



**FINAL NARRATIVE REPORT  
IRFFI/UNDG IRAQ TRUST FUND (UNDG ITF)**

<b>Participating UN Organization(s)</b>	<b>Sector(s)/Area(s)/Theme(s)</b>
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<b>Programme/Project Title</b>	<b>Programme/Project Number</b>
Improvement of water supply and drainage provisions through the rehabilitation of pumping stations	A5 – 02 (OSRO/IRQ/403/UDG)

<b>Programme/Project Budget</b>		<b>Programme/Project Location</b>	
<b>UNDG ITF:</b>	USD 25,158,544	<b>Region (s):</b>	
<b>Govt. Contribution:</b>		<b>Governorate(s):</b>	
<b>Agency Core:</b>			
<b>Other:</b>		<b>District(s)</b>	
<b>TOTAL:</b>	USD 25 158 544		

<b>Final Programme/ Project Evaluation</b>	<b>Programme/Project Timeline/Duration</b>
<b>Evaluation Done</b> Yes      No <b>Evaluation Report Attached</b> Yes      No	<b>Overall Duration</b> <i>August 2004 – December 2009</i> <b>Original Duration</b> <i>August 2004 – August 2006</i> <b>Programme/ Project Extensions</b> <i>First Extension:</i> <i>August 2006 to December 2007. (1.5 years)</i> <i>Second Extension:</i> <i>December 2007 to December 2008. (1 year)</i>

**a. Provide a brief introduction to the programme/ project**

The Ministry of Water Resources (MoWR) controls about 275 major pumping stations in the Euphrates and Tigris river basins, most of them built in the 1970s or early 1980s. These large pumping stations feed major irrigation canals and assure drainage of the irrigated land. Maintenance and replacement of irrigation pumps, motor and refurbishment of pumping stations have been largely neglected since the 1980s and the Iran- Iraq war. During the latest conflict the installations were looted, backup generators and electrical control boards disappeared or were vandalised. The Ministry estimated that only 60% of the pumping stations in the country are operational. About 150 generators run pumping stations that supply the single source of both drinking water and irrigation supplies to large portions of central Iraq. The main objective of this project was to procure and install new pumps and generators to a number of pumping stations in order to restore parts of the water supply system of central Iraq to a sustainable level.

**b. List programme/project outcomes and associated outputs as per the approved Project Document**

**The immediate objectives/outcome:**

- A full assessment of the condition of the pumping stations in the country, and to identify and detail the measures to be taken for their repair or rehabilitation, based on a priority list, prepared by the MoWR
- Operational condition up to 125 pumping stations restored within the Tigris and / or Euphrates hydraulic systems, contributing to the better water supply of some 1,000,000 Ha of agricultural land and 150 000 of households within the areas' rural communities.

**Outputs:**

- Rehabilitation of up to 125 pumping stations earmarked as priorities, through the local or international procurement of mechanical and electrical equipments and spare parts and their installation.
- MoWR technical staff trained in condition assessment and repair of pumping stations; technical and administrative staff on contractual matters for major international procurements / service contracts

**Main activities:**

- A general inventory and condition assessment of the approx. 275 pumping stations under the control of the MoWR, in a GIS-linked database;
- A detailed survey of actions required for the rehabilitation of the approx. 125 pumping stations earmarked as priorities on the basis of their importance for the supply of water for human consumption, as well as for irrigation to strategically important agricultural areas
- Rehabilitation of Pumping Stations, training and technology transfer to MoWR technical staff

Targeted beneficiaries have been those farming households, living or previously settled in, the command-areas of irrigation system damaged during the conflict, together with local communities using the water of these resources for drinking purposes.

Priority was given to those groups who are facing disruption of water supplies which is leading to a lack of drinking water for human or animal consumption, or secondly the loss of orchards and agricultural production.

**c. List the UN Assistance Strategy Outcomes, MDGs, Iraq NDS Priorities, ICI benchmarks relevant to the programme/ project**

The project activities have contributed to the overall UN strategy for Iraq which supports the Iraqi National Development Strategy and contributes to the Millennium Development Goals, designed to achieve the following outcomes:

- enhanced sustainable long-term food production and natural resource management;
- rehabilitation and reconstruction of infrastructure;
- strengthened institutional development and capacity building;
- support to legislation, policy and strategy formulation;
- enhanced employment and income-generation;
- enhanced environmental restoration and conservation.

**d. List primary implementing partners and stakeholders including key beneficiaries.**

The main implementing partner for this project was MoWR. The other international partners involved in this project were the original manufacturing companies from whom the equipment was ordered and who also contributed to the project through provision of specific technical trainings for the MoWR staff engineers. Supervision company employed by FAO was also responsible for technical supervision of all sites and thus can be considered an important implementing partner in this project.

MoWRThe Ministry of Water Resources was a direct beneficiary of this project. Both physical and human capacity building have targeted sites and staff belonging to the MoWR. As the water from these pumping stations is used for human consumption as well as irrigation of agricultural lands, those who indirectly benefit from the increased availability of water are households living in those areas in which pumps have been rehabilitated and brought back to full operational capacity.

**e. Report on the key outputs achieved and explain any variance in achieved versus planned results. Who have been the primary beneficiaries and how they were engaged in the programme/ project implementation?**

At the initial stage of the project a general inventory and condition assessment of approximately 275 pumping stations under the control of the MoWR, in GIS-linked database was undertaken. In period from July to December 2005 the final list of pumping stations was completed where it was found that there are 305 instead of 275 pumping stations as was specified in the original project document. Soon after the standard database package for the inventory was identified as well as the key reporting information required from the database. A local Jordanian company developed a database demonstration incorporating the identified requirements. The pumping station asset database covering 181 stations was completed in 2008, in close collaboration with the MoWR who since then took over its ownership.

Training on the updating of the database was conducted and information can now be extracted through the Geographical Information System (GIS) to determine rehabilitation priorities and requirements.

As explained in the introduction notes detailed condition assessments were completed on fourteen pumping stations. See details elsewhere in this document.

The original proposal for the pumping station project was approved in April 2004 for total amount of USD 13,463,000 and proposed to restore 125 pumping stations into operational condition based on a priority list prepared by the MoWR. However, this meant that the actual funding available for rehabilitation of each pumping station would be only USD 107 704. After review of the actual cost for the re funding of this kind would only be sufficient to replace circuit breakers and other minor spare parts to keep the pump stations operational until the next break down. Fundamental problem encountered was that the pumping stations were over thirty years old and if the aim was to rehabilitate them and make them last for another thirty years it was clear that substantial repair of electrical and mechanical equipment had to be replaced which would change initial cost estimate per pumping station drastically.

Given the above, a meeting was convened in Amman from 14 to 18 of August 2004 with representatives from the Ministry of Planning and Development Cooperation and the MoWR during which the MoWR proposed that FAO should undertake the major rehabilitation of eleven pumping stations and the rehabilitation of one other pump station through provision of spare parts only. The MoWR was responsible to provide FAO with a prioritised list of twelve pumping stations for rehabilitation. (Signed minutes of the meeting available at request)

Following the conclusion of the above mentioned meeting, the MoWR provided FAO with a list prioritizing twelve pumping stations and the cost estimate for their complete rehabilitation. Based on these cost estimates it was evident that approved funding (USD 13 463 000) would only cover the rehabilitation of eight out of prioritised twelve pumping stations. In order to move forward FAO and the MoWR decided to undertake detailed conditions assessment and name plate data surveys of the eight selected stations and prepared survey reports on each station including detailed Bill of Quantities for procurement of mechanical and electrical equipment, the installation, testing and commissioning which would be used by FAO for issuance of tender documents to the original equipment manufacturers (OEMs).

Subsequently the project outcome and outputs were revised as follows;

### **Revised Project Outcomes:**

- a full assessment of the condition of the pumping stations in the country and to identify and detail the measures to be taken for their repair and/or rehabilitation.
- within a priority list prepared by the Ministry of Water Resources (MoWR) on a needs basis, operational condition pumping stations within the Tigris and/or Euphrates hydraulic systems are restored and are contributing to an increased water supply for irrigation of agricultural lands and farming activities within the rural community areas.

### **Revised Project Outputs:**

- a general inventory and condition assessment of the approximately 181 pumping stations under the control of the MoWR undertaken, including the design and compilation of a pumping station database.
- a detailed survey of actions required for the rehabilitation of the approximately 125 pumping stations earmarked as priorities on the basis of their importance for the supply of water for human consumption, as well as for irrigation to strategically important agricultural areas.
- rehabilitation of pumping stations earmarked as priorities, through the local or international procurement of mechanical and electrical equipment and spare parts and their installation.
- MoWR technical staff trained in condition assessment and repair of pumping stations as well as repairs and maintenance of the rehabilitated pumping stations; and technical and administrative staff trained on contractual matters for major international procurement/service contracts.

It is important to note that once proposals were received from the original manufacturer for rehabilitation of eight selected stations it became apparent that initial MoWR's cost estimates were very optimistic and given the amounts quoted in the bids received, works could start on only four out of eight stations. Hence in 2005 FAO issued contracts for works to begin on four stations (Kirkuk, North Suwera, Al Amiriyah and Mandelli 1).

Additional funding received in May 2006 for total amount of USD 11 650 000 enabled works to start on four other prioritised pumping stations (Hutaman, Al Hussaniyah, Salman Pak and Al Sijilla). Therefore, the actual number of pumps to be rehabilitated under this project has been initially reduced to twelve at the meeting held in Amman in August 2004 and later due to budgetary constraints to eight pumping stations (Kirkuk, North Suwera, Mandelli 1, Al Amariyah, Hutaman, Al Sijila, Al Hussaniyah and Salman Pak). However, a detailed condition assessment survey has been conducted on fourteen pumping stations (in addition to the above eight: Al Shomally, Halata, Abu Sabkha, Al Muhadad, Abushut and Nahar Saad).

**Mandali 1 pumping station:** Both the assessment condition and name plate data surveys studies were completed. The original manufacturer Sigma Invest provided a technical proposal which was duly received and cleared by the MoWR and a contract worth USD 3 815 836 was awarded in August 2005 for the supply and installation of the replacement pumps. The contractor has provided factory training for two MoWR engineers onsite. The factory inspection and witness testing of all mechanical and electrical equipment was completed which was then delivered to site, installed, tested, commissioned and handed over to MoWR in June 2007. Additional technical inspection visits by FAO to the site were performed in 2008.

**North Suwira and Al-Amiriyah pumping stations:** Both the assessment condition and name plate data surveys studies were completed on both stations. A Purchase Order for USD 2 360 431 was issued for the supply of pumps and equipment for the North Suwira Pumping Station in September 2005 and a PO for USD 1 688 159 for the Al Alimiriyah Pumping Station in December 2005. Due to detailed and protracted negotiations on contractual terms and conditions, the contractor did not actually sign the contracts until May 2006. The equipment was delivered to the MoWR warehouses in September 2007. The equipment for North Suwira were transferred. The installation was completed July 2009.

**Hutaman, Al-Hussainiyah and Salman Pak pumping stations:** Both the conditions and name plate data surveys studies were completed for each station. The proposal was received from the OEM (KSB) for the supply and installation of the replacement pumps which was also cleared by MoWR technical staff. The contract for USD 7 308 484, was signed on 9 August 2006 for rehabilitation of all three stations and represents a negotiated reduction over the previous estimate of USD 7 757 567. Manufacture, witness testing and training were completed with the final deliveries of equipment in November 2007. Installation was completed for Hutaman. The Al Hussaniyah station minor adjustments were executed that were completed by end of February 2009. For the Salman Pak pumping station, the MoWR installed the working stations and the worked was completed in 2010. FAO has therefore handed over equipment to MoWR and as a consequence the contract with KSB was reduced to USD 6 787 344.

**Al-Sijilah pumping station:** A conditions and name plate data surveys studies were conducted and completed on this station. A proposal was received from the OEM (SPP) for the replacement of pumps and electrical control equipment. The Purchase Order for the pumps and electric control equipment was issues for USD 588 217. After manufacture and witness testing was completed the delivery took place during August 2007. The installation was completed in 2010. Due to difficulties in obtaining visas for Iraqi experts to travel to UK it was not possible to provided training in repair and maintenance of the pumping station, despite the efforts that were made to seek for alternative training.

**Kirkuk Pumping stations:** Both the conditions and name plate data surveys studies were completed on this station. The following spares, worth USD 1 180 511, were procured: pump bearings, standard bearings, two sizes of autotransformers, grease pumps, two sizes of capacitor, dewatering pumps, oil pressure devices, batteries and silicon transformer oil plus vacuum contactors. The installation of equipment was completed by the MoWR.

In addition, thirty 30 KvA generators have been purchased under this project (USD 380 000) in addition to spare parts for Hutaman pumping station worth USD 122 120 requested to be procured by the MoWR.

As already mentioned above, a number of MoWR technical staff was trained during the life of the project. Except for the pumping stations Kirkuk and Al Sijila, for which the respective training was not conducted due to problems encountered with travel arrangements, training in condition assessment, repair and maintenance of pumping was completed at all other pumping stations. Two engineers from six pumping stations traveled to the premises of the respective

OEM to receive comprehensive technical training while a number of operational and maintenance staff at all eight pumping stations received on-the-job training.

The main training on Geographical Information System (GIS) which was the requirement of setting up of the main database on the state of pumping stations, was held in Amman for one month (December 2008) for ten MoWR staff (USD 270 580).

Furthermore, as a consequence of the risk management procedures, which were put in place to minimize various risks related to the project implementation, the ministry staff at various levels got inevitably involved with direct management of the project and contributed to all project activities. In that sense, all the staff designated by the MoWR to follow this project was exposed directly or indirectly to various types of trainings and had an opportunity to participate in decision making. This in return led to them acquiring knowledge of the various stages of the project cycle such as preparation of assessment survey, preparation of technical specifications, international procurement, logistics, testing of equipment and installation, etc.

**f. Report on how achieved outputs have contributed to the achievement of the outcomes and explain any variance in actual versus planned contributions to the outcomes. Highlight any institutional and/ or behavioural changes amongst beneficiaries at the outcome level**

**Planned outcomes:**

- A full assessment of the condition of the pumping stations in the country, and to identify and detail the measures to be taken for their repair or rehabilitation, based on a priority list, prepared by the MoWR
- Operational condition up to 125 pumping stations restored within the Tigris and / or Euphrates hydraulic systems, contributing to the better water supply of some 1,000,000 Ha of agricultural land and 150 000 of households within the areas' rural communities.

**Achievements:**

A pumping station asset database was finalized, covering all 305 pumping stations under MoWR. List of 14 pumping stations designated for rehabilitation was finalized. Detailed data was collected for the specifications of each pumping station, type & general condition of equipment for each pumping station. The data included an overall schedule for repair, rehabilitation or replacement of equipment.

Eight main pumping stations involving 50 pumps located in Kirkuk, Wasit, Diyala, Karbala, Anbar, Naseriyah, Babel and Baghdad Governorates have been rehabilitated through the replacement and/or rehabilitation of pumps, motors and electrical equipment. These stations, with capacities ranging from 2.7 to 9 m<sup>3</sup>/s, provided irrigation for agriculture and drinking water for the targeted farming households as well as livestock

The rehabilitation works for the pumping stations Kirkuk, North Suwira, Mandel 1, Al Amiryah, Huttaman, Al Sijillah, Al Hussainiyah and Salman Pak provided 150,000 ha (603,000 Donum) for irrigation benefiting 120, 000 farming households, fresh water for 400 000 inhabitants, agro industry and industry get fresh drinking water in Kirkuk and Mandli townships for up to 1 million people, 20 water treatment works, eight poultry and fish farms and numerous farmers and livestock owners, plus improve the drainage of agricultural areas and eliminate the necessity to discharge saline drainage water into fresh water sources.

In Kirkuk, the two pumping stations of Al Qadisyah and Al FAO benefited from the supply of key spare parts. As a result, the cultivated area doubled from 5,000 ha (20,000 donums) to 10,000 ha (40,000 donums). Cropping intensity and crop yield also increased resulting in improved food security, increased income and on farm employment. Irrigation water was generally equitably distributed among the farmers. Most importantly, there was also an improvement in both quantity

and quality of drinking water which is being provided to about 1 million people in Kirkuk town and the immediate vicinity.

In Hutaman, the pumps are presently operating for 15 hours a day, which has significantly reduced water logging and salinity. Farmers were highly satisfied with the benefits derived from the project. They indicated that more water was now available for irrigation and confirmed that water logging and salinity have been reduced. They further indicated that before the project they hardly cultivated any land due to non-availability of irrigation water, but now they are cultivating 3,200 ha (12,800 donums) out of the 3,875 ha (15,500 donums) command area.

**Table 1.** This table shows the increase of irrigated land/ha and no. of beneficiaries using the irrigated land following the rehabilitation of the pumping stations.

NO.	Pump Station		No. of Pumps sets before rehabilitation		No. of Pumps sets after rehabilitation	Ratio of project performance	Beneficiaries No.		Irrigated area before and after rehabilitation (Hectares)		Increasing in man power (Farmers and household Farmers)
			Working	Not working			BR	AR	BR	AR	
1	Kirkuk Pump station	PS 1	8	6	14	100%	27000	36000	4680	8250	6000
		PS 2	4	4	8	100%					3000
2	Mandl/1		2	3	5	100%	17500	50 000	438	5250	37,500
3	N.Suwaira		1	3	4	100%	2200	10000	2750	12500	9750
4	Al-Amiriyah		0	5	5	60%	0	45000	0	22500	45,000
5	Al-Sijilla		1	2	3	90%	2400	8000	3375	11250	7600
6	Al-Husianiya		1	2	3	60%	1500	5000	750	2500	3,500
7	Huttaman		1	2	3	100%	115	472	1275	4250	357
<b>TOTAL</b>			<b>20</b>	<b>30</b>	<b>45</b>		<b>56,715</b>	<b>113,972</b>	<b>13.268</b>	<b>55,250</b>	<b>57,257</b>

## Training

MoWR technical staff trained in condition assessment and repair of pumping stations as well as repairs and maintenance of rehabilitated pumping stations; technical and administrative staff trained on contractual matters for major international procurements / service contracts.

Several training courses to build and improve the capacity of MoWR staff were conducted including:

GIS linked database: A training course was held in Amman for the period from 29 Nov 2008 to 5 Jan 2009 for 12 key technical staff of MoWR on GIS. In addition, MoWR PS staff was trained on data collection.

- Inventory and condition assessment: Key admin staff of the 14 pumping stations was trained on rules and procedures for international equipment specifications and contractual services for one week in Iraq. Technical training on operating, repairing and maintaining the pumping stations:

20 operational and maintenance staff at the 8 pumping stations received training at the suppliers workshops as part of their contracts for one week.

As mentioned above, both the outputs and outcomes of this project have been substantially revised to match the budget available for this project. Eight pumping stations have been rehabilitated to the full potential while a centralised database was set up for the MoWR to be used for information collection and monitoring as well as for future rehabilitation works on other stations.

To that end it could be argued that various actions taken under each project component (physical capacity building, training, setting up of database, etc) have led to achievement of project outcomes.

**g. Explain the overall contribution of the programme/ project/ to the ICI, NDS, MDGs and Iraq UN Assistance Strategy.**

**Millennium Development Goals:**

**Goal 1:** Poverty reduction. This project has contributed towards to this goal by increasing the agricultural productivity and access to food by increasing availability of fresh water used for agriculture and farm irrigation.

**Goal 4:** Reducing child mortality. The household food security has been improved as direct outcome of improved farm and rural income.

**Goal 7:** Ensuring environmental sustainability. This project has contributed directly to protection of the main element of ecosystems (fresh water) needed to sustain human population.

This project contributed to the following Sections, Goals and Benchmarks of the **International Compact of Iraq**

- **Section 4.6** Agriculture and Water Management Strategy:
- **Goals: 4.6** To support the development of the agriculture sector to achieve food security, generate employment, diversify the economy and preserve the countryside. Create an enabling environment for a market oriented agricultural sector.

**Benchmark #3:** Undertake specific measures to develop an integrated land and water development policy

- Over 2008-2010, produce Regional Land and Water Usage Plans indicating options for increasing efficiency of water use in agriculture and closing the demand-supply gap.

**Benchmark #4:** Improve institutional and regulatory underpinnings of public agriculture

- Over 2008-2010, strengthen the technical and management capacities of agricultural organizations (priority action).

**Benchmark #5:** Carry out investment plans:

- By 2008, develop financing plans and mechanisms including public and private resources (Priority Action):
  - Rehabilitate damaged physical infrastructure
  - Improve delivery of public agricultural services

**National Development Strategy**

Under 4.4.2 Agriculture

Iraq's irrigation infrastructure fell into disrepair and salinity has spread across much of the irrigated field of central and southern Iraq.

Item 9: Agriculture production decline because of salinity.

Item 15: Old irrigation pumps that require rehabilitation to operate the irrigation system well.

Under 4.4.3 Future Plans

Item 4: Encouraging establishing specialized agricultural associations.

Item 6: Completing irrigation and drainage systems for irrigated projects using comprehensive reclamation system and rehabilitate existing ones as well as implementing main outfalls.

## Iraq UN Assistance Strategy

- Sector Outcome 1:** Enhanced production and productivity in the agriculture sector  
**Sector Outcome 2:** Poverty reduced and sustainable employment for vulnerable groups created.

### **h. Explain the contribution of key partnerships including national, international, inter-UN agency, CSO or others towards achievement of programme/ project results.**

For this project FAO cooperated closely with the Iraqi Ministry of Water Resource (MoWR).

The MoWR's initial role was to select the project sites for rehabilitation and provide, where possible, the basic survey reports and technical dossiers for the works to be done. Later on, in collaboration with the MoWR, FAO ensured timely recruitment of project personnel including the Project National Coordinator (NPC) to coordinate project activities from Baghdad and Erbil in collaboration with the MoWR counterparts.

Furthermore, the MoWR, through its line ministers in respective governorates, was fully involved in FAO's procurement process as well as in all the stage of the elaborate undertaking of civil, mechanical and electrical rehabilitation works pumping stations. This was done through direct employment of the MoWR Engineers to monitor and provide advice during the work implementation. Hence, responsibilities of the project implementation were in a certain sense co-shared with the MoWR.

As explained elsewhere in this document, other international partners involved in this project were the original manufacturing companies from whom the equipment was ordered and who also contributed to the project by providing important technical trainings for the MoWR staff engineers. Supervision company employed through FAO was also responsible for technical supervision of all sites and thus can be considered an important partner in this project.

### **i. Highlight the contribution of the programme/ project on cross-cutting issues:**

- **Were the needs of particularly vulnerable or marginalised groups addressed?**

As mentioned above, direct beneficiary of this project is the Ministry of Water Resources. It is the MoWR who has submitted a list of prioritized pumping station for immediate rehabilitation to FAO.

- **How did men and women benefit from the programme/project? How were gender inequalities handled?**

Both women and men have been selected by MoWR to attend training courses delivered under this project. Women received irrigation infrastructure rehabilitation assistance and training on priority basis when beneficiaries are selected. While transforming traditional farmer organizations into Water User Associations, women's participation will be ensured and women will be encouraged to be active members of the management team.

- **Were environmental concerns addressed including environmental impact/risk assessment where relevant?**

Environmental considerations were an important element of this project with a reduction of water logging and salinisation of agricultural lands in the region being important objectives. For example, improving the drainage networks, in this case Drain 22 in Mussieb irrigation network, will avoid saline water (charged with residues from upstream agricultural areas) overflowing and contaminating downstream lands, discharging into the rivers and water supply canals resulting in environmental and health risks for the population.

- **Were there any specific issues in relation to the security situation?**

The security situation at stations sites was very contentious through the implementation of this project. For example during installation, the staff at Mandel 1 pumping station were issued with a threatening letter by the local militia and had to negotiate terms for a return to site and resumption of work. These and similar incidents have added to the cost and duration of all contracts executed in Iraq and a procedure and methodology for resolving this issue needs to be addressed immediately.

- **Did the project contribute to employment generation (gender disaggregated)?**

Short term job opportunities for men and women were created through employing the unskilled and skilled labour in irrigation infrastructure rehabilitation, and the increased delivery of water which led to the cultivation of abandoned lands resulting in the creation of long term employment job opportunities in the rural sector, improving their income and livelihood. Regular access to water also encouraged schools and medical facilities to be established in the area to benefit all genders.

**j. Report on any assessments, evaluations or studies undertaken relating to the programme/ project and how they were used during implementation. Has there been a final project evaluation and what are the key findings? Provide reasons if no evaluation of the programme/ project have been done yet?**

A project evaluation was undertaken and completed in November 2009. The report is available at the Multi-Partner Trust Fund Office gateway website.

The interim results of the Stocktaking Review of the International Reconstruction Fund Facility for Iraq (Scanteam) dated November 2008 for this project state that Efficiency is Acceptable, Efficiency is Satisfactory, Value for Money is Moderately Satisfactory, National Ownership is Satisfactory while On Track.

**k. Indicate key constraints including delays (if any) during programme/ project implementation**

See below.

**l. Report key lessons learned that would facilitate future programme design and implementation.**

Information received from the MoWR during the project inception required cross checking for accuracy and reconciliation from three different sources of information which were later built into the survey and could be find in resulting documentation (bill of quantities, electrical layout single line diagrams and equipment name plate data). Delays occurred due to the lack of the information and while having to cross check information available.

Other causes of delay were:

- A Shortage of “As built drawings” from Iraq to verify information being received from the field.
- Delays in receiving information from remote field sites and from the original manufacturers.
- All contract documents had to be developed using FAO and FIDIC procedures in order to meet the requirements and cover the unusual circumstances surrounding project implementation.
- All pumping equipment has to be manufactured to order, as there are no stock items for the

pumps as most models were more than 30 years old.

- Manufacturing/delivery/installation lead times are twenty four to thirty six to nine months before commissioning.
- Incompatibility between new and existing 30 year old equipment when replacing or repairing pumps, motors, electrical control and auxiliary equipment in an existing pumping system and pump house structure. Such incompatibility could lead to the procurement of equipment that cannot be fitted into the existing structure or system, or will not work once it has been installed.
- Poor installation of new equipment or sub-assemblies and inadequate care taken during the rehabilitation of pumping stations, as a result of using unknown and untried contractors because the poor security situation in the country has prevented known contractors from tendering.
- The high cost of procurement and rehabilitation.
- The changes that have taken place in electrical control technology over the last 30 years.
- Having to rely on third hand information provided by the MoWR staff, as FAO cannot field international technical staff to pump station sites.

In view of the above and as already mentioned before, a full risk assessment analysis for the rehabilitation of the pumping stations was undertaken and procedures for requesting proposals from suppliers were amended in order to minimize the risks. These procedures, which are time consuming, were not foreseen during project formulation but should be taken into consideration for next project which will be funded for same type of works.

	<b>Performance Indicators</b>	<b>Indicator Baselines</b>	<b>Planned Indicator Targets</b>	<b>Achieved Indicator Targets</b>	<b>Reasons for Variance</b>	<b>Source of Verification</b>	<b>Comment (if any)</b>
<b>IP Outcome 1</b>							
<ul style="list-style-type: none"> <li>○ Within a priority list, prepared by the MoWR on the needs basis, restore into operational conditions up to 125 pumping stations within the Tigris and/or Euphrates hydraulic systems, contributing to the better water supply of some 1 000 000 ha of agricultural land and 150 000 of households within the areas' rural communities.</li> </ul>							
<b>IP Output 1.1</b> A general inventory & condition assessment of the approximately 275 pumping stations under the control of the MoWR, in GIS-linked database.	<b>Indicator 1.1.1</b> Restore the present water supply system to a sustainable level & to support new systems.	Rehabilitation & reconstruction of infrastructure; : Increased availability of clean water  Increased agriculture production.	GIS linked database that prioritize systems supporting drinking water (for humans & animals) and systems supporting major agriculture areas.	List of 14 pumping stations designated for rehabilitation was finalized. A detailed data was collected for the specifications of each pumping station, type & general condition of equipment for each pumping station. The data included an overall schedule for repair, rehabilitation or replacement of equipment. Technical specs for equipment procured & engineering works required. The data is considered a uniform system for future rehabilitation works on other stations.	Budgetary constraint	<ul style="list-style-type: none"> <li>• Inventory - condition assessment data.</li> <li>• Tech specs of equipment &amp; engineering works required</li> <li>• Budgets.</li> <li>• BOQ</li> <li>• Tender Docs</li> </ul>	<b>Completed</b> * Field surveys of pumping stations were carried out in consultation with engineers from (MoWR).
<b>IP Output 1.2</b> a) A detailed survey of actions required for the rehabilitation of the approximately 125 pumping stations earmarked as priorities on the basis of their importance for supply of water for human consumption as well as for irrigation to strategically important agricultural areas.	<b>Indicator 1.2.1</b> Improve water availability for irrigation, human & animal consumption	Enhanced sustainable long term food production and natural resources management.	Procure and install new pumps and associated electrical equipment to pumping stations.  Rehabilitate 12 pump stations (of which one of them provision of spare parts only).	Eight main pumping stations involving 50 pumps located in Kirkuk, Wasit, Diyala, Karbala, Anbar, Naseriyah, Babel and Baghdad Governorates have been rehabilitated through the replacement and/or rehabilitation of pumps, motors and electrical equipment. These stations, with capacities ranging from 2.7 to 9 m3/s, will provide irrigation for agriculture and drinking water for humans as well as livestock	Nil	Resident enginners reports with photos.  Contractors reports.  MoWR supervising engineers	Completed.  MoWR to install North Suwira, Al Amiryah, Al Sijillah and Salman Pak

	<p><b>1.2.3</b> Eliminate discharge of saline drainage water into fresh water sources.</p>	<p>Enhanced environmental restoration and conservation.</p>		<p>The rehabilitation works for the pumping stations Kirkuk, North Suwira, Mandel 1, Al Amiryah, Huttaman, Al Sijillah, Al Hussainiyah and Salman Pak will provide 150,000 ha (603,000 Donum) for irrigation benefiting 120, 000 farming households, fresh water for 400 000 inhabitants, agro industry and industry get fresh drinking water in Kirkuk and Mandli townships for up to 1 million people, 20 water treatment works, eight poultry and fish farms and numerous farmers and livestock owners, plus improve the drainage of agricultural areas and eliminate the necessity to discharge saline drainage water into fresh water sources.</p>	<p>Nil</p>	<p>Evaluation reports by Scanteam and FAO independent team</p>	
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				<p>Survey of actions needed for rehabilitation of below mentioned pumping stations were as follows:</p> <p><b><u>Mandali 1</u></b> Assessment condition completed</p> <p>Supply of replacement pumps and electrical equipment Completed and delivered to site</p> <p>Installation of Electrical &amp; mechanical equipment Installed, tested, commissioned</p> <p><b><u>North Suwira – AlAmiriyah</u></b> Assessment condition completed</p> <p>Supply of pumps &amp; equipment for North Suwiriah and Al Amiriyah completed</p> <p>Installation to be completed by MoWR North Suwira PS under installation, AlAmiriyeh will be installed when the security situation allows</p> <p><b><u>Hutaman-Al Hussainieh-Salman Pak</u></b> Assessment condition completed</p> <p>Delivery of pumps and electrical equipment Completed and handed over</p> <p>Installation <b>Hutaman</b> Installation <b>Al Hussainiyah</b> <b>Salman Pak</b> Completed Completed</p>	<p>Resident enginners reports with photos.</p> <p>Contractors reports.</p> <p>MoWR supervising engineers</p> <p>Commissioning and test results</p> <p>Certificates of Handover of equipment to MoWR</p>	<p>For North Suwira, Al Amiriyah, Al Sijillah and Salman Pak MoWR has undertaken to perform the installation works utilizing their own engineering staff.</p>
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**IP Outcome 2**

- MoWR technical staff trained in condition assessment and repair of pumping stations as well as repairs and maintenance of rehabilitated pumping stations; technical and administrative staff trained on contractual matters for major international procurements / service contracts.

<p><b>IP Output 2.1</b> a) Training of and technology transfer to the MoWR staff.</p>	<p><b>Indicator 2.1.1</b> Acquiring knowledge at all stages of the project cycle for MoWR staff.</p>	<p>Strengthened institutional development and capacity building</p>	<ul style="list-style-type: none"> <li>• Enable MoWR staff to use the technical information provided (centralized database). They will use such information for collection and monitoring as well as future rehabilitation works on other stations.</li> <li>• Equip MoWR staff with the technical capacities for operation, repair and maintenance of pumping stations.</li> </ul>	<p><b><u>GIS linked database :</u></b> A training course was held in Amman for the period from 29 Nov 2008 to 5 Jan 2009 A number of 12 key technical staff of MoWR were trained on GIS. MoWR PS staff were trained on data collection (181 pumping stations) for the database which was set up with a local contractor <b><u>Inventory and condition assessment</u></b> key admin staff of the 14 pumping stations were trained on rules and procedures for international equipment specifications and contractual services <b><u>Technical training on operating, repairing and maintaining the pumping stations</u></b> 20 operational and maintenance staff at the 8 pumping stations mentioned in the report received training at the suppliers workshops as part of their contracts .</p>	<p>Visas for UAE were rejected for Iraqi citizens.</p>	<p>Included in the suppliers contracts and were a condition of payment.</p>
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	<b>Indicator 2.1.2</b> Assist MoWR staff to participate in decision making as part of the management.	Enhanced employment and income generation	•					
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