) Lack of maintenance materials and equipment due to bomb damage

The looting of transport vehicles, service trucks and tankers, consumables, spare parts, maintenance tools, monitoring equipment, safety equipment, and laboratory testing equipment and materials has had a severe impact on the functioning of the operational units within the water and sanitation authorities due to the Iran-Iraq wars, Gulf wars, economic sanctions and the recent Iraq War.

The average annual budget fell to about US\$ 8 million from 100 US\$ million in 1990. In reality this decrease was even greater due to the devaluation of the Iraqi Dinar.

The introduction of OFFP in 1995 arrested the decline of the water and sanitation sectors and there was marginal improvement in water treatment, production, distribution networks, supply and wastewater treatment and collection systems, but they are still in a crisis situation due to the Iraq war.

The water networks in Baghdad suffered greatly from bomb damage, resulting in acute shortages of water supply leading to people breaking into the networks.

A large number of water compact units, serving mainly the rural areas, are poorly maintained and have been affected. These are largely operated by local authorities and communities. Many were heavily looted during the conflict. In the Basrah area, the majority of the water treatment plants are compact units, where 50 % of the plants require urgent repair due to damage or lack of maintenance.

Although some of the compact units are new (less than 2 years old), the rest can be categorized as needing repair or replacement immediately. Many of these should be replaced by a regular treatment unit.

(c) Shortage of staff and training (Current situation with staff is stated later.)

There was an acute shortage of staff, particularly experienced staff for managerial positions, technical staff for planning and design and maintenance technicians. The major causes of this shortage of key staff are considered to be the low salaries (average salary 170 USD, assuming that 1 USD equals 1,800 Iraqi Dinar) and the image of being a failure in life, which contribute to the very acute shortage of sewerage staff.

The anticipated lifetime of the plant has been shortened by lack of preventive maintenance and improper operation. There is a lack of an institutional and O/M system using IT .

The looting of the Ministry offices' furniture, equipment, stationery and loss of data and records caused by the war has created difficulties for the functioning and operation of the Ministries' management units. For example, the General Corporation for Water and Sewerage (GCWS) under the Ministry of Public Works currently has no designated functional office.

(d) Decrepit facilities

By way of example, most of the water treatment plants were commissioned between 1950 and 1985 and were partially modified between 1976 and 1982, except Al-Wahda in Baghdad City, which was modified in 1999. Many of the plants and networks designed during this period need rehabilitation of the structures, plant and equipment. The anticipated lifetime is estimated at 15-25 years, assuming proper maintenance.

The network in Baghdad consists of 7,190 km of pipe with diameters ranging from 100 to 1,600 mm and the pipes are made of ductile iron (2,400 km), steel (290 km), asbestos cement (3,700 km) and cast iron (800 km). The total length of piping in the Central and South regions, excluding Baghdad, is some 28,000 km: 5,500 km of asbestos cement pipe, 10,000 km of ductile iron, 2,800 km of cast iron, 8,300 km of PVC, 1,200 km of steel and 300 km of pipe made from other materials.

The average age of the pipes is 10-15 years for galvanized steel, 10 to 25 years for ductile iron, 35 years for steel, 30 years for asbestos cement and 40 years for cast iron. Therefore, a considerable amount of the network piping is estimated to need rehabilitation.

Water losses through the distribution network are presently of the order of 45-60 % and in some cases higher because they are too old and have been damaged by war. The incidence of breaks has increased threefold since 1990, but the network has deteriorated further as a result of the last conflict.

To reduce water losses along with rehabilitation and expansion of water plants should be taken as the priority. Care should be taken before constructing new water plants without thought.

(e) Inadequate construction of facilities without proper planning and principals

The distribution networks were constructed in a piecemeal fashion without any real planning or respect of proper design standards and principals. The existing overall storage capacity corresponds to only a minute amount of daily production and is inadequate to overcome a shortage. Most of the existing reservoirs (storage capacity) in the Central and South regions have been abandoned.

Reservoir operations are at present based on direct pumping, which is dependent on a reliable power supply. Direct pumping also creates undue stress on the pumps, resulting in frequent breakdowns and a reduction of the lifespan of the pumps.

Newly developed areas in city suburbs are not currently served with any potable water distribution network.

(f) Regional deference in infrastructure development

Potential availability of sanitary services in Baghdad including the suburbs is higher than that in other cities. It is relatively low in the central and southern regions where the Shiites are the majority and in the Autonomous Region in the North of Iraq.

The water supply from the main water treatment plants has been stabilized, but quantities and quality are still insufficient in Basrah .

It has been reported that rural communities along the road from Basrah to Safwan have tapped the main pipeline to get water, causing a drop in water pressure and preventing water from reaching Safwan residents.

Although the impact of the war on the infrastructure in the north is negligible and there was some advantage from OFFP, the water supply system in north Iraq continues to suffer from excessive leakages as a result of the very old water network in many urban and semi-urban locations.

**5.4.2 Assistance by Foreign Donors, NGOs, etc.**

NGOs such as Care International, NCA and Caritas have been primarily involved in the sector on a special projects basis, primarily for immediate or short-term critical needs.

Currently, there is an on-going effort by the Coalition Provisional Authority and USAID, as well as efforts by international agencies such as UNICEF, UNDP, ICRC and other NGOs to restore the sector to pre-war status.

Rehabilitation of water and sanitation services in the Northern governorates continues under UNICEF, working together with the local authorities in the rural areas, as well as urban and semi-urban areas.

In the three (3) main cities of Erbil, Dohuk and Suleimaniyah, UNOPS is involved in master planning studies for water and wastewater, while UNICEF continues to cater for the rehabilitation, maintenance and limited extension of the water and sanitary infrastructure.

GFIW (the General Federation of Iraqi Women) and ISEPI (Iraqi Society for



Environmental Protection and Improvement), Iraqi NGOs, have been involved in institutional improvement of the water and sanitation sector in northern Iraq.

### **5.4.3 Restoration Plan**

After the war, the coalition powers established the Coalition Provisional Authority (CPA) to provide for the effective administration of Iraq during the transitional period. Their duties include advancing efforts to restore and establish national and local institutions for respective governance and facilitating economic recovery and sustainable reconstruction and development. One of the main goals of the CPA is to restore services to the general public to acceptable levels. Water and sanitation services are one of the most important issues and top the CPA agenda. For this purpose, the CPA has recently created the Ministry of Public Works (MPW) out of the Civil Services Division of the Interior Ministry. The key priorities set forth by the CPA and MPW for the water and sanitation sectors are as follows.

- Re-establish the Ministry to a functional level
- Re-establish central control of Governorates, particularly in personnel, assets and financial management
- Engage with the three Northern Governorates on integration of functions
- Establish effective aid/donor condition mechanisms
- Start the medium to longer-term strategic planning process with involvement from key donors and stakeholders to report on progress against key indicators and objectives.
- The planning process will include:
  - Establish targets for up to 5 years into the future. Targets will include, on an annual basis, water supply coverage, sewerage coverage and 2004 budget in detail.
  - Establish city master plans in major cities for water supply and sewerage systems and a master plan for solid waste management.
  - Establish information technology (IT) planning to manage asset location, condition and management, billing and revenue collection, and Human Resources functions.
  - Identify skills gaps and develop training program requirements.

There are policy issues that need to be resolved across more than one Ministry and/or sector.

In other words, they are the ones relating to institutional and capacity building and physical improvements.

Institutional and capacity building includes:

- Reconstructing institutions, and improving staff capacity and capabilities.
- Improving and raising staff capability through training
- Integrating and utilizing IT facilities in planning, operation and maintenance

Physical improvements include:

- Providing potable water and improving the efficiency of the distribution system.
- Improving sewerage facilities and solid waste management
- Developing city master plans for the water and sanitation sector
- Expanding water supply and sanitation coverage in both urban and rural areas.

These programs can progress in two phases:

- (i) An immediate phase that concentrates on the restoration of conditions to pre-war conditions during 2004 and early 2005:
  - Reconstruct institutions and improve staff capacity and capabilities
  - Raise potable water access in urban areas by 15 % and in rural areas by 20 %
  - Reduce water loss by 10 %
  - Raise sanitation coverage in urban areas by 10 % and test and adopt a comprehensive strategy for sanitation in rural areas
  - Improve solid waste collection from both urban and rural areas
  - Develop City Master Plans for the provision of water and sanitation services in 15 major cities
  - Develop capacity building and enhanced (computerized) management systems.
- (ii) A second phase to improve and expand services in all governorates during 2005-2007:
  - Raise potable water access in urban areas by 15 % and in rural areas by

25 %

- Raise sanitation coverage by 30 % in urban and rural areas
- Reduce water loss by 20 %
- Further improve Solid Waste Management in both urban and rural areas
- Continue capacity building.

The UN presented a detailed list of the projects in accordance with this strategy with the role of partners, capital resources and resource mobilization targets. (refer to the supplement table.)

#### **5.4.4 Current Situation with Organization and Staff of Project Implementing Agencies**

There are three (3) main institutional agencies responsible for the water and sanitation sectors in Iraq, each responsible for a different geographical region.

The first agency is GCWS, which belonged administratively to the Ministry of Interior, and is now under the Ministry of Public Works. GCWS responsibility covers water and sewerage services in fifteen (15) governorates in the central and southern areas excluding Baghdad and northern governorates (Anbar, Salah Al-Deen, Wasit, Qadisia, Babil, Diala, Baghdad, Kerbala, Najaf, Thi qar, Muthanna, Missan, Basrah , Ninewa, and Taneen.)

Second is the Mayoralty of Baghdad (BM), which is responsible for water and sewerage services within the city and surrounding area of Baghdad. For the Mayoralty of Baghdad the main sector institutions are the Baghdad Water Authority (BWA), which is responsible for the main water intakes, treatment plants, transmission lines, storage reservoirs and water distribution network pipes of diameter 250 mm and above in Baghdad. The Baghdad Sewerage Authority (BSA) is responsible for the main sewers, sewage treatment and sewage disposal in Baghdad. The BWA and BSA are under the responsibility of a Deputy Mayor for Technical Affairs. Municipality Directorates (MD) have been established in each of the nine (9) municipalities that constitute the Baghdad Mayoralty. Under the coordination of the Deputy Mayor for Municipalities, they are responsible for, among other things, the operation and maintenance of the water supply distribution networks (pipes below 250 mm in diameter), service reservoirs, sewer networks and pumping stations, solid waste management and street cleaning.

The third main institutional agency is the Autonomous Region in the North of Iraq (ARNI), comprising the three (3) governorates of Erbil, Douk and Sulayniyah. In each of the autonomous governorates, urban water supply and sewerage is under the responsibility of the Directorate for Water and Sewerage (DWS) placed under the supervision of the Office of Municipalities & Tourism (MMT). Rural water supply and sanitation is the responsibility of the Directorate of Reconstruction and Development (DRD) under the Office of Ministry of Reconstruction and Development (MORD) in Erbil and Dohuk, while in Suleimaniyah the Directorate of Works and Reconstruction (DWR) is under the Office of Works and Reconstruction.

The Government of Iraq is responsible for water and sewerage policies, standards, tariffs and providing funding for capital expenditure, while the responsibility for development, planning, execution of works, and operation of public utilities is the duty of the above three (3) bodies.

As related institutions, the Ministry of Water Resources is responsible for raw water resources (surface water or groundwater from wells and springs) and for the monitoring of these resources and development, planning, bulk water transfers and capital expenditure to improve surface and ground water resources, while the Ministry of Health is responsible for the monitoring of the quality of drinking water according to national standards. The Ministry of Water Resources is also responsible for monitoring site selection and operation of sanitary landfills.

**Table 5.4.5: Regional Authorities & Geographical Sector Management Units**

Functions	Sector Administrative Structure			
	Baghdad City	Iraq excluding Capital	Autonomous Gov. of Erbil & Dohuk	Autonomous Gov. of Sulaymaniyah
Sector Management	Mayorality of Baghdad	Min.of Public Works	MMT <sup>1)</sup> & MRD <sup>2)</sup>	MMT & MWR <sup>3)</sup>
Water Supply & Sewerage Operation	BWA <sup>4)</sup>	GCWS	DWSE <sup>5)</sup> & DRD <sup>6)</sup>	DWSE & DWR
	BSA <sup>7)</sup>			
Solid Waste Collection & Disposal	Deputy Mayor of Municipalities	General Directorate for Municipalities	MD <sup>8)</sup>	MD

- 1) Office of Municipalities and Tourism
- 2) Office of Reconstruction and Development
- 3) Office of Works and Reconstruction
- 4) Baghdad Water Authority
- 5) Directorate for Water and Sewerage
- 6) Directorate of Reconstruction and Development
- 7) Baghdad Sewerage Authority
- 8) Municipality Directorate

Prior to 2003, there was a huge shortage of staff within the sector. The number of vacancies represented as much as 54 % of the approved positions. Based on a review of the figures for staffing at GCWS, 71 % of the positions were vacant.

The main areas that experienced shortages were managerial positions, technical staff and technicians. Managers, engineers and technicians only make up 12 % of the total staff for the Water Authority and 15 % for the Sewerage Authority.

One of the main factors of the huge shortage of staff is considered to be the low salaries (average 307,000 Iraqi Dinars, approximately equal to 170 USD/month) offered and the image of failure in life could have deterred candidates, as could the social stigma attached to working for the sector. The uneven coverage is reflected in the staffing amongst the authorities with the Water Authority having 85 % of the total staff and the Sewerage Authority 14 %.

The average age of employees is on the high side. Many of the staff are close to retirement.

Although recruitment focused on universities and colleges, there are very few managers to adequately train them to enter senior level positions.

A solution employed in the recent past has been to contract out part of the maintenance work and to hire temporary staff. This, however, was a very short-term solution to a very long-term problem. The temporary staff were even more poorly trained, but paid at rates above the government levels.

Training averaged only 3.8 staff weeks per 100 staff. Since the 1991 Gulf War, staff has generally received very limited training.

UNICEF through Care International has been providing 3-day training courses focusing on basic operating functions in the Central/Southern areas. These were considered worthwhile, but by no means met the overall needs the sector. The lack of training received by staff that operated the rural water systems resulted in inadequate maintenance of the facilities.

However, in the North, UNICEF conducted a variety of training programs suitable for Operators/ Mechanics, Engineers/Planners and Managers and Anjumans (for

rural water projects), established Planning groups and Communication Cells for hygiene promotion in the three (3) Governorates, etc.

Considering that Iraq has been left out of international societies for 20 years, it is clear that the following are absolutely lacking and education and training in the sector is a must.

- Complex infrastructure development management
- Operational management
- Process engineering
- IT management
- Master Planning, conducting studies, designs, computer modeling etc.

#### **5.4.5 Obstructive Factors in Restoration and Problems to be Solved for Development**

##### **(1) Obstructive factors against restoration**

###### **(a) Restoration of peace**

Site surveys are a must at the final stage in formulating M/P and F/S and conducting D/D. In the case of supplying compact unit water plants as a grant followed by site installation and training for O/M, keeping peace and security is a prerequisite. An unstable situation with respect to peace would be the major obstruction to dispatching Japanese experts to Iraq.

###### **(b) Stable power and fuel supply**

Securing power and fuel supply will also be a must in management of water supply, sewerage facilities and waste management. As stated in 5.4.1(4) - Problems, power and fuel supply is absolutely lacking. In this situation, the same problems will occur after the construction of facilities.

###### **(c) No reconstruction of official central and local government**

Without the existence of an official government reflecting Iraqi people's opinions, it is difficult to make priorities among the programs in each sector and region. Priority will be assessed by health indicators at a governorate/city level; coverage at a governorate/city level; and population density, but Iraq still remains the center of power. Before conducting M/P and F/S, the requesting agency and counterpart organization should become clear.

(2) Development issues: Policy and direction of project formulation

Development issues, policy and direction of project formulation, is to solve the current problems stated in 5.4.1 (4) – Problems, and to execute restoration programs proposed by CPA-MPW. The following will be necessary as stated in 5.4.3 :

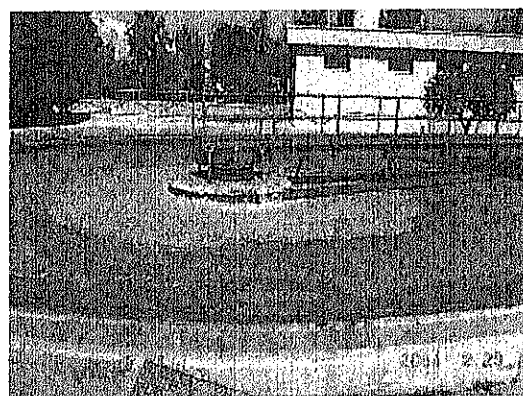
- (i) Institutional and capacity building includes:
  - Reconstructing institutions and improving staff capacity and capabilities
  - Improving and raising staff capability through training
  - Integrating and utilizing IT facilities in planning.
  
- (ii) Physical improvements include:
  - Providing potable water and improving the efficiency of the distribution system
  - Improving sewerage facilities and solid waste management
  - Developing city master plans for the water and sanitation sector
  - Expanding water supply and sanitation coverage in both urban and rural areas.

(a) Institution and capacity building

Considering that Iraq has been a closed country for more than 20 years, reconstructing institutions and improving staff capacity and capabilities are absolutely necessary. To improve the situation, continued training in third countries and in Japan will be considered for managerial persons, planning and design technicians, O/M technicians and workers of the related agencies and organizations. Dispatching specialists from Japan will also be considered when



GABAWY\_MADONAI andfill in Amman, Jordan.  
Shield sheets are installed.



Final sedimentation in ABOU-NSSAER WWTP in  
Amman, Jordan. Scum is not controlled. Amman

peace and security is improved. Technical transfer and improving capacity and capability for managerial persons and planning and design technicians will also be realized in the formulation of M/P and F/S. For example, the team members interviewed the man in charge of waste management in Amman, Jordan, and visited existing garbage transfer stations and a landfill in Amman. Amman city has been accepting trainees from surrounding Arabian countries. Training in Jordan, which is similar to Iraq in natural conditions, would be meaningful. For training on wastewater treatment, on the other hand, Jordan itself looks like a developing country in wastewater management, and training in this field in Amman is judged meaningless.

(b) Understanding of urgent facility construction project

Although some concrete facility construction projects, including the ones in the central and southern areas, were expected, only projects in Baghdad City were listed with concrete information and material data. According to the information from Baghdad University, USAID and Bechtel have been very active. It is said that they have been proceeding with plans for construction of water plants with a capacity of 200,000 m<sup>3</sup>/day in Samawah, wastewater treatment plants in Nasiriyah (target population: 60,000 inhabitants, approximately 150 million USD), in Najaf (target population 24,000 inhabitants, 70 million USD) and in Karbara (under study). It is also said that Bechtel, with Parsons, is proceeding with a plan for sanitary landfill construction along with staff training and capacity building.

(c) Close cooperation with grant team

Water supply and sanitation projects are a serious matter affecting people's lives. The sooner the implementation, the better. In the case where a candidate project is considered by the grant team to be urgent and appropriate to implement in close cooperation with members in charge of water supply and sanitation, even a part of the project should be implemented immediately. If we sit idly by without taking any action, USAID and Bechtel will go on with the easy projects to implement, while our role will be redirected and complicated like undertaking rehabilitation of networks or existing facilities of water supply and sanitary facilities. The following is the candidate list from the grant team:

(i) Water supply

- Supply of compact units to Baghdad City and compact units with loose



R.O to three (3) governorates in the southern area (Basrah , Maysan, Dhi Qar)

- Supply of water tankers to Baghdad City
- Supply of water management equipment (Excavators, Backhoes, Loaders, Lorries) to four (4) governorates in the southern area
- Rehabilitation of Saba Nissan Water Plant in Baghdad City

(ii) Sewerage/Sanitation

- Rehabilitation of pumping stations in Baghdad City
- Construction of a part of the extension of Kerth wastewater treatment plant (up to primary sedimentation) in Baghdad City
- Supply of sewerage management equipment (Cesspool Emptier Tankers, Vacuum cars, Jet cleaners, Road sweepers, etc.) to Baghdad City
- Supply of sewerage management equipment (Vacuum cars, Jet cleaners, etc.) to four (4) governorates in the southern area

(iii) Waste Management

- Supply of garbage collection cars, Landfill equipment to Baghdad City and four (4) governorates in the southern area.

After the conclusion of the study on them, projects which are not listed as grant aid and urgent projects, will be followed up as a priority.

(d) Formulation of M/P and F/S

Although information about networks for water supply and sewerage and land use is a must from the viewpoint of formulating Yen loan projects, we may not get such information on the projects in central and southern regions, except in Baghdad City. In such a situation, we consider it too early to make a plan for water plant, wastewater treatment plant and landfills and consider that formulation of M/P and F/S should be prioritized. What Bechtel has been planning to proceed with is considered to take priority as point development.

Formulation of a M/P is recognized as very important by the UN and UNDP from the view point of technical transfer during the course of the project and area development, including networks, and it will meet their needs.

However, a superior pilot project that is considered as urgent and good enough to improve the current situation should be implemented immediately and independently during the formulation of the M/P and F/S. If we simply follow the present process where a project is implemented a few years after the F/S, USAID and Bechtel will proceed to construct facilities for themselves, which will result in Japan having to only (slowly) rehabilitate networks.

Usually in the formulation of M/P and F/S, Japanese experts conduct a site survey, but it is difficult for them to do so at present due to the peace and security problem in Iraq. For the time being Japanese experts will have to stay at Amman, Jordan, and hire Jordanian and/or Iraqi consultants and/or NGOs or invite the Iraqi experts to Amman to get the necessary information and data in order to decide the framework of the M/P and F/S. Needless to say, it is desirable for the Japanese experts to conduct the site survey if the situation permits. The biggest concern is whether we can get the updated and future data such as population forecasts and land use. Even Baghdad City officials seem to be unsure of current population within the city.

A comprehensive M/P and F/S is necessary, including water supply, sewerage system and waste management, some times including city development. The priority areas for M/P and F/S are Baghdad City, Mosul, Najaf and Karbala and Basrah based on the interview result with the Ministry of Public Works. However, according to UNDP, English consultants have already started or plan to conduct M/Ps in Basrah and Mosul city. As a result, we concluded that the target areas will be Baghdad, Najaf, Karbala, Nasiriyah and Samawah city.

What is to be considered for the study of improvement, extension and construction of facilities during the course of formulation of M/P and F/S? Raising the availability of water supply, sewerage systems and waste management services will be listed as the development issues. These are considered during the course of formulation of M/P and F/S except the urgent projects with abundant information and data.

In formulation of M/P and F/S the following should be considered and studied:

(i) Raise potable water access

The existing supply system is stretched to its limit and system strengthening/master planning is required before coverage can be increased by any significant percentage. City master plans have to be completed before accurate figures on the incremental costs of service coverage can be given.

The water demand necessary for planning and designing water treatment plant capacity is listed in the table below, but the figures seem bigger than those in advanced countries. These figures should be evaluated in the M/P.

**Table 5.4.6 Required Production Demand**

Indicator	Baghdad	BM rural area	Municipality	Municipalities	Rural Area
Coverage (%)	100	100	100	100	90
Water supply rate (lpcd)					
Domestic (lpcd)	330	180	300	250	180
Industries (lpcd)	40	0	30	20	0
Government (lpcd)	55	10	50	40	10
Sub-total of WSR (lpcd)	425	190	380	310	190
Unaccounted for water					
Leakage (lpcd)	75	35	70	50	35
Production Capacity Rate (lpcd)	500	225	450	360	225
Production Rate (lpcd)	550	250	500	400	250

Infrastructure required will include larger feeder water mains, service reservoirs to balance daily and hourly flows and provision for dividing the area into pressure zones and installing control valves to allow the isolation of supply zones and mains for repairs and maintenance.

To raise the coverage levels across the country, supplies to rural areas and villages will have to be improved.

The cost of raising potable water access in urban areas by 15 % and in rural areas by 20 % are estimated at approximately 2 billion USD, including the cost of rehabilitation and new construction. The cost should be examined.

To achieve the coverage target, approximately 3.8 million additional people in rural areas will have to be served. This should be examined by estimation of the population.

Four techniques have been identified for serving the additional people in

rural areas; their costs are estimated as follows:

- Extension of existing urban systems : approximately 370 USD/capita
- The use of compact units plus local reticulation : approximately 186 USD/capita
- Tankering potable water : approximately 373 USD/capita
- Using wells to supply water : approximately 267 USD/capita

These estimations should be examined.

In areas with saline ground water, to improve coverage will require the installation of treatment plants such as loose reverse osmosis (R.O) membrane systems, reticulation systems and tankers. However, loose R.O membrane systems are costly, so treated water would be limited to be used only for drinking water.

(ii) Reduce water losses

Before extending water supply systems, unaccounted water should be improved. Water losses are currently estimated at 60 % of the potable water from the water treatment plants. Repair of the water distribution networks to ensure that safe water (free of pathogens and other harmful chemicals) actually reaches families is a priority. It will also require a full inspection and mapping of networks.

Reducing water losses has a three-fold effect of:

- Increasing coverage because there is more water available.
- Reducing operational costs because less water is required.
- Reducing the risk of illness because leaks into the system are eliminated or reduced preventing the contamination of potable water.

To reduce water losses, a reduction by 10 % involves the rectification of visible leaks. There are approximately 15,000 km of water main in Iraq, and using consultants' studies, the cost per kilometer for the rectification of

visible leaks has been estimated to be 500 USD/km, although MPW is of the opinion that this is on the low side. The cost should be studied further.

In the long run the losses should be reduced further. For this:

- Reducing water loss by more than 10 % will require leak detection devices, metering of major off-takes and supply areas, water balances, etc. to identify unaccounted for water usage and repair of leaks that are not visible.
- To get below 20 % water loss is approaching world best practice and would involve water meters on all usage and detailed accounting of water supply and uses.
- The introduction of meters into the system would allow pricing to be based on consumption with higher charges being applied for consumption above average levels. This approach of applying an appropriate tariff structure has the advantage of reducing wastage, setting the basis for demand management, and sending economic signals to the consumer.
- The program cost is estimated at 1.2 billion USD under the assumption that the 15,000 km of older pipes will need to be fully assessed and repaired at a rate of 1,500 USD/km (total cost for repair is estimated at 22.5 million USD). These costs should be studied.
- The total cost of the program to reduce unaccounted for water usage from 40 % to 30 % is estimated to be 1.4 billion USD. This cost should also be studied further.

(iii) Increase Sewerage Services

To increase sewerage services, the following should be studied:

- Fundamental data such as waste water quality and generation should be studied as a priority because the available data are very limited.
- To increase the overall percentage by 10 % will require application of innovative treatment processes including natural and simple treatment process such as stabilization ponds, duckweed and aquaculture.

- Land in Iraq is relatively flat, so many pumping stations will be required in increasing sewerage service, which will require alternative collection systems such as low pressure systems wherever possible and suitable.
- Increasing the coverage by 10 % will serve an additional 1.8 million people.
- The cost per capita for providing sewerage services is estimated to be 775 USD of which 570 USD is for the collection systems and 205 USD for treatment. The estimated cost of the program is 1.4 billion USD in total. These estimates should be studied further.
- Generally speaking, high population density areas have a significant advantage for adopting sewerage systems, while low population density has the advantage for an on-site treatment system. Comparison of the costs, including sludge treatment and disposal methods should also be studied.
- Alternatives of wastewater treatment processes in relation to the characteristics of the area in question should also be compared.
- Additional increase in coverage by 30 % will serve 5.3 million people and is expected to cost 4.1 billion USD in the long-term continuing phase. This should also be studied.

#### (iv) Improve Waste Management

In formulating M/P and F/S for waste management, the following should be studied:

- Currently there is no comprehensive waste management in Iraq. There is no available data about waste generation and quality because there is no truck weighing facility in landfill sites. Fundamental data should be captured first.
- A strategy will need to be developed to include a policy framework, standards, training needs, rehabilitation programmes for child scavengers, implementation and operation of waste processing/disposal facilities such as landfills and regular collection of generated waste. Education/enlightenment campaigns to promote segregation of waste at

source/household level and demonstration/start-up recycling plants, etc. also need to be covered.

- The M/P should include a study of the treatment and disposal process for medical and industrial waste.
- The total cost is estimated to be 153 million USD based on 50 landfill sites in Iraq, 0.5 USD/site for operating equipment, 20 collection vehicles for each site at 80,000 – 100,000 USD per vehicle and three demonstration plants at 0.5 million USD each. These unit costs should be studied further.
- The groundwater level in the southern area is relatively high. The construction method used for landfills should be studied carefully.
- A M/P study for waste management should be carried out with the M/P for water supply and sewerage systems including treatment and disposal processes for the sludge from these systems.

### (3) Outline of urgent projects

The three (3) urgent candidate projects firmly proposed by Baghdad City were concluded as the following:

#### (a) Rasafa Water Treatment Plant (WTP) in Baghdad

A new construction plan for the Rasafa water treatment plant was proposed by Baghdad City. The plan was initially proposed in 1984 by an English consultant based on a study, and the proposal was subsequently planned and designed in 1994 by the French company, Degremont.

The reasons for the proposal are:

- Water supply capacity at that time was 2.2 million m<sup>3</sup>/day but in 2007 the water shortage would be 3 million m<sup>3</sup>/day because the population has been estimated to reach more than 10 million in 2007.
- It would be better to have the water intake upstream in the Tigris River from the viewpoint of water quality because the flow of the river has decreased by 300 m<sup>3</sup>/sec relative to that of two years before. Also, the downstream of the river has been polluted by organic matter due to the discharge of untreated wastewater into the river.
- Although water on the Rasafa side is provided from Saba Nissan WTP

on the west side of the Tigris River, water shortages on the Rasafa side are still severe.

However:

- We can understand the idea that construction of a water treatment plant in the upstream of the river will be better from the view point of water quality. However, we had better study it further to see if the unit water supply of 500 l/day/capita is appropriate or not because the figure includes an unaccounted 170 l/day/capita. We consider that the efforts to reduce water loss should be considered as the first priority. (According to Baghdad City, THW, a German company, under USAID has already started a leakage survey using leakage detectors, rehabilitation and construction of new networks.)
- Since the population and population density figures may have changed greatly compared to that 20 years ago, they should be inspected and the plan should be reviewed first. As a result of discussions, we agreed with Baghdad City representatives on the necessity to review the existing plan, including F/S, and to eliminate this project from the urgent projects.

(b) Rehabilitation and expansion of Saba Nissan water treatment plant (WTP) in Baghdad

Saba Nissan WTP is located on the east side of the Tigris River (Rasafa side) in the northern part of Baghdad City. It was constructed in 1972 with a capacity of 450,000m<sup>3</sup>/day. It is the biggest water treatment plant at present in Baghdad City and is severely decrepit. Water shortages in the Rasafa area are very acute. The actual condition is that 300,000 – 400,000 m<sup>3</sup>/day of water is temporarily supplied to the Saba Nissan network system across the Tigris River from Kerth WTP, which is located on the west side of the river. This project consists of rehabilitation of the existing WTP, expansion of the WTP phases 1 and 2 with a capacity of 225,000 m<sup>3</sup>/day each and rehabilitation of the water intake facility. As part of the expansion of the WTP, Bechtel has already been proceeding with phase 1. Baghdad City requested that rehabilitation of the existing WTP, expansion of the WTP phase 2 and rehabilitation of the water intake facility be undertaken by the Japanese Government. Since this is an extremely urgent project and Baghdad City wants rehabilitation as grant aid, we are keeping close contact with the grant team.

Because it is extremely urgent for Baghdad City, the Deputy Mayor of Baghdad City suggested that the City might request this project from USAID again in case the Japanese Government does not decide to undertake it as a Japanese



Assistance Project before this October.

As for the extension of the WTP, it will be not any problem to start construction because the distribution networks have already been completed, but rehabilitation works will require some more time for confirmation of specifications and current conditions.

(c) Extension of Kerth (Daura) wastewater treatment plant (WWTP), new construction of sewer main and a pumping station

Wastewater generation from the east side of the Tigris River (Kerth area with estimated population of 2.7 million) is estimated at 600,000 m<sup>3</sup>/day. Approximately 400,000 m<sup>3</sup>/day of wastewater is estimated to flow to the Kerth WWTP, which is the only WWTP on the west side of the river and has a capacity of 205,000 m<sup>3</sup>/day, via the existing Daura pumping station. The rest of 200,000 m<sup>3</sup>/day of wastewater is discharged directly into the Tigris River without any treatment. The inflow of 400,000 m<sup>3</sup>/day of wastewater into the WWTP is also discharged directly into the river without any treatment due to lack of maintenance because of lack of funds and looting of equipment during the war. Untreated wastewater discharge pollutes water resources downstream in the river, which causes health and environmental problems not only in Baghdad City but also in areas down stream of Baghdad on the river.

The project consists of rehabilitation of existing facilities, extension of the WWTP by 205,000 m<sup>3</sup>/day, new construction of a sewer main and Daura pumping station (P.S) No.2. The existing Daura P.S No.1 and WWTP were constructed by the French Degremont 20 years ago, and the facilities are now too old for use. The extension for the WWTP was planned more than 20 years ago, but it was never realized due to lack of funds.

The rehabilitation of the WWTP is being executed by Bechtel and is expected to be completed by the end of this year. Baghdad City wants the Japanese Government to implement the extension of the WWTP and the new construction of the sewer line and Daura P.S No.2. Baghdad City also wants the Japanese Government to construct a part of the new construction of the WWTP (up to primary sedimentation) as a Japanese grant aid project. For proper operation of the WWTP the rehabilitation of the existing pumping stations located upstream of Daura P.S No.1 (which is being considered for rehabilitation by Japanese grant aid) is a must. We are keeping in close contact with the grant team. In

addition, we are now in the process of cost estimation for the extension of the WWTP in case of gradual construction by phases.

To proceed with this project there is very little data on raw water quality. We recommend conducting a simple F/S and/or D/D including a review of the existing design and getting the minimum necessary data and information for preparing the design specification during the study. The alternative of a gradual construction plan, design and cost estimation should also be prepared.



**Supplement Table : Results Matrix : Cluster (3) – Water and Sanitation**

<p><b>National long-term priority or goals:</b> To reduce the percentage of people without access to safe drinking water and sanitation by 50 % by 2015 (MDG/ICSD) and to contribute significantly to reaching the infant mortality rate and nutrition MDG.</p>			
<p><b>High level-cluster outcome by the end of 2004;</b> Recover water and sanitation coverage to 1990 levels (urban water 97% rural water 75% sanitation 75%)</p>			
<p><b>High level/cluster outcome by the end of 2006:</b> Decentralized management with strong public private partnerships and community involvement (particularly women) achieving water and sanitation services approaching 1980 levels (urban 350 lcd, rural 250lcd)</p>			
Program outcomes	Project outputs by 2004	Role of partners	Resource mobilization targets
<p><b>Increased access to potable water in urban areas by 10 %</b></p>	<p><b>Humanitarian</b></p> <ol style="list-style-type: none"> <li>1. Urban population provided with chlorinated water</li> <li>2. 0.5 million people provided with tankered water</li> <li>3. 60 % of collapsed networks repaired</li> <li>4. 75 % of water treatment labs rehabilitated</li> <li>5. Main water sources sampled and tested</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>1. Rehabilitation of water treatment plants and pumping stations</li> <li>2. Rehabilitated networks</li> <li>3. Rehabilitation of chlorine production capacity</li> </ol> <p><b>Development</b></p> <ol style="list-style-type: none"> <li>1. Overhauling of water treatment plants</li> <li>2. 15 City M/Ps developed</li> <li>3. Implementation of 3 cities M/Ps begun</li> </ol>	<ul style="list-style-type: none"> <li>• UNICEF: coordination, policy</li> <li>• UNDP: service delivery</li> <li>• UNOPS: leakage reduction</li> <li>• UNIDO: chlorine production</li> <li>• WHO: surveillance</li> <li>• UN-HABITAT: urban planning</li> <li>• Ministry of Municipalities and Public Works</li> <li>• Baghdad Mayoralty</li> <li>• Consultants</li> <li>• Contractors</li> <li>• NGOs</li> </ul>	<p><b>2004:</b> Funded: \$9.8M Unfunded: \$120M</p> <p><b>2005-6:</b> Funded: \$3M Unfunded: \$120M</p>
<p><b>Increased industrial effluent / sewage treatment/discharge/ access to sewage in urban areas by 5 %</b></p>	<p><b>Humanitarian</b></p> <ol style="list-style-type: none"> <li>1. Sewage networks repaired</li> <li>2. Sewage pumping stations repaired</li> <li>3. Effluent hotspots identified</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>1. Sewage pumping stations rehabilitated</li> <li>2. Sewage networks rehabilitated</li> <li>3. Sewage testing rehabilitated</li> </ol> <p><b>Development</b></p> <ol style="list-style-type: none"> <li>1. 15 City M/Ps developed</li> <li>2. Implementation of 3 cities M/Ps begun</li> <li>3. Commission of STP</li> <li>4. Expansion of networks and pumping stations</li> <li>5. Sewage trunks replaced</li> <li>6. Industrial waste treatment systems installed</li> <li>7. Alternative sewage systems piloted</li> <li>8. Small bore sewage systems piloted</li> </ol>	<ul style="list-style-type: none"> <li>• UNDP: coordination, service delivery management, policy</li> <li>• UNICEF: technology choice, policy</li> <li>• UNOPS: networks</li> <li>• WHO: surveillance</li> <li>• UN-HABITAT urban planning</li> <li>• UNIDO: industrial effluent</li> <li>• Ministry of Municipalities and Public Works</li> <li>• Baghdad Mayoralty</li> <li>• Consultants</li> <li>• Contractors</li> <li>• NGOs</li> </ul>	<p><b>2004:</b> Funded: \$14.8M Unfunded: \$113M</p> <p><b>2005-6:</b> Funded: \$5M Unfunded: \$140M</p>
<p><b>Increased solid waste collection and disposal by 30 %</b></p>	<p><b>Humanitarian</b></p> <ol style="list-style-type: none"> <li>1. Procurement cost of solid waste</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>1. Procurement of capital equipment</li> </ol>	<ul style="list-style-type: none"> <li>• UNICEF: coordination, technology choice, policy</li> <li>• UNDP: service delivery, management, policy</li> </ul>	<p><b>2004:</b> Funded: \$5M Unfunded: \$15M</p>

	<p><b>Development</b></p> <ol style="list-style-type: none"> <li>Promotion of outsourcing of services</li> <li>Innovative collection, sorting, recycling and disposal systems piloted</li> </ol>	<ul style="list-style-type: none"> <li>● Ministry of Municipalities and Public Works</li> <li>● Baghdad Mayoralty</li> <li>● Consultants</li> <li>● Contractors</li> <li>● NGOs</li> </ul>	<p><b>2005-6:</b></p> <p>Funded: \$4M Unfunded: \$76M</p>
Potable water access	<p><b>Humanitarian</b></p> <ol style="list-style-type: none"> <li>1 million people provided with tankered water</li> <li>Rural population provided with chlorinated water</li> <li>Compact unit and pumping stations repaired</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>Rehabilitation of compact units</li> <li>Rehabilitation of water pumping station</li> </ol> <p><b>Development</b></p> <ol style="list-style-type: none"> <li>Range of technologies in rural areas expanded</li> <li>New facilities constructed</li> </ol>	<ul style="list-style-type: none"> <li>● UNICEF: coordination, technology choice, service delivery, management, policy</li> <li>● UNDP: service delivery management, policy</li> <li>● UNIDO: chlorine production</li> <li>● WHO: surveillance</li> <li>● Ministry of Municipalities and Public Works</li> <li>● Baghdad Mayoralty</li> <li>● Consultants</li> <li>● Contractors</li> <li>● NGOs</li> </ul>	<p><b>2004:</b></p> <p>Funded: \$6.7M Unfunded: \$33M</p> <p><b>2005-6:</b></p> <p>Funded: \$4M Unfunded: \$24M</p>
Sanitation services in rural areas increased by 30 %	<p><b>Humanitarian</b></p> <ol style="list-style-type: none"> <li>Schools provided with toilets</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>Rehabilitation of rural sanitation infrastructure</li> </ol> <p><b>Development</b></p> <ol style="list-style-type: none"> <li>Range of technologies in rural excretia disposal expanded</li> <li>Marketing approach instilled</li> <li>Construction outsourcings</li> <li>Key hygiene behaviors changed</li> <li>Participatory techniques developed</li> </ol>	<ul style="list-style-type: none"> <li>● UNICEF: coordination, Technology choice, service delivery, management, policy</li> <li>● UNDP: service delivery management, policy</li> <li>● WHO: surveillance</li> <li>● Ministry of Municipalities and Public Works</li> <li>● Baghdad Mayoralty</li> <li>● Consultants</li> <li>● Contractors</li> <li>● NGOs</li> </ul>	<p><b>2004:</b></p> <p>Funded: \$3.4M Unfunded: \$9M</p> <p><b>2005-6:</b></p> <p>Funded: \$3M Unfunded: \$25M</p>
Effectiveness of Public Management system improved	<p><b>Humanitarian</b> (to be determined)</p> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>Restore and rehabilitate office premises</li> <li>Strategic planning unit equipped and trained</li> </ol> <p><b>Development</b></p> <ol style="list-style-type: none"> <li>Promote decentralized and participatory management</li> <li>Promotion of outsourcing of services</li> <li>Senior staff trained in public management technologies</li> <li>Technical staff training in updated technology</li> <li>Water demand management</li> </ol>	<ul style="list-style-type: none"> <li>● UNICEF: coordination, Capacity building</li> <li>● UNDP: institutional reform</li> <li>● UNOPS: networks</li> <li>● WHO: surveillance</li> <li>● UN-HABITAT: demand management</li> <li>● Ministry of Municipalities and Public Works</li> <li>● Baghdad Mayoralty</li> <li>● Consultants</li> <li>● Contractors</li> <li>● NGOs</li> </ul>	<p><b>2004:</b></p> <p>Funded: \$0.5M Unfunded: \$4.5M</p> <p><b>2005-6:</b></p> <p>Funded: \$1M Unfunded: \$10M</p>
Materials required by the cluster secured	<p><b>Humanitarian</b> (to be determined)</p> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>Chlorine factory rehabilitated</li> <li>Soda factory rehabilitated</li> <li>Alum factory rehabilitated</li> </ol>	<ul style="list-style-type: none"> <li>● UNICEF: coordination,</li> <li>● UNDP: public private partnership</li> <li>● WHO: hygiene related materials</li> <li>● Ministry of Industry</li> </ul>	<p><b>2004:</b></p> <p>Funded: \$0.1M Unfunded: \$9.9M</p> <p><b>2005-6:</b></p> <p>Funded: \$0 Unfunded: \$4M</p>

	<b>Development</b> 1. Bio-degradable composted 2. Plastics recycled	
	<b>Implementation support and common services, including security</b>	<b>2004:</b> Funded: \$3.5M Unfunded: 0
<p><b>Coordination mechanisms and program modalities:</b> Task manager: UNICEF ; Deputy task manager UNDP</p> <p><b>Staff:</b> Program Staff on the ground:</p> <ul style="list-style-type: none"> <li>● UNICEF 12 national staff, 6 area based and 6 covering more than one sector</li> <li>● UNDP 20 urban sanitation 15 solid waste</li> <li>● WHO 15 area based staff working on water quality</li> <li>● UNIDO 1 Chlorine production</li> </ul> <p><b>Linkages with Iraq Authorities and other Actors:</b></p> <p>Weekly meetings with MMPW and all major partners, weekly meetings of Baghdad Mayoralty and a major partners, UNICEF led coordination meeting with all partners, NCCI led (UNICEF led when international staff return) coordination meeting with all partners in Baghdad. On-going regional coordination meetings in 4 Governorates, to be expanded to all Governorates as security improves.</p> <p>In addition, to overall coordination UNICEF coordinates potable water, solid and rural services with UNDP coordinating sanitation and urban services.</p> <p>Work is divided and coordinated geographically, technologically, by Urban-rural, Baghdad-rest of municipalities divides. Difficulties in coordinating Bectel and US Army at present. Iraqis are currently in the driver's seat but under close CPA security. There is still inadequate coordination between the North and the South.</p> <p><b>Security scenario for planning purposes:</b> Planning based upon continued security Phases 4 for 2004 but gradually improving in 2005/6.</p>		

MDG: Millennium Development Goals

ICSD:

(4) Draft of potential projects for urgent restoration assistance

Outline of potential projects are shown in Annex (Potential Project List, Project Sheet).

## 5.5 Communication

According to a World Bank Report, the GDP per capita of Iraq is continuously declining from \$3,100 in 1980, \$2,100 in 1990 and under \$800 (estimate) in 2003 due to the several conflicts and UN economic sanctions. Modern communication systems provide the vital infrastructure for the successful reconstruction and future development of Iraq as a modern state. To achieve a successful reconstruction of modern communication systems in Iraq, establishment of a comprehensive master plan for this sector is one of the key factors because communication systems are in a

period of revolutionizing, such as converting to IP systems, all over the world.

### 5.5.1 Present Situation and Issues

The Ministry of Communications (MoC) controls Telecommunication Services and Postal Services in Iraq. The previous Ministry of Transport and Communications (MoTC) was separated into the Ministry of Communications and the Ministry of Transport in October 2003.

#### (1) Telecommunications

During the Saddam regime, investment for public communication systems was very poor. Iraqi Government Statistics issued in 2002 showed that Iraq maintained a telephone density of about 3.8% in 1995 and this figure suffered a decline of about 3.2% in 2000 due to a couple of wars and the related UN economic sanctions.<sup>1</sup> However, this figure gradually improved during the period 1999 to 2002 with the introduction of telecommunication equipment and materials received under the Oil For Food Program (OFFP). However, telecommunication infrastructures were damaged anew during the war in 2003 and by year's end only about 70 million lines were functioning. This teledensity is extremely low compared with that of Jordan and Saudi Arabia, which are 15%, and UAE, which is 32%.

**Table 5.5.1 Investment Record of Telecom Sector**

Year	Amount Invested (\$mil)	Notes
1990 – 1997	0	UN Sanctions
1998	2.0	UN Sanctions, from Ministry of Finance
1999	3.5	UN Sanctions, from Oil for Food Program
2000	7.0	UN Sanctions, from Oil for Food Program
2001	35.0	UN Sanctions, from Oil for Food Program w/661 approval
2002	120.0	UN Sanctions, from Oil for Food Program w/661 approval
2003	128.0	Around 50% Rehabilitation for Damaged Telecom Equipment
2004	?	

Source: ITPC

Through the years there had been some improvement made for the communication sector such as the installation of 6,000 km of optical fibre cable and replacement of exchanges from analogue to digital. However, the war in 2003 brought some heavy

<sup>1</sup> According to "Needs Assessment Working Paper" (Oct. 2003), teledensity in 2003 was 4%.

damage to the infrastructure once again and the remaining limited equipment and cables are still one of the main targets for terrorist attacks.

International telecommunication systems were totally damaged by the war in 2003. Iraq is now temporarily operating 720 lines (6 x 4 x E1-30) by using VSAT. The CPA provided mobile international switching equipment to handle 720 lines as well but it was yet to be operational as of February 2004.

Limited cellular phone communication service was started just this February 2004 with the issuance of three cellular communication licenses of one million subscriptions each with a two-year operation to three private companies in the northern, central and southern territories of the country. The Iraqi Government will extend this license with an expansion nationwide after two years operation.

The local telephone charge is ID 2.5 per three minutes. Prior to the 2003 war, domestic telephone charges were collected every three months and international charges were collected every two weeks. After some order has been restored following the March 2003 war, the Iraqi Telecommunication and Postal Company (ITPC) had issued telephone bills last October 2003 but were able to collect only 8% within a two-month period. Although the collection was small, it still means that ITPC is functioning unlike electric and water charges, which remain uncollected. ITPC were to issue a second billing this February 2004.

Due to the lack of a collection system, a prepaid card is used for making an international call from a private telephone and the rate is ID 750 per minute. However, connection is very difficult because of the limited number of lines, which is only 720.

## (2) Postal Service

ITPC manages the postal services in Iraq. There are 336 post offices throughout the country but only 270 post offices were operating as of February 2004.<sup>2</sup> ITPC plans to reopen the rest of the post offices within this year. Mail has to be brought to a post office because mail boxes in town were all destroyed. All mail is gathered at the Central Post Office in Baghdad and delivered to each post office via provincial centres. There are about 50,000 P.O. boxes in Iraq with plans to add 35,000 more this year. Delivery service to each house is made once a day. The delivery period is

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<sup>2</sup> According to Iraqi Government Statistics in 2002, the number of post offices was 266.

about 1 to 3 days. The annual postal volume per capita was only 0.11 pieces of mail in 2000. According to ITPC officials, this figure is still declining due to the disorder prevailing across the country.

The stamp charge for normal mail (up to 10 g) is ID 25 and registered mail is ID 100. For parcels, the first 2 kg is ID 5,000 and each succeeding 1 kg is ID 500; 30 kg is the maximum weight for posting. There is no restriction for incoming parcels from outside countries. However, there are so many restrictions for outgoing parcels resulting in almost no statistics for outgoing parcels.

The Iraqi Postal Service provides a Savings Service and presently holds 176,000 accounts and ID 17 billion deposits in total. This is about 2% of Iraqi families, which number approximately 5 million people. At present only 147 post offices are providing this service. Sixty (60) post offices out of 147 are located in Baghdad City. Only 18 post offices are using computers and the rest are operating manually. Savings accounts have no interest. A Two-year Term Deposit is provided and its interest is 9%. This term deposit can continue yearly after the initial two year period. Withdrawal from the post offices other than the account holding office was possible before the war. However, this service has been discontinued. Money transfer service is also no longer available at the moment.

### **5.5.2 Activities of Other Donors and NGOs**

USAID donated mobile local exchanges and transmission equipment to replace damaged telecommunication equipment for Baghdad City. In accordance with the Iraq Joint Needs Assessment Working Paper, USAID awarded a US\$45 million contract for the rehabilitation of the telecommunication infrastructure

The trend to privatisation of the communication sector is spreading all over the world and Iraq is no exception to this trend. Privatisation is a basic concept for assistance to the communication sector by the UN and CPA. In this regard, UN and CPA assistance is mainly focusing on institutional strengthening, establishment of a policy framework, numbering plan, licensing guideline, etc.

### **5.5.3 Development Program of the Iraqi Government**

The Iraqi Government does not have any rehabilitation or development program at present. ITPC has no budget for 2004 although it has a crash program for the year as shown in Table 5.5.2. This crash program was planned for the year 2003. However, due to the 2003 war, this program was postponed until this year.



**Table 5.5.2 Urgent Demand for Iraq – Year 2004**

Province	Number of Exchanges	Total Capacity '000	Cable Network	Capacity of Cable Network	No. of Transmission Links	Capacity of Transmission Links	Bldgs to be built
Baghdad	24	200	24	300,000	24	STM-16	17
Ninewa	20	180	20	250,000	4+16	STM-4+STM-1	7
Karkuk	15	91	15	150,000	5	STM-1	3
Salah Aldeen	23	83	23	150,000	8	STM-1	9
Diyala	33	148	33	200,000	17	STM-1	13
Anbar	22	38	22	50,000	19	STM-1	13
Babylon	17	140	17	200,000	9	STM-1	8
Karbala	12	86	12	190,000	3+7	STM-4+STM-1	6
Najaf	14	140	14	200,000	3+13	STM-4+STM-1	5
Quadisiya	12	48	12	60,000	9	STM-1	5
Muthanna	12	60	12	100,000	11	STM-1	1
Dhiqar	8	30	8	45,000	6	STM-1	4
Wasit	18	52	18	65,000	14	STM-1	15
Missan	16	62	16	80,000	11	STM-1	12
Bassrah	16	112	16	160,000	6+7	STM-4+STM-1	7
<b>Total</b>	<b>262</b>	<b>1,470</b>	<b>262</b>	<b>2,200,000</b>	<b>133</b>		<b>125</b>

Source: ITPC

ITPC hopes to reach 12% teledensity by 2006 with the involvement of private investment. This figure is the same as the targeted teledensity in the UN Needs Assessment Report.

#### **5.5.4 Present Organization and Workforce of MOC and ITPC**

The Ministry of Communications has four divisions directly under the Minister. The actual operation is executed by the state-owned Iraqi Telecommunication and Postal Company (ITPC). ITPC has 15 departments under a General Director. ITPC has another company exclusively responsible for providing Internet services named the State Company for Internet Services (SCIS). See Figures 5.5.1 and 5.5.2

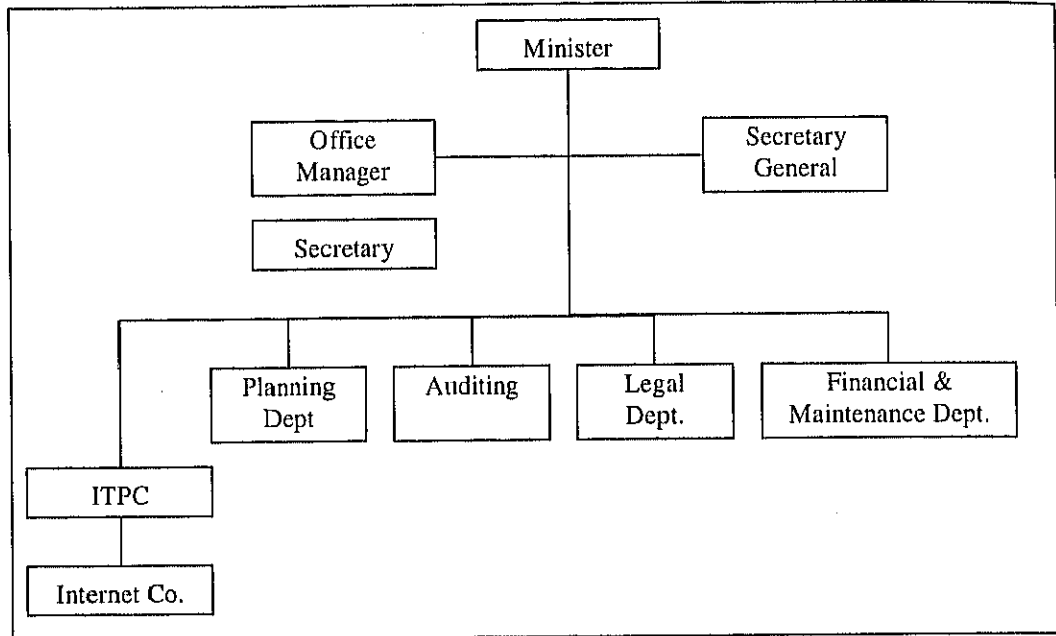


Figure 5.5.1 Organization Chart of Ministry of Communication

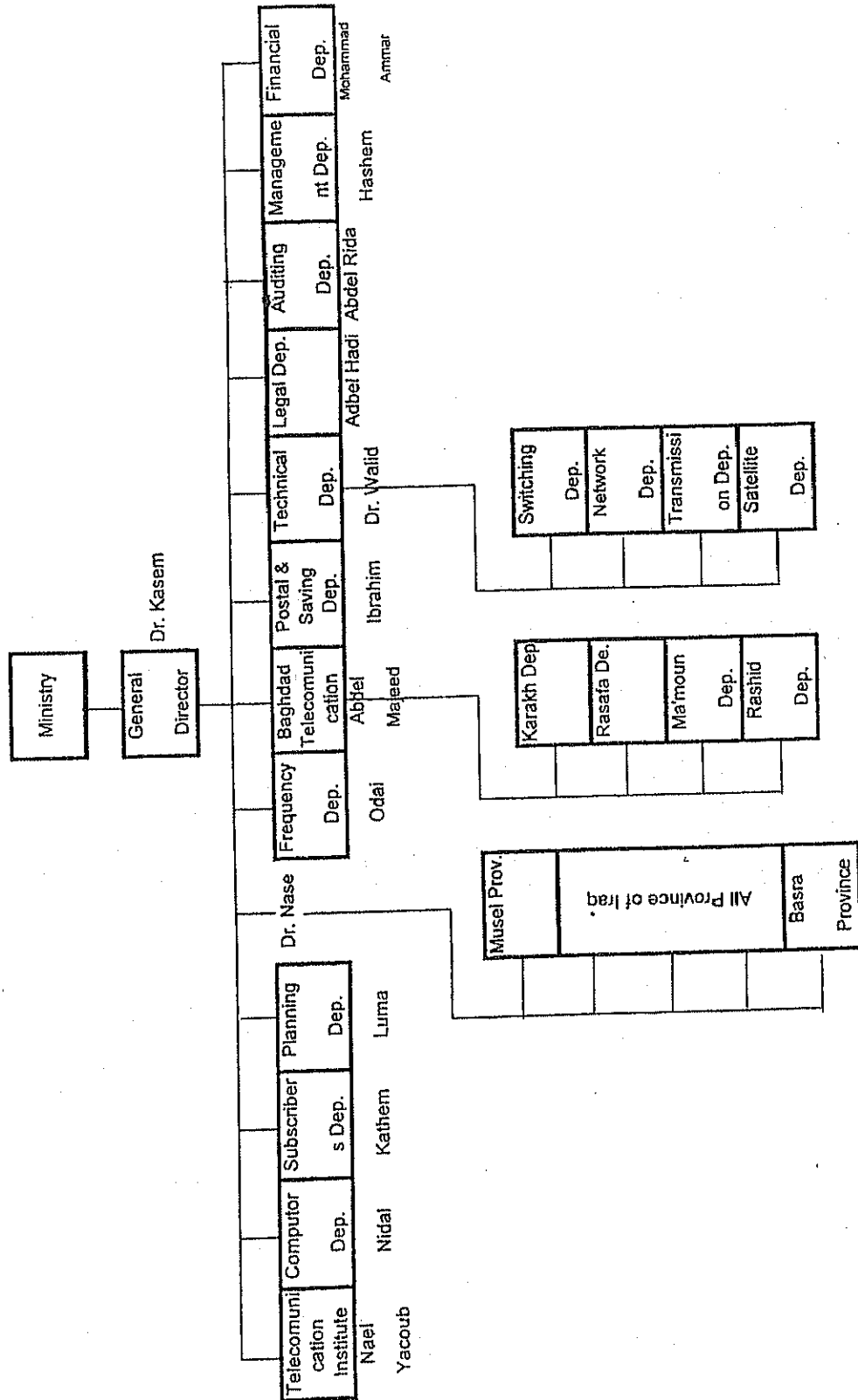


Figure 5.5.2 Organization Chart of Iraqi Telecommunication and Postal Company (ITPC)

The Ministry of Communications and ITPC have 172 and 15,670 employees respectively. Postal staff in ITPC number 2,442. There are more than 14 employees for every 1,000 telephones in Iraq and this ratio is more than the regional average. It is expected that this statistic will improve with the expansion of telecommunication services. On the other hand, there are only 9 employees per post office and this number seems insufficient for the operation of the postal service. However, according to an ITPC staff member, this number is still enough due to the poor service conditions.

**Table 5.5.3 Classification of ITPC Employees**

	Doctor	Master	High Diploma	Bachelor	Diploma	High School	Secondary	Primary	Non	Total
Engineer	3	16	3	1,067						1,089
Technician			1	178	2,353	711	235	160		3,638
Clerical/ Management		2	2	499	837	1,098	699	302	32	3,471
Foreman		1		11	3	10	2	6		33
Skilled				155	358	1,130	1,114	2,024	551	5,332
Unskilled					17	58	320	960	752	2,107
Total	3	19	6	1,910	3,568	3,007	2,370	3,452	1,335	15,670
(Postal)				(121)	(343)	(527)	(641)	(704)	(106)	(2442)

Source: ITPC

Note: Numbers in parentheses are part of total.

### 5.5.5 Constraints and Issues

Because of the wars and the related UN economic sanctions imposed on Iraq during the last 20 years, no renewal and/or improvement of communication systems, equipment and facilities has been carried out in Iraq. It can be considered that the rehabilitation and reconstruction of this sector is almost a new construction of the communication systems in Iraq. In this regard, a development plan and program focusing on middle and long-term points of view should be established because the communication and broadcasting sectors are now facing a technical renovation such as IP. Rehabilitation of existing facilities should also consider how long the life of such facilities would be prolonged.

There is no competent ministry for the broadcasting sector in Iraq at this moment. However, consolidated technical development for a network of telecommunication and broadcasting should be considered.

ITPC has almost 5,000 technical staff in its workforce. This is more than enough at this

time. These technical staff members may have basic technical skill but may not have enough knowledge for modern technologies because the long economic sanctions deprived them of the chance to learn new technologies. Well-organised and systematic training and education for technical staff is essential. Iraq will not be exempt from the worldwide privatisation trend of this sector. The role of the Ministry of Communications will change from the operation of communications to control of communication companies. There is a high possibility that ITPC will convert from a state-owned company to a private company in the future. In this sense, education and training about policymaking and a regulatory framework for administrative staff is also vital.

It was learned from a MoC staff member that the annual budget for previous years was approximately \$60 million. However, the CPA suspended all liquid assets of the MoC from the year 2003. The MoC and CPA have provided no operational budget for the year 2004. Salaries for employees are paid from the Ministry of Finance directly.

#### **5.5.6 Proposed Plan and Program**

It is necessary to rehabilitate and to reconstruct communication systems methodically. For Iraq this means the early establishment of a comprehensive master plan study for the communication sector. This master plan should include an overall strategy for the establishment of national policy, a legal framework, institutional strengthening, development feasibility, etc.

Proposed projects and programs have been selected from the following two points of view:

- Projects or programs which are necessary urgently and also required as basic infrastructure for future development.
- Projects or programs which are highly necessary but, before implementation, have to be studied in conjunction with a comprehensive master plan for effective implementation.

##### **(1) Development Study**

###### **(a) Comprehensive Master Plan Study for Establishment of National Communication and Broadcasting Network System**

This master plan aims:

to establish a comprehensive master plan from middle and long-term points of view as a national master plan;

to educate and to train Iraqi personnel who had missed opportunities to build their

capabilities; and

to propose an action plan.

(b) Master Plan Study for Communication Network System Establishment for Regional Cities and Remote Areas

This study will correspond with the result of the above study and aims to establish a master plan to implement for regional cities and remote areas.

(c) Study for National ICT (Information & Communication Technology) Master Plan

Many countries are introducing several ICT programs for the operation of their administration to improve administrative services, which is called e-Government. In this regard, it is also recommended that a master plan be established for introducing ICT into future Iraqi Government Administration.

(d) Master Plan Study for Nationwide Postal Service Modernization Project

Postal service is one of the basic national infrastructures even if a telecommunication system is developed. A post office can provide savings, as in Japan, for common people. In this master plan study, modernization of postal services such as computerization will be proposed and for some priority programs, a feasibility study and action plan are proposed.

(2) Candidate Projects

(a) Nationwide Digital Microwave Backbone Network Construction Project

A digital microwave backbone transmission link would cover the most populated areas in the country and would consist of two grids being the southern backbone (Baghdad- Hilla- Najaf- Samawa- Nashiria- Basrah : 22 Hops) and the northern backbone (Baghdad- Samara- Tikrit- Mosul: 13 Hops).

The existing analogue microwave equipment has been completely destroyed. However, all existing buildings except two are usable requiring minor rehabilitation only, such as installation of air conditioner and back-up generator, and repair of doors and windows. All antenna towers are also usable.

The role of the microwave network is normally a system to back up a cable network. The cable to be installed would be optical fibre. However, cable installation work will take a long time, and the cable installed is often cut, either accidentally or intentionally, because of unstable security conditions. Urgent recovery of telecommunication systems is one of the key factors to recover safe and stable lives

for common people so immediate construction of this digital microwave backbone network is essential.

It is necessary to train Iraqi engineers in Jordan and Japan for minor civil works, equipment installation and commissioning work. Some support of experienced third country engineers may be necessary for completion of the project to avoid the need for Japanese experts to enter Iraq. The project period is estimated at approximately 8 to 10 months from commencement.

(b) Standard A Earth Station and International Switching System Reconstruction

Two new Standard A Satellite Earth Stations (for the Indian Ocean Region and the Atlantic Ocean Region) and a related new International Telephone Switching System will need to be installed in Baghdad. With this reconstruction, about 70% of Iraqi people could connect to an international line. A high capacity optical fibre cable network for international communications will also be required to cope with demand increasing in the future. However, the satellite network is still essential as a back-up system, in the same way as the microwave backbone system backs up the national cable system. It is necessary to train Iraqi engineers in Jordan and Japan for some civil works, equipment installation and commissioning work with allowance for some support of experienced third country engineers for completion of the project to avoid the need for Japanese experts to enter Iraq. The project period estimate is about a year.

(c) Rehabilitation and Reconstruction of Transmission and Exchange Systems in Major Cities

This involves rehabilitation and reconstruction in major cities to connect the above mentioned backbone network to improve the condition of telecommunications. Not only is there an urgent need for this project but a continuous implementation is required as well. It is possible to inject some flexibility in dealing with the budget by the selection of candidate cities, capacity of transmission systems and exchanges with priorities.

Projects (a) and (b) are essential not only for early recovery of telecommunication systems but also for basic infrastructure requirements even if advanced telecommunication systems with new technologies are introduced in the future. Project (c) should be done as soon as possible with consideration of the security situation, budgetary limitation, and the opinion of the Iraqi Government.

(3) Proposed projects identified in the development study

(a) Construction of Communication Systems for Regional Cities and Remote Areas (Phase I)

This project is to be identified in the master plan study and phase I is a pilot project to expedite improvement of the communication network in regional cities and remote areas.

(b) Outside Plant Maintenance & Training Centre Construction Project (Phase I)

The main operation and maintenance facilities with training facilities will be established in Baghdad, Mosul and Basrah . The first facility will be constructed as phase I with a Japanese grant. After phase I, the project will continue with another two main centres and about 20 sub-centres nationwide. In this phase I project, Iraqi personnel will train in Jordan and Japan for smooth implementation of the project.

(c) Nationwide Postal Service Modernization Project

- Rehabilitation of Existing Facilities and Construction of Additional Facilities
- Installation of Sorting Machines for Major Provincial Post Offices
- Computerisation and Introduction of On-line System for Savings Department
- Supply of Delivery Vehicles and Motor Bikes

Additionally, the following projects are to be considered from middle and long-term points of view. These projects will be identified in the master plan studies, which are the "Comprehensive Master Plan Study for Establishment of a National Communication and Broadcasting Network System" and the "Master Plan Study for Communication Network System Establishment for Regional Cities and Remote Areas".

(a) Reconstruction of optical fibre cable network in Baghdad City

Baghdad is the capital city with a population of about 7 million, or 30% of Iraq's total population, and is the centre of business in Iraq. Improvement of the telecommunication system in Baghdad to international standard is an essential factor for the reconstruction of Iraq itself. However, the CPA is also planning to be involved in this project and it is necessary to have coordination with the CPA.

(b) Construction of Communication Systems for Regional Cities and Remote Areas (Phase II)

This project is a continuation of Phase I.