

as a result of the combined effect of adverse factors mentioned above, the country's import needs for basic food are forecast to increase substantially in 1991-1992 (July-June). The mission estimates that Iraq will need to import 7.5 million tons of food in 1991-1992 (July-June) to feed its population of 18.7 million at an estimated cost of \$US 2.6 billion. This is clearly a substantial amount that cannot possibly be funded by the international community and would therefore have to be borne by Iraq itself.

104. Largely as a result of considerations such as these, the United Nations system proposed, both in the report prepared by Under-Secretary-General Martti Ahtisaari (S/22366, annex) and in subsequent appeals by the Secretary-General and his Executive Delegate, the organization of food assistance programmes targeted at specific beneficiary groups throughout the country. The mission can confirm that the general situation with regard to the population's nutritional requirements has continued to deteriorate, the small increases in the rationing system supplies being (a) insufficient to compensate for energy losses suffered during the several months of extremely low ration level distributions and (b) inadequate in themselves to raise the current allowances to satisfactory standards. There is therefore a continuing need to maintain the vulnerable group feeding programme to take account of the increase in the number of destitute people.

105. The mission also travelled extensively to the affected areas and reviewed the situation of the Kurdish population which sought refuge outside Iraq in February/March 1991. There are considerable differences between regions, with the north-west, under the control of the forces of States cooperating with Kuwait for the past several weeks, having returned to near-normal conditions and the north-east and east of the country undergoing a steady daily flow of returnees back home through several crossing points on the border with the Islamic Republic of Iran. The major preoccupation are their feeding needs and the uncertainty with regard to the duration of assistance for those who have settled in tents and other temporary structures on the ruins of their demolished villages. For these latter populations, their reintegration into the State rationing system will clearly depend on re-establishment of the food distribution network in settlements that do not exist anymore. On the other hand, for those returnees to towns and villages that do exist, whether under government control or not, the external food aid would be needed only temporarily until normal conditions are re-established.

106. The mission's attention was also drawn to the difficulties faced by the internally displaced population that sought refuge from civil strife in the south of Iraq. They require temporary food support upon their return and until properly reintegrated in the internal rationing and distribution network. Pending the return to a normal marketing and distribution network that can guarantee access to food at reasonable prices to all, international food assistance will have to remain the cornerstone of the United Nations programme in Iraq. Such food aid should continue to be provided as at present through WFP under arrangements with the Ministries of Labour and Social Affairs and Health as well as directly with UNHCR with regard to the internally displaced and returnee feeding operations.

107. At the current level of food supplies, the Iraqi population is fast approaching the threshold of extreme deprivation except for the very few who can still afford to complement the food rationing system distribution by purchases in the free market. With the prospect of a major famine, the international humanitarian assistance programme can only be a palliative of short-term duration and this only on condition that it be underwritten by the donor community. On the other hand, it is evident that the Iraqi Government could afford, as it has done in the past, to import its food needs and so satisfy the largely unmet demand, by increasing the supplies through the rationing system or abandoning the rationing altogether but maintaining a heavily subsidized price structure for the basic food commodities. At the same time there is an urgent need to rehabilitate the agriculture sector to enable it to restore its traditional one-third contribution to national food requirements and to maintain the employment in this sector at pre-war levels.

108. The mission recommends the following actions:

(a) Suitable arrangements should be urgently worked out to enable Iraq to finance the purchase of its basic food imports for 1991-1992 (July-June) at an estimated cost of \$US 2.64 billion and the essential agricultural import needs for the next cropping season, estimated at \$US 0.5 billion;

(b) In the meantime the current food assistance programme will need to be extended to 31 December 1991; it must to cover the vulnerable groups including a large number of destitute people, returning refugees and the internally displaced persons. The quantity of food to be delivered between 16 July and 31 December 1991 is estimated at 81,723 tons, valued at \$US 34,835,065.

D. Energy

1. Electric power

109. Electricity is a basic need in Iraq because water supply, health services, sanitation handling, irrigation pumping, food manufacturing and processing and most services depend on electric power as the source of energy. The country's high degree of urbanization and high temperatures requiring space cooling further aggravate this need for electricity.

110. The war's damage to the power system facilities and the impact on the electricity supply was assessed during a field visit by the energy mission, extending from the Basra area in the south to the Mosul area in the north. It included visits to 15 power-generating plants and many 400 KV and 132 KV transmission substations. The facilities and headquarters of the Baghdad Water Authority were also visited to determine the linkage between power supply and the quantity and quality of water supply, and the power requirements for sewage.

111. Iraq's power system was severely damaged during the war, particularly the generating plants, and restoration will cost at least \$US 12 billion. The

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installed capacity is of three types: steam plants to provide base-load supply; gas turbines for mid-range and peaking duty; and hydropower for varying services depending on water availability. The important steam plants required for sustained electricity supply were very severely damaged, varying from total destruction in the case of the 800 MW Hartha plant in the south and the 250 MW Dibis (steam/gas turbine) plant in the north, to 75 per cent destruction at the 1,200 MW Musayeb plant in the south and several plants in the Baghdad area. Gas turbine plants were 80 per cent destroyed. To prevent flooding if dams were destroyed the hydropower reservoirs had been lowered below minimum levels before the war, and now only limited hydroelectric energy is available, even when the units are operable.

112. The war came close to completely destroying the power system. In the 800 MW Nasariyah steam plant a special bomb or rocket penetrated the concrete substructure of the cooling water intake, flooding the basement and all pump motors. One motor was salvaged, but without cooling no output would be possible. Similarly, three of the four surge tanks at Saddam Dam hydroelectric plant were pierced by rockets, seriously affecting plant operations. Powerhouse cranes are critical because they are required for repairs and several were destroyed. At the Baiji steam plant, bombing resulted in the crane falling to the turbine hall floor, between two units. At Samawa hydroelectric plant the gantry crane was demolished and collapsed on one unit, so early plant restoration is impossible. The critical control rooms, substation protection buildings and spare parts storage areas were hit at almost all locations. This has resulted in long delays in any restoration work. The vital Mosul 400 KV substation serves as a major hub for five 400 KV lines and fourteen 132 KV lines, in addition to providing 1,000 MVA of 400/132 KV stepdown transformation to supply area loads. At this station the special gas-insulated 400 KV switchgear was damaged severely and all transformers were destroyed, so the station is still out of service. Supply to the Mosul area from Saddam Dam in the north has to be routed to Mosul via a single 400 KV line to Baiji plant (to the south) and return. The degree of destruction is shown by the condition of transmission facilities in the south. Ground forces destroyed fifty-seven 400 KV towers on the Basra to Nasariyah transmission line and wrecked 132 KV substation facilities at New Rumaila and its satellite stations, which normally provide power supply for oil production facilities in the area.

113. The pre-war generating capacity totalled over 9,500 MW while at the end of the war the available capacity was negligible. Since then, the electric utility management, engineers and staff have done a major job of restoring those generating units and transmission facilities that could be salvaged using ingenious makeshift arrangements and any available resources, including cannibalizing damaged units, using all spare parts, and searching out equipment in the local market. The Nasariyah steam plant was equipped with closed-circuit cooling towers with water from the Euphrates River serving only to make up for losses. All cooling towers were lost by bombing so the cooling system was converted to a once-through cooling of the condensers using river water. This involved a major civil and mechanical engineering project involving changing of 2-metre-diameter cooling lines. At the same plant all

auxiliary pipes and control cables were destroyed and had to be reinstalled. Today two of the four Nasariyah units are in operation. However, these units are vulnerable to river silt blocking of the condensers at any time. At the Taji gas turbine plant, five of the seven gas turbines and all stepup transformers were destroyed, so partial output from the remaining two gas turbines is being supplied to the system using mobile transformers. The total destruction of the Dibis power plant also cut off electricity supply to the area including water pumping loads at the city of Kirkuk and the intermediate towns. One 132 KV line and temporary transformers have been arranged to provide partial power supply in the Dibis-Kirkuk area.

114. The pre-war generating capability of 9,552 MW was reduced to an available capacity on 1 July 1991 of 2,325 MW or 25 per cent (see appendix VIII). Almost one half of the original 128 generating units are in operation but with substantial capacity reductions. The total available capacity will probably decline for lack of spare parts and maintenance. Furthermore, no additional capacity can be restored without spare parts and technical assistance. The transmission and distribution facilities generally survived the war with a larger amount of the pre-war facilities, about 75 per cent, than did generation facilities, because transmission and distribution facilities are not concentrated targets. However, only about 40 per cent of the original 400 KV facilities are available because these were a prime target.

115. It is important to recognize that the present restoration work is only a short-term solution. Many of the existing units, particularly the old ones, will soon either fail or will be shut down as obsolete. The plants that can be counted on for the long term are the existing hydropower plants, appropriately restored, totalling about 2,500 MW, and, when restored, the Baiji, Dora and Musayeb steam plants totalling about 3,000 MW. This 5,500 MW of capacity is still short of the required 7,500 MW to meet the 1990 load level plus a typical 50 per cent reserve. So new capacity must be built immediately. In the meantime, the cost over the next year of providing spare parts, restoring to service about 2,300 MW of the existing generating units, and returning to service 15 per cent more of the transmission and distribution facilities, is estimated at \$US 2.2 billion (see appendix IX). To put this amount in perspective, the replacement cost of the complete Iraqi power system is \$US 20 billion and annual spare part and maintenance requirements are 3 to 4 per cent of the investment cost. So \$US 2.2 billion equals about three years of maintenance. If the existing capacity can be retained in operation and other units can be restored to service, this would still provide only about one half of the pre-war generating capacity.

116. The fragile electricity supply is frequently interrupted at the supply end by unit breakdowns and at the consumer end by feeder switching. So service is only six to eight hours each day in urban areas. Water treatment plants are particularly hard hit because intermittent service means continuing pressure changes. Baghdad Water Authority is receiving only 50 MW of power while in 1990 it received 150 MW. As a result, most of its available power is being used for water supply. The sewage is not being pumped and is gathering, overflowing into the river, and even infiltrating the water system. The Water

Authority is trying to find standby generators to pump sewage, as an alternative to the public electricity system.

117. The limited supply of electricity, particularly in the rural areas, is demonstrated by the results of a July 1991 UNICEF survey of the availability of electricity for water pumping in the Acgra district of the Mosul Governorate. In a sample of 194 villages and towns having a total population of 184,000, 192 villages or 99 per cent of the villages had public electricity supply. A typical village had electricity supply only three hours per day because the supply was rotated by switching feeders.

118. In all areas of the power system, power production will certainly be reduced owing to the hazardous condition and mode of operation of equipment, the lack of maintenance and absence of spare parts. This is certainly the case for all the generating plants and those substations that have been repaired under emergency conditions that required using measures that are far short of normal technical standards. For instance, Saddam Dam output of 100 MW will be interrupted if one circuit breaker fails. Similarly, at the Nasariyah steam plant 300 MW output will be lost if one air compressor or one cooling water pump or one water treatment pump fails. In every plant there are examples of risky emergency repairs, without adequate or sometimes any protection, resulting in critical situations that put the complete installation at risk in cases of failure. These risks are being increased as time progresses without any maintenance. This is particularly critical for gas turbines now operating on a continuous basis without the normally required maintenance inspections. Critical also is the old Najibiya steam plant near Basra, which was obsolete and shut down before the war, but now is being operated in a very dangerous condition.

119. In conclusion, unless additional capacity can be placed in service, the overall power-generating capacity will certainly be reduced in the coming months. Moreover, if some critical components of these plants fail there is high risk of loss to the system of either the complete plant or at least a large unit. The consequences of such risks are very high during the peak demand months of July, August and September.

120. Under the present circumstances and the pressing power needs, there is no alternative but to find immediate solutions to maintain service, even though these may not be cost-effective in the long term, particularly since much of the restoration has been achieved by cannibalization and without adequate protection systems. Meanwhile, the following actions are recommended by the energy mission:

(a) The execution of the prepaid orders that were placed with foreign contractors before the war and the delivery of parts and technical assistance should be allowed;

(b) The present situation at the operating power plants should be consolidated by allowing spare parts and related technical services to be ordered and delivered;

(c) Import of goods and services should be allowed for the restoration of sources of additional capacity such as the No. 3 unit at Musayeb steam plant;

(d) Expenditure of national funds should be allowed to cover a six-month requirement for (a) to (c) above, totalling \$US 0.7 billion.

2. Oil

121. The following provides information on the three main components of the oil sector: oil production; pipelines; and refineries. This assessment relies essentially on the information given by the Ministry of Oil. The mission could not check all this information but it is considered to be generally reliable. A field visit to the Dora refinery has confirmed the information given for that plant at the level of the Ministry.

122. Iraq's oil production capacity before the Persian Gulf war was 1.3 million barrels per day in the northern fields (Kirkuk and others) and 2.2 million barrels per day in the southern fields (North and South Rumaila, Zubair, Lahis). Iraq's quota under the Organization of Petroleum Exporting Countries (OPEC) is 3.14 million barrels per day while its domestic requirements are 0.45 million barrels per day.

123. During the Persian Gulf war, the southern oil field facilities were severely damaged. Oil production there is assessed to be very low. The northern facilities were less damaged during the war, but they apparently suffered some damage during the civil conflict in March 1991. The total national oil production capacity is now estimated at 1.455 million barrels per day. Taking into account Iraq's internal consumption requirements, the oil production available for export is estimated at 1 million barrels per day. This translates into a potential revenue of \$US 5.5 billion over a one-year period, at a market price of \$US 15 per barrel.

124. The Ministry of Oil considers that production capacity could be raised to 1.6 million barrels per day by the end of 1991 and to the pre-war level of 3.14 million barrels per day by mid-1992. These forecasts presume that the Government can import the necessary items to rehabilitate the production facilities. In any case, these forecasts seem rather optimistic and the mission does not expect a full rehabilitation of the production capacity before the end of 1992 at the earliest, assuming the lifting of the sanctions on import of needed materials.

125. Regarding pipelines, the main outlets for oil are the two pipelines through Turkey (IT 1 and IT 2). They have a potential volume of 1.590 million barrels per day, but are now estimated to be functioning at 1.340 million barrels per day because of the destruction of a pumping station. The Al Lakkar terminal in the Persian Gulf, with a potential pumping capacity of 1 million barrels per day, is not in operation now. The pipeline linking the Rumaila fields to the east-west Saudi pipeline going to Yanbu is idle at this moment. Its capacity before the war was 1.65 million barrels per day. To put

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it in service, the Iraqis must rebuild a compression station located in Iraq that was destroyed during the war and agree with the Saudi Arabian authorities on the use of the pipeline.

126. The Ministry of Oil has the necessary technical expertise available in-country to restore the lines through Turkey into full service, but it lacks the necessary parts. It may need some foreign technical assistance for work on the Al Bakkar terminal or for accelerating the rehabilitation programme overall, if they are given the possibility of obtaining such foreign assistance. For the next coming months, it appears that, while the addition of some spare parts would be useful, there is little risk of pipeline capacity dropping below the current capacity of 1 million barrels per day.

127. The current production levels at Iraq's three refineries are:

Baiji	300 000 bl/d
Dora	90 000 bl/d
Basra	<u>70 000 bl/d</u>
Total	<u>460 000 bl/d</u>

128. The total pre-Persian Gulf war refining capacity was 700,000 barrels per day. The Basra refinery has undergone the most severe damage, and only one out of two trains is now producing. All three refineries are simple hydroskimming; however the Baiji refinery also has hydrocracking. Repair operations have been made possible by heavy drawdown on spare refining equipment, including frequent cannibalization operations. This situation makes the reliability of the present refinery operations low. The final products in the market are of low quality. Additives needed for the production of refined products are in short supply. The distribution network has also been damaged, as well as pumping stations and storage tanks. The security of supply is thus gradually decreasing as long as no spare parts are available.

129. In summary, spare parts and additives are both needed to keep up the present level of oil production, pipeline operations and refinery operations. In order to increase production to the pre-war level, extensive repairs and rebuilding would have to take place, particularly in the Basra area. The costs of such a full restoration of the oil sector is estimated at approximately \$US 6 billion over a two-year period. The mission therefore recommends that Iraq be allowed to import \$US 3 billion worth of spare parts and consumable materials over a one-year period, or at least \$US 1 billion for an initial four-month period.

IV. CONCLUDING REMARKS

130. None of us on the mission team could overlook a glaring paradox: at a time when the international community is beset with disasters of daunting dimensions around the globe, we continue to appeal to the same donors to fund emergency programmes in Iraq that the country could pay for itself. With considerable oil reserves in the ground, Iraq should not have to compete for scarce aid funds with a famine-ravaged Horn of Africa, with a cyclone-hit Bangladesh.

131. We saw with our own eyes the scenes already reported at length: the raw sewage pouring into the Tigris and the Euphrates, the children afflicted by malnutrition. Our report is inevitably but a photograph in time, fast obsolete, yet the urgency of relief from suffering remains. Further, the hard statistics speak for themselves. Conditions are already grave in all of the essential sectors assessed and can only worsen in the weeks ahead. We must achieve a breakthrough to avert the looming crisis.

132. We have not set our sights on the optimum but no doubt unrealistic goal of full restoration of services to pre-war levels. We have not even aimed at funding for a full year. Instead, more modest objectives for the key sectors, for a limited initial four-month period (September to December 1991), have been quantified. Essential civilian needs must be assured for this immediate future.

133. To fund even this partial endeavour is far beyond the capacity of the United Nations system. Nor should the resources emanate exclusively from international programmes, given the dictates of common sense and of solidarity with those needs elsewhere I referred to above. Iraq's own national resources, whether material or human, must obviously be put to good use.

134. The mandate assigned to me as the Secretary-General's Executive Delegate is of a humanitarian nature: political determinations are not in my purview. Indeed, we have consistently focused upon the needs of the most vulnerable groups, wherever they may be identified and located throughout the country. The United Nations presence in Iraq, which for the purposes of our operation has been managed through United Nations humanitarian centres with their accompanying complement of United Nations guards, has monitored and reported on the provision of humanitarian assistance and advised the authorities in this respect. This will continue to constitute a major priority. The right to food, water, shelter and adequate health care are amongst the most fundamental of all human rights and must be assured to all people in all areas. As with all the key rights and freedoms set out in the Universal Declaration of Human Rights and the International Covenants, there can be no discrimination whatsoever in their enjoyment. Due note was taken, during our stay in Iraq, of the authorities' declared objective of fostering the democratic process, with its intrinsic attributes of political pluralism and freedom of the press. The present negotiations with the Kurdish leadership were cited as an example of this trend.

135. Events of earlier years and, more recently, the civil strife that followed the Persian Gulf war, brought harmful consequences for vulnerable groups, for displaced populations, which must continue to be redressed. Those affected must be reassured and encouraged to return to their homes. The amenities so commendably accorded to those involved in the civil unrest must be extended. Where mines have been sown as indiscriminate seeds of death around refugees' home regions, they must be detected and removed. Where original habitats have been destroyed, they must be rebuilt: this is particularly true of the Kurdish villages and towns that had been razed in previous years. It takes on an added urgency with the approach of winter. Indeed, massive transformations inflicted upon the human and natural environment in any region are unacceptable and can only be injurious to all concerned in the long term.

136. The creation of confidence, which is sadly lacking in some parts of the country, is crucial. It is in the interest of Iraq, of the displaced populations and of the international community. The United Nations presence in the country has welcomed the cooperation it has received from the authorities in pursuing this shared interest. In the coming weeks, as the need to maintain confidence in the equitable distribution of goods and services throughout all segments of the population takes on critical importance, such transparency and cooperation will be essential. We will have to be assured, in particular, of the maximum distribution to the civilian population, whose proportion can indeed only grow as the time of conflict and the militarization of society recedes.

137. This mission has addressed the current humanitarian needs in Iraq and has concluded that their magnitude requires funding that exceeds international aid and short-term palliatives and can be met only from the country's own resources. How this finding is to be reconciled with the Security Council's imposition of sanctions is a determination that is not ours to make. On the basis, however, of our deliberations and meetings with the authorities in Iraq, it would appear feasible to institute arrangements whereby Iraq's requests for imports to meet the needs outlined in this report would be submitted to the United Nations and subjected to appropriate monitoring. The precise mechanism need not be specified here. The formula agreed upon would provide for clear records of all transactions to be furnished to the Organization. Constant accountability would be assured, as would the humanitarian purposes of imports financed by oil sales. As for the question of equitable distribution, a functioning food rationing system is already in place. Other aspects have been mentioned in preceding paragraphs and concern the United Nations presence in the country.

138. It remains a cardinal humanitarian principle that innocent civilians - and above all the most vulnerable - should not be held hostage to events beyond their control. Those already afflicted by war's devastation cannot continue to pay the price of a bitter peace. It is a peace that will also prove to be tenuous if unmet needs breed growing desperation. If new displacements of Iraq's population result from hunger and disease, if relief is again sought across national frontiers, the region's stability will once

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more be set at risk with unforeseeable consequences. Humanitarian and political interests converge in the aversion of catastrophe. It is clearly imperative that Iraq's "essential civilian needs" be met urgently and that rapid agreement be secured on the mechanism whereby Iraq's own resources be used to fund them to the satisfaction of the international community.

Appendix I

CHANGES IN PRICES OF ESSENTIAL FOOD ITEMS IN IRAQ

JULY 1990-JULY 1991

(Iraqi dinars per kilogram)

	Wheat flour	Rice	Lentils	Sugar	Local cheese	Veget- oil	Fish	Red meat	Poultry meat	Eggs (30 eggs)	Milk powder	Tea	Potatoes
July 1990	0.060	0.240	0.400	0.200	1.600	0.600	5.000	7.750	3.000	3.600	1.600	2.000	0.500
July 1991	2.873	5.278	4.795	4.289	11.600	12.031	14.357	12.250	NA	14.719	30.818	37.406	2.094
Increase (times July 1990 prices)	48	22	12	21	7	20	3	2	NA	4	19	19	4

Appendix II

K/CAL VALUE OF PER CAPITA DAILY FOOD RATION UNDER THE
 RATIONING SYSTEM

Commodity	K/cals per 100 grs	1990 Sept./Dec.	Ration level 1991			
			Jan./April	May	June	July
Wheat flour a/	360	21 600	18 000	21 600	25 200	27 768
Rice	371	5 565	3 710	3 710	3 710	5 565
Vegetable oil	884	4 420	2 210	2 210	2 210	2 210
Lentils	354		not distributed			
Sugar	386	3 860	2 895	3 860	3 860	3 860
Tea	293	293	-	146	146	146
Powdered milk	507		restricted			
Per month		35 738	26 815	31 526	35 126	39 549
Per caput per day		1 191	894	1 051	1 171	1 318

Source: FAO, Food and Nutrition Paper No. 26, Food Composition tables for the Near East (Rome, 1982).

a/ July wheat flour ration is composed of 50 per cent wheat flour, 40 per cent barley meal and 10 per cent maize meal.

Appendix III

MISSION'S OBSERVATIONS ON 1991 CROP PRODUCTION IN IRAQ BASED
ON FIELD SURVEYS IN JULY 1991

GOVERNORATE	MAIN FACTORS AFFECTING PRODUCTION IN 1991
1. TA-MEEM	Widespread crop failures and poor yields due to insufficient rainfall, shortages of fertilizers; large areas under wheat and barley could not be harvested owing to civil strife and security problems; 50 per cent of the combine harvesters and tractors out of service for lack of spare parts.
2. SULAIMANIYA	Only small proportion of the area could be harvested due to movement of population to Iranian borders in March and subsequent security problems, wheat crop in some areas destroyed by fire; out of 154 combine harvesters 50 in working condition, 29 stolen; about 70 per cent of 3,860 tractors stolen; delayed and insufficient rainfall.
3. ARBIL	Poor yields due to insufficient rainfall; lack of fertilizers; large areas destroyed as a result of military activities; farming activities disrupted owing to movement of population following civil strife.
4. NINEVEH	Total crop failure on more than one quarter of the areas planted; extremely low yields on other areas for lack of rain; serious sunn pest infestation; shortage of pesticides; fertilizers and machinery shortages.
5. DOHUK	Rains started three months late; massive movement of population to borders in March; large areas affected by sunn pest as no spraying could be undertaken; out of 128 combine harvesters, 74 stolen; out of 705 tractors, 600 stolen.
6. SALAH AL-DEEN	Crop failure on large part of the area planted due to three months' delay in the start of rains and no rainfall after 25 March; serious shortages of fertilizer, pesticides and no seed available for vegetable cultivation; locust larvae seen in some areas.
7. WASIT	Owing to damage to Kut Dam, irrigation and drainage operations stopped; large areas flooded; crops along Iranian border cannot be harvested owing to security situation. Maize crop rotted in the field owing to security problems.

GOVERNORATE	MAIN FACTORS AFFECTING PRODUCTION IN 1991
8. MAYSAN	Massive crop failures owing to lack of irrigation, serious shortage of fertilizers, pesticides and spare parts.
9. BASRA	Crop failure on bulk of the area planted owing to stoppage of irrigation following power breakdown; black rains affected pollination; disruption of farming activities owing to movement of farmers as a result of civil strife; transportation difficulties owing to destruction of bridges in war. Damage to drainage system.
10. THI QAR	Large-scale crop failures due to breakdown of irrigation system by war; low yields on remainder area owing to military activities, lack of rains and shortages of pesticides.
11. MUTHANA	Stoppage of power supplies affected irrigation to a large proportion of the cultivated area and created flooding and drainage problems. High prices of fuel before May caused widespread damage to Alfa-alfa area.
12. QADISIZA	Serious crop failures due to lack of irrigation supplies. In remaining areas yields exceptionally low as only one irrigation against normal of four could be applied; rice yields also expected to be significantly reduced owing to shortage of irrigation supplies. In remaining areas yields exceptionally low as only one irrigation against normal of four could be applied; rice yields also expected to be significantly reduced owing to shortage of irrigation supplies and farm inputs.
13. BABYLON	A large proportion of land was affected by lack of irrigation owing to breakdown of power supplies; flooding of land caused excessive salinity, black rains affected pollination; serious shortages of seed, fertilizer, and insecticides; date plants affected owing to lack of aerial spraying.
14. NAJAF	Wheat and barley crops affected by shortage of irrigation, fuel and fertiliser; civil strife disrupted farming activities owing to massive movement of population; black rains (three times) reduced pollination. For rice, the main crop, quantity of water not enough as electric supply restored for six to eight hours daily. Planting of rice delayed by two months.

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GOVERNORATE

MAIN FACTORS AFFECTING PRODUCTION IN 1991

15. KERBALA

Crop failure on bulk of wheat and barley areas owing to lack of drainage and irrigation; three black rains affected pollination; civil strife disrupted farming activities; date plants sprayed only once manually owing to restrictions on aerial spraying.

Appendix IV

CEREAL PRODUCTION 1989/90 (ACTUAL) AND
 1990/91 (FORECAST)

(Area in '000 hectares)

(Production in '000 tons)

CROP	1989/90	1990/91 ^{a/}
Wheat		
Area	1 196	2 512
Production	1 196	525
Barley		
Area	1 995	2 389
Production	1 854	520
Rice		
Area	85	88
Production	228	125
Maize		
Area	59	40
Production	185	74
Other grains		
Area	12	8
Production	6	4
TOTAL		
Area	3 348	5 037
Production	3 469	1 248

Source: Ministry of Planning, Central
 Statistics Organization, Annual Abstract of
 Statistics 1990.

^{a/} Mission's forecast.

Appendix V

SUMMARY OF ESSENTIAL AGRICULTURAL NEEDS FOR 1991/92

(In round figures)

Commodity	Quantity (tons)	Value (thousands of dollars)
Fertilizers	300 000	200 000
Seeds	65 000	40 000
Pesticides	7 000	25 000
Veterinary drugs		500
Machinery/spares		175 000
Livestock concentrate	15 000	34 500
Miscellaneous		25 000
	Total	500 000

Appendix VI

BASIC FOOD IMPORT REQUIREMENTS OF IRAQ FOR 1991-1992 (JULY/JUNE)

Basic food	Import requirements ^{a/} (Thousand tons)	Unit price C.I.F. (\$US per ton)	Import cost (Millions of dollars)
CEREALS AND PULSES ^{b/}			
Wheat	3 616	170	614.7
Rice	695	400	278.0
Barley	560	150	84.0
Maize	387	120	46.4
Pulses	84	500	42.0
POTATOES ^{b/}	100	470	47.0
VEGETABLE OIL	350	470	164.5
MEAT AND LIVESTOCK PRODUCTS			
Red meat	150	2 500	375.0
Poultry meat	160	1 500	240.0
Eggs	50	1 390	69.5
Baby milk	72	3 500	252.0
Other milk	600	217	130.2
SUGAR AND SWEETENER	600	300	180.0
TEA	45	2 500	112.5
Total	7 469		2 635.9

^{a/} Calculated on the basis of per capita requirement based on 1987-1989 averages of utilization minus domestic availability using FAO Food Balance Sheet for Iraq for a projected population of 18.7 million.

^{b/} Includes, where necessary, provision for seeds, feed, wastage and small replenishments of stocks.

Appendix VII

FOOD ASSISTANCE REQUIREMENTS

Beneficiaries		Requirements	
Category	Number	Feeding period	Person/days feeding
Vulnerable groups ^{a/} ^{b/} (institutions)	80 000	16 July/31 December	13 520 000
Destitute people	600 000	"	101 400 000
Iranian refugees	20 000	"	3 380 000
In transit, Zakho	15 000	"	2 535 000
In destroyed villages north-west	30 000	"	5 070 000
Allowance for migratory movements	80 000	3-months buffer (90 days)	7 200 000
Arbil sector		15 July/31 August	
Returnees	100 000	(47 days)	4 700 000
Anticipated	100 000	1 August/30 September (61 days)	6 100 000
Sulaimaniya sector		15 July/31 August	
Returnees	150 000	(47 days)	7 050 000
Anticipated	150 000	1 August/30 September (61 days)	9 150 000
Allowance for return of balance from the Islamic Republic of Iran	100 000	2 months buffer (60 days)	6 000 000
Internally displaced in southern Iraq	60 000	15 July/31 August (47 days)	<u>2 820 000</u>
Total feeding days			<u>168 925 000</u>

^{a/} Only orphans, children in kindergartens and mothers and children in MCH centres as well as hospital patients receive dried skim milk, enriched (11,432,850 days at 50 grs).

^{b/} Apart from orphans, children in kindergartens and mothers and children in MCH centres, all other beneficiaries are entitled to a ration of pulses (232,950,650 days at 40 grs).

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Appendix VIII

POWER-GENERATING UNIT STATUS AS OF 1 JULY 1991

Region	Plant	Unit capacity MW	No. of units installed	Total capacity MW	Units put in operation	Total available MW
Northern region	Sadam Dam.					
	P. storage H	100	2	200	0	0
	Reg. scheme H	15	4	60	4	30
	Main scheme H	187.5	4	750	2	230
	Mosul east G	12	4	48	0	0
	Mosul gas G	20	12	240	4	40
	Mulaabdulla G	20	12	240	7	70
	Dibis S	15	4	60	0	0
	Dibis G	35	5	175	2	0
	Dokan H	80	5	400	2	110
	Derbendkhan H	80	3	240	0	0
	Baui S	220	6	1 320	5	900
	Central region	Taji G	20	7	140	2
Samarra H		28	3	84	0	0
Himrin H		25	2	50	1	20
Qadisiya H		110	6	660	2	60
Baghdad-S S		55	4	220	0	0
		67.5	2	135	2	50
Baghdad-S G		27	1	27	0	0
Sarrafa G		20	1	20	0	10
Dora S		160	4	640	2	250
Dora G		35	4	140	4	70
Hilla G		20	4	80	3	30
Musayeb S		300	4	1 200	0	0
N. Baghdad G		17	6	102	1	10
Najaf G	63	3	189	0	0	
Southern region	Nassiriya S	210	4	840	3	300
	Hartha S	200	4	800	0	0
	Khor Ulzubair G	63	4	252	1	30
	Najibia S	100	2	200	2	90
	Shuaiba G	20	2	40	1	10
Total			128	9 552	50	2 325

Note: Capacity put into operation = 25 per cent.

H = hydro, S = steam, G = gas turbine.

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Appendix IX

**SPARE PARTS, MATERIALS, EQUIPMENT AND RESTORATION WORK REQUIRED
 TO SUSTAIN ELECTRIC SERVICE OVER THE NEXT YEAR**

1. The following list represents the minimum requirements to sustain the present level of electric service of about 2,300 MW of generating capacity, to improve the reliability of generation and transmission by normalizing protection systems, to restore transmission facilities to a reasonable level of security, and to start restoration of more of the damaged generating units so that further deterioration in electric service does not occur and some additional supply can be provided.

2. The generation requirements are a combination of providing spare parts, improving the security of units now operating, obtaining materials such as boiler water treatment chemicals to sustain operation, restoring more damaged units to increase the supply, restoring powerhouse cranes so that maintenance can be performed, and increasing the security of the power supply.

(Millions of dollars)

(a) Prepaid spare parts

Many parts and services are prepaid without having received the goods including Musayeb No. 3 turbine rotor and Khorulzubair gas turbine inner casings 100

(b) Spare parts and materials

All spare parts and most operating materials are consumed and a backlog must be supplied for all equipment including electronic cards, pumps, motors, chemicals, turbine oil, special oils, bearings, turbine blades, etc. 500

(c) Unit restoration

Some units can still be recovered for operation with parts and outside technical assistance, as follows:

Restore Samarra hydro (84 MW) with new rotors, windings, transformers, gantry crane, governors 30

Restore Musayeb No. 3 (300 MW) by complete turbine rebuilding, part replacements, rewiring, etc. 90

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(Millions of dollars)

Restore Baiji steam plant switchyard, powerhouse crane, one unit that has been cannibalized (200 MW)	50
Restore Nasiriyah steam plant cooling system, cannibalized units, auxiliaries, etc. (500 MW)	50
Restore 10 x 20 MW frame 5 gas turbines at Mosul, New Baghdad and Mulaabdulla (200 MW)	20
Restore Dora steam plant No. 4 unit by erecting new stack and replacing cannibalized parts (160 MW)	30
Restore Hadida hydro plant (660 MW) with new 400 KV cables and substation repairs	30
Generation subtotal	900

3. The transmission requirements include the replacement of two major 400 KV switching stations at Mosul and Kirkuk each with 5 x 400 KV and 14 x 132 KV lines and 1,000 MVA of 400/132 KV transformation, plus transmission spares, 400 KV and 132 KV lines, and 132 KV substations.

(Millions of dollars)

<u>(a) Replace 400 KV substations</u>	
Mosul super grid station with SF6 switchgear	100
Kirkuk super grid station with SF6 switchgear	100
<u>(b) Replace 132 KV substations</u>	
There are 12 damaged 132 KV stepdown stations similar to New Rumaila with 2 x 63 MVA transformers and typically four 132 KV supply lines and 12 outgoing 33 KV feeders	150
<u>(c) Transmission lines</u>	
2,000 km of 400 KV lines suffered about 30 per cent damage; estimate is based on a partial replacement cost of \$200,000/km	120

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(Millions of dollars)

2,000 km of 132 KV lines suffered about
30 per cent damage; estimate is based on
a partial replacement cost of \$100,000/km 60

(d) Transmission spares

General spares are required including
breaker parts, insulators, switches,
transformer oil, line hardware, control
relays, transformers, bushings, etc. 150

Transmission subtotal 680

4. Many areas of the distribution system were damaged during both the
bombing and the civil disturbances.

(Millions of dollars)

(a) Spares

All stock of distribution materials has
been consumed including conductor, fuses,
insulators, cables, reclosers, capacitors,
etc. 200

(b) Distribution lines

10,000 km of 11 KV lines were damaged to
about 30 per cent 60

2,000 km of 33 KV lines were damaged to
about 30 per cent 12

22,000 km of 0.4 KV lines were damaged
to about 30 per cent 33

(c) Transformers and capacitors

About 2,500 MVA of distribution transformer
capacity must be replaced at a unit cost
with switches and hardware of \$20/KVA 50

About 430 MVAR of capacitors must be
replaced at a unit cost of \$10/KVA 5

Distribution subtotal 360

5. In the area of general services supporting all utility activities vehicles, communication facilities, and service buildings are required.

(Millions of dollars)

(a) Communications

The complete microwave system must be rebuilt to cover all plants, substations and administrative centres. The power-line carrier system must also be rebuilt 200

(b) Vehicles

The present fleet is about 2,000 for distribution, 1,000 for transmission, 400 for generation and 400 for administrative. Many vehicles were lost, particularly as a result of the civil unrest. Vehicles required are 2,000 at an average (including high-cost special vehicles) of \$25,000/vehicle 50

(c) Special materials

For offices and service buildings imported items are required such as fluorescent lights, elevators, pumps, etc. to effect repairs 10

General subtotal 260

Total 2 200

Appendix X

SUMMARY OF INTERNATIONAL TELECOMMUNICATION UNION MISSION FINDINGS
ON TELECOMMUNICATIONS IN IRAQ (28 JUNE-7 JULY 1991)

1. At the end of 1990 Iraq had a modern telecommunication network serving millions of its people through 900,000 telephone lines. Digital microwave links, fibre optics and coaxial cables constituted the backbone transmission media connecting various cities and villages together. Four Satellite Earth Stations working with Intelsat, Arabsat and Intersputnik, two international exchanges, different microwave and coaxial cable links to neighbouring Turkey, the Syrian Arab Republic, Jordan and Kuwait carried the regional and international telecommunications traffic.
2. At the end of the war and the disturbances that followed, the telecommunications systems were virtually defunct. The picture emerging now shows that at least 400,000 telephone lines were completely damaged and hence put out of service for good. Other telephone lines were partially damaged. The main microwave links connecting cities were damaged. International and regional communications are destroyed. What is left of telecommunication services now is less than 30 per cent as compared to the pre-war situation.
3. People were instantly deprived of their basic telephone services. Government departments such as water and sanitation, health, food and energy were dependent on the telecommunication network. With the telecommunication network severely damaged, control and management of these departments and their services are harshly affected.
4. To control epidemics and diseases, first-hand information is essential. The disease surveillance system for the assessment of health status and trends, monitoring the drinking water supply systems in affected areas and reporting, require rapid transfer of data through communication means.
5. The energy sector essential for vital sectors of life including water and sanitation is working almost blindly. Control of the 20 main power stations responsible for electricity generation was greatly dependent on the public telecommunication network.
6. With the absence of normal telephone communication, human sufferings are great. People who can make it are travelling 1,000 km to Amman in Jordan to make telephone calls to their relatives abroad.
7. Owing to the destruction of the telecommunication infrastructure in Iraq, United Nations agencies are establishing their own radio systems. These systems include HF, VHF and UHF radio and portable Inmarsat terminals. Fixed, portable and mobile radio are installed in Baghdad and relevant cities and field offices. United Nations radio communications in Iraq are subjected to some problems that include inadequate and non-reliable transmission on HF radio, inadequate coverage for the VHF radio, short time intervals allocated

for HF transmission in Iraq and to Geneva to allow for communications on the same frequencies for other parts of the world, temperatures as high as 50°C or more, high cost for Inmarsat transmission and maintenance problems.

8. Huge efforts by Iraqi Government to rebuild the telecommunication network are under way amid severe shortages of spares, non-standard procedures for some microwave and exchange installations (long microwave routes have no diversity, exchanges working with no stand-by processors), lack of proper buildings design to house electronic exchanges, severe and frequent power cuts which damage the electronic equipment, long telephone line connections, high congested trunk routes and so on.

9. In short it can be said that no reliable telecommunications exist in Iraq. This is now leading to a drop in work efficiency in all governmental departments; heavy reliance on transportation and hence increased costs; humanitarian efforts are facing abnormal conditions; people cannot call their doctors or reach ambulances or fire brigades by telephone, no reliable field data can be gathered efficiently; to name few things.

10. The restoration of the telecommunication network to its pre-war condition will take several years and several hundreds of millions of dollars. While it is recognized that such restoration will have to be carried out by the Government of Iraq, in the present circumstances it is not possible for the Government to resume purchase immediately. In the interim, there is a need for international emergency assistance with the provision of \$US 41.3 million to purchase priority requirements for basic telecommunications.

11. To meet basic telecommunications services, urgent needs have to be met. The total cost of these needs are \$US 41.3 million. This includes:

	(United States dollars)
1,000 public telephone booths to be installed in different parts of the country	3 000 000
10 multi-access radio telephone systems	5 000 000
20 containers (1,000-2,000-telephone capacity)	10 000 000
Portable Earth station equipped with telephone and telex service (60-channel capacity)	5 000 000
Radio cellular system (for fixed telephone installations)	10 000 000
40 electrical generators (40-50 KVA)	300 000
Cables, feeders and electronics spares	5 000 000
100 vehicles for maintenance	2 500 000
Total	<u>41 300 000</u>

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12. The mission recommends the following:

(a) To meet the urgent needs of a basic communications system, there is a need for international emergency assistance with the provision of \$US 41.3 million to purchase priority requirements as outlined in paragraph 11;

(b) The Iraqi Telecommunication Authority should be enabled to purchase its spares and communication systems contracted before the embargo. Unless spares are available, much of the efforts being carried out now for restoration of communications services will be brought backward;

(c) Assistance is required in the re-establishment of international services;

(d) An ITU office should be set up in Baghdad to coordinate the expected humanitarian assistance in the field of telecommunications. Moreover this office will liaise between different United Nations agencies in telecommunications matters and render technical advice;

(e) The Iraqi Telecommunication Authority, while cooperating fully with the ITU mission, agreed to connect all United Nations offices in Baghdad to one automatic exchange. This is possible now and will facilitate matters for humanitarian agencies in Iraq. Other United Nations field offices will be connected as appropriate.
