UN PARTICIPATING ORGANISATION
LOGO

United Nations Development Programme
United Nations Development Group Iraq Trust Fund

COMPLETION REPORT FOR PROJECT:

Summary

Participating UN Organisation:

Food and Agriculture Organisation of the United Nations (FAO)

SOT:

The project will contribute to Agriculture and Food Security sector Outcome 1) Sustainable agricultural development (in which fisheries is a sub-sector). 2) Food security and natural resources management through rehabilitation and improvement of fisheries and aquaculture production systems.

Project No. and Project Title: A5-15

Restoration and modernization of fish production in Iraq (OSRO/IRQ/503/UDG)

Project Location/Region/Province:

Myssan, Wasit, Babylon and Baghdad Governorates

Reporting Period:

01 July 2006 to 30 September 2010

Report Number:
9 and completion report

Counterpart organisations / implementing partners:

Responsible line ministry of government of Iraq: Ministry of Agriculture

Project cost:

Project cost at approval: USD 7,312,177
Project costs at completion: USD 7,269,948
Left over resources: USD 42,229

Abbreviations and acronyms:

CTA – Chief Technical Advisor
GBFRD - General Board of Fish Resources Development
GOI – Government of Iraq
ICI – International compact of Iraq
MoA – Ministry of Agriculture in Iraq
MDGs - Millennium Development Goals
NDS – National Development Srategy of Iraq
NPC – National Project Coordinator
NPD – National Project Director
PSC – Project Steering Committee

Project Duration:

Overall Duration: 51 months
Original Duration 24 months
Original start date: 18 May 2006
Original End date: 18 May 2008
First extension: 18 November 2008
Second extension: 31 March 2009
Third extension: 30 September 2009
Fourth extension: 31 March 2010
Fifth extension ; 30 September 2010
Revised End Date: 30 September 2010

I. Purpose

Main objectives and outcomes expected as per approved Project/Programme/project document:

The longer term objective of the project was to support fish production in Iraq by stimulating the resumption of fish farming in large and small scale enterprises through practical demonstrations of applicable fish farming techniques, supply at cost of fingerlings, and on-going support of an active, applied and adaptive research programme.

The immediate objectives of this project were to:

- Build or restore the productive capacity to supply fish fingerlings to the commercial fish farming industry.
- Build and restore a series of fish farming enterprises in the most needed areas in Iraq.
- Demonstrate new lake-based fish farming methods, and initiate stocking of native carps in selected lakes.
- Improve local capacity to manage and develop the fishery/aquaculture sector.

The following outputs were expected at the termination of the project:

- A plan specifying all the required equipment and facilities for the proposed rehabilitation of the fish sector including established priorities for replacement;
- Specified equipment for rehabilitation.
- Report and proposal submitted for funding continuation of research and extension for the fish industry in Iraq.
- Fifteen sites selected and rehabilitated for fish farming in the neediest areas.
- Established baseline information and established hatchery centre at Huweza Marsh
- Pilot fish cage farms established at Kut & Hindia dams.
- Five Iraqi scientists and 24 technicians trained in modern fish farming methods.
- Extension materials developed to support the adoption of fish farming in Iraq.
- Technicians, fish farmers, resource managers and local communities trained in improved fish farming methods, hatchery/nursery management, fish health and marketing. The direct beneficiaries are 1 500 small fish farmers (farms of 10 ha or less) and rural fishers communities.

There were no major changes deviating from the objectives and outputs identified in the project document. At the outset of the project implementation, GBFRD informed the project that the output on rehabilitation of selected fifteen fish farming sites had already been attended and therefore decided not to pursue with this particular output during project implementation. It was also decided to establish a hatchery based on Chinese style carp breeding at Suwera Central Hatchery facility in Wasit Governorate in addition to the hatchery in Huweza for native carps as indicated in the outputs.

Reference to how the programme/project related to the UN Assistance Strategy to Iraq and how it aimed to support Iraq national development goals and the Millennium Development Goals:

Under UN Cluster (A) for Agriculture, Food Security, Environment and Natural Resources Management, the UN assistance to Iraq is to increase agricultural production, in which fish production is included, and national food security, enhance product quality and safety and reduce reliance on fish imports. To achieve this objective, one of the strategies underpinning the UN Plan in the cluster, is to achieve a sustainable, economically efficient, socially acceptable and environmentally sound rural development. The initiatives of this project will increase the aquaculture and inland fish production to boost the national fish production through production of increased good quality fish seed supply, increased diversity of aquaculture practices, and built institutional and local capacity to jointly undertake a programme to develop aquaculture into a sustainable industry.

The framework for setting Iraq's national development goals is based on the internationally agreed MDGs. As the project main focus is to increase inland fish production and enhance food security and livelihoods of rural poor the most immediate contribution that project makes to the achievement of the Iraq's national development goals is to contribute to the eradication of hunger and poverty. In this

context enhanced fish production through aquaculture and improved fishery practices will relieve hunger directly through the provision of food and providing a source of employment and income generation for food purchase. Clearly development of aquaculture and inland fish production has the potential to contribute to the achievement of the MD Goals Four and Five by providing a source of high quality food source, rich in essential micronutrients.

The project outputs are also directly in line with the national development priorities of agriculture sector in Iraq, in which fisheries is a sub-sector, i) to create employment opportunities through diverse fish farming practices both in open water bodies and land, ii) to build capacity to generate new generation of researchers and extension workers and iii) to provide technical inputs to develop a management and conservation plan for Huweza Marsh, in which aquaculture and fishery practices are included, to revive aquatic food production in the marsh and thereby offer opportunities for communities associated with the marsh to diversify their livelihoods and income generation avenues.

Project Management arrangements

Overall project implementation was carried out by FAO with the assistance of consultants and the collaboration of the Iraqi MoA. Management of the project with respect to appointment of international staff, organization and support of training, procurement of scientific equipment was carried out in collaboration between FAO-Headquarters and FAO/Iraq in Amman. Implementation of project activities nationally was the responsibility of Fisheries Directorate known as the GBFRD (General Board of Fish Resources Development) of the Ministry of Agriculture (MoA). To coordinate the implementation of the project activities the GBFRD deputed a NPD (National Project Director). The NPD was responsible for ensuring that the appropriate and agreed Government inputs in kind at national and governorate/district levels are provided in an efficient and timely manner. The NPD was also responsible for approaching the various government departments/agencies to mobilise resources for the project. Since the NPD worked on a part-time basis, a NPC (National Project Coordinator) was appointed under the project to assist the NPD.

In addition to the apart from the project management responsible for the implementation of project activities at national level, a PSC (Project Steering Committee) composed of all stakeholders was established to ensure overall quality control of project management and activities.

FAO staff in Iraq worked on the project and provided with all the necessary support in all aspects of project implementation. The CTA (Chief Techcnial Advisor) who was based in Amman was to travel and stay in Baghdad, if security situation permitted However, the security situation did not allow this travel. As a consequence, the CTA of the project was on direct and constant contact with the NPD and NPC, supported by FAO staff in Iraq.

CTA identified required technical expertise and prepared TORs in consultation with the NPD and FAO. NPD and NPC compiled and collated information and progress made with respect to implementation of project activities and submitted progress reports to the FAO through CTA on a six-month basis and to PSC meetings and review meetings.

Video conferences, as well as periodic visits to Amman by NPD, NPC and counterparts (national counterparts and MoA officials) took place for the monitoring and follow up on implementation of the project as well as for PSC meetings and technical meetings.

Delivery mechanism included a team of national staff to establish project management structure at the ground and contracting relevant research and academic institutions/national consultants in Iraq as necessary by FAO, supported by FAO Office in Iraq, and MoA counterparts. Technical surveys and assessments were carried out by technical teams of the GBFRD and contracted national consultants/academic and technical institutions. Linkage with Cluster A was established as required to explore the governance and human development aspects of cooperation. GBFRD's personnel and FAO technical staff in Amman prepared in collaboration with international consultants specificationd of agreed supplies and equipment and initiated international tendering.

All procurement of inputs has been undertaken in accordance with FAO rules and regulations, in line with other FAO-implemented projects under the UNDG ITF. Value for money of project inputs determined by comparing the proposal costs with the price of comparable inputs/equipment and with

the proposals received from other bidders. Local appropriateness and acceptability of inputs were achieved by full involvement of MoA in determination of specifications.

In line with FAO policies and procedures, monitoring was done at all crucial stages of implementation of the project based on the measurable indicators and means of verification as identified in the logical framework. Moreover, the progress achieved in the implementation of project activities was assessed against expected output delivery during PSC meetings and mid-term reviews and six-month reports on activities implemented. This helped the counterparts to raise awareness on constraints in the implementation of project activities, and to make necessary changes in designs of the ongoing implementation process and to take appropriate measures to make planned project activities effective during the remaining project's life span. Six-months (9 annuals reports) project progress reports were sent to FAO and to the GOI by FAO-project management. These were transmitted to the Cluster and submitted through UNDG to the donor as required.

II. Resources

Total approved budget and summary of resources used for the programme/project from the UNDG Iraq Trust Fund (and non-Trust Fund resources where applicable):

UNDG ITF funds approved: USD 7 312 177

UNDG ITF funds received: USD 7 312 177

Project expenditure: USD 7 269 948

Amount still available to the project at completion of activities: USD 42 229

Use of Funds according to the 6 broad categories:

CATEGORY	UNDG ITF approved budget (As per Original Project Document)	Actual Disbursement and Commitments (as per 31/03/11 non-final and provisional figures)	Percentage of Approved	Budget Revision approved on 27/04/10	Percentage of revision
1. Supplies, commodities, equipment and transport	4 666 000	3 257 774	70%	3 306 982	99%
2. Personnel (staff, consultants and travel)	1 146 800	1 293 919	113%	1 349 512	96%
3. Training of counterparts	450 000	32 442	7%	14 672	221%
4. Contracts	250 000	1 836 657	135%	1 841 634	100%
5. Other Direct Costs	329 920	374 786 **	113%	329 920	113%
6. Indirect support costs	469 457	474 370	101%	469 457	101%
Total Expenditure	**7 312 177**	**7 269 948**		**7 312 177**	99%

* Includes USD 72 916 related to the procurement of equipment

UNDG ITF funds received.

Project expenditure and amount still available to the project at completion of activities. Please include here explanations of the use of funds according to the 10 broad categories and explain any deviations of project expenditure vs original budget

Indicate approved budget revisions

Indicate other funding sources available to the project

If resources still available indicate proposed use

Budget revisions, movement of funds between the project budget components were approved on: 18 November 2008, 31 March 2009, 30 September 2009, 31 March 2010 and 30 September 2010. The overall fund of US$ 7,312,177 was neither decreased nor increased. There were no constraints in the mechanism of the financial process.

Human Resources

Indicate number, type (operations/programme) and level of staff used for the project in two categories national and international. Please be careful to indicate where staff are shared with other projects

National Staff: Provide details on the number and type (operation/programme).

National Project Coordinator – stationed in Baghdad in Iraq, nominated by the Iraqi MoA for support to programme coordination, work plan formulation and assistance in activities implementation.

National Project Adviser – stationed in Amman, Jordan, to assist the International Project Manager in the activities implementation.

International Staff: Provide details on the number and type (operation/programme).

International Project Manager (Chief Technical Adviser) stationed in Amman, Jordan with the responsibility of overall project management.

Main Project Assets

- Equipments: USD 2 430 552
- Generating Sets: USD 41 700
- Laboratory, Optical, Testing and Weighing Equipment And Supplies: USD 118 218
- Vehicles: USD 22 512

Complete final resources utilisation overview at annex 2.

III. Results

An assessment of the extent to which the programme/project component / programme /project has achieved the outcomes and outputs expected

Complete log frame results matrix comparing results foreseen and those achieved and attach as annex 1.

To contribute towards the longer term objective of the project to support fish production in Iraq and to address the immediate objectives, the project made three key impacts. The three main project impacts are i) strengthened the GBFRD capacity to produce the critical input, the fish seeds, ii) strengthened the GBFRD capacity to monitor and maintain a conducive aquaculture environment, and iii) built capacity of the GBFRD personnel in innovative approaches of aquaculture development, who will in turn has taken the lead role in capacity building of fish farmers in order to revive fish farming activities from its defunct status.

Iraq has experienced a lengthy period of neglect of aquatic food production through improved aquaculture and fishery practices and therefore restoration of aquaculture and fisheries productivity have to be urgently preceded their development. In order to revive the fish farming in Iraq the most urgently needed basic service deliveries are to initiate production of fish seed and supply to farmers, to provide a service to monitor their aquaculture environment and advice on best management practices to maintain a conducive environment for healthy aquaculture production. In order to strengthen the productive capacity of the GBFRD to restore fish seed supply to revive commercial aquaculture production the project established two hatcheries to produce fish seed of native carps and exotic carps (common carp and Chinese carps) which are the main species currently preferred by aquaculture farmers. As per project document the hatchery established to produce fish seeds production of exotic carp was completed in addition to the setting up of a hatchery at Huweza Marsh to breed and produce fish seeds of native carps as per project document. The two hatcheries contributed to generate 10.55 million native and exotic carp fish seeds. The project also provided a fish fry transportation facility to strengthen the fish seed delivery capacity of the GBFRD to fish farmers in most needy areas in support of reviving fish farming activities.

In order to provide a monitoring service to maintain conducive aquaculture environment by the farmers, the capacities of the GBFRD was strengthened to monitor physico-chemical parameters of aquaculture environment and surveillance of bacteriological and parasitological conditions by upgrading and updating GBFRD laboratory facilities with required equipment and chemicals with supporting glassware. The Project supplied 33 types of laboratory equipment including microbiological equipment, 26 types of glassware and 26 types of chemicals to strengthen the GBFRD's monitoring capacity of aquaculture environment.

The project also completed a baseline survey on hydrological, biological and scio-economic conditions of Huweza Marsh. Huweza Marsh provides an important habitat for a wide range of fish species, many are of economic importance, and several are endemic. The communities who associate with the marshland, especially Marsh Arabs, have been depending on this marshland for their livelihoods for many centuries. Current fish stocks have changed radically in recent decades due to the negative impacts of the marsh drainage programme and resulted in altered fish diversity and depleted populations of several species of economic importance. Therefore, the marshland requires an effective aquaculture and fisheries development, management and conservation plan to mitigate and restore diversity and stocks of fish. The data generated from the baseline survey on hydrological, biological and socio-economic status provides important technical inputs to develop a development, management and conservation plan and to evaluate the temporal impacts of the plan on the ecological status of the marshland and status of socioeconomics of associated communities.

Moreover, the project took several positive steps to initiate the modernization of aquaculture and fisheries sector in Iraq with installation of pilot cage fish farming at Kut and Hindia Dams in Wasit and Babile governorates, respectively, and establishment of close recirculation system , design and construction of Chinese type fish hatchery at the Central Hatchery facility at Suwera in Wasit Governorate , construction of Zuger type fish hatchery in Myssan Governorate at Huweza marsh and construction two administrative buildings at Kut and Hindia dams. The two pilot cage fish farms

are being used as demonstration facilities to train current and potential fish farmers and entrepreneurs who wish to enter into aquaculture. The closed recirculation system is being used to maintain the genetic quality of broodstcok and production of quality fish seeds. Chinese style hatchery is producing fish seeds of Chinese carps in large numbers. All these initiatives accrue benefits to fish farmers to revive and diversify aquaculture activities.

In order to disseminate innovative aquaculture practices and good management practices developed elsewhere and to diversify aquaculture practices in Iraq, five senior officers of the GBFRD were trained on innovative approaches in aquaculture in China, and Thailand and four officers were trained in cage and recirculation aquaculture systems in Germany to act as master trainers. It was originally planned to train 24 GBFRD officers and technicians on aquaculture practices and good management practices. This target could not be met due to unavailability of officers with suitable qualifications to benefit from the arranged training activities. With technical inputs from the project, the GBFRD prepared three extension manuals in Arabic on open water aquaculture practices; live fish food production and fish feed preparation and fish breeding techniques to facilitate training of fish farmers. Despite the set target to train 1500 farmers, only 89 farmers have been trained on selected aquaculture technologies and good management practices at the termination of the project due restricted movement of officers due to security situation and delays in setting up of aquaculture techniques and demonstration facilities. However, GBFRD will continue the training process beyond the project termination to complete the target of 1500 farmers and beyond.

Thus, the ultimate beneficiaries of this project are the aquaculture farming communities, particularly the rural farmers. There are several direct and indirect beneficiaries of the project. The line institution under MoA, the GBFRD, including its' scientists, technicians and resource managers were benefited directly from this project, while policy makers, planners, NGOs and civil societies will have the indirect benefits. The several tiers of stakeholders benefited and/or will benefit from the outputs of the project. These tiers include:

- **Rural poor communities associated with the inland water resources in the project governorates:** Improved options for enhance livelihoods, food security and nutrition through aquatic food production, enhanced human capital through improved knowledge,

- A**quaculture farmers, including potential farmers and Inland fishermen:** Enhanced opportunities to enter into aquaculture practices, and thereby enhance income, livelihoods and nutritional and food security.

- **Governorate, district and local resource management and extension**: Technical and high potential strategy options to support the systems approach and implement to promote aquatic food production towards a sustainable aquaculture industry, improved knowledge on appropriate technologies to diversify aquaculture practices, institutional strengthening.

- **Policy makers at governorate /national level:** Awareness of value of aquatic natural capital and the direction of its development, management and conservation for sustainable aquatic food production and thereby, enhance food security livelihoods of wetland associated communities.

- **Researchers and scientists**: Technology development to offer opportunities for farmers, poetntial farmers, entrepreneurs and community groups to enter into aquaculture and fishery practices, to take a systems approach to develop aquaculture and fishery practices towards its sustainability, suitability and adaptability of the approach to local situations, to create opportunities to further improve aquatic food production.

- **NGOs and civil societies**: Knowledge generated from the project will help NGOs and civil societies to facilitate institutional arrangement in managing and conserving the natural aquatic resource capital and disseminate good management practices to enhance aquatic food production.

The understanding created among the GBFRD officials, through the knowledge generated from project interventions, led to open a policy dialogue that the primary role of the government is to play a regulatory, facilitating and nurturing role rather than a role of competitor to the private sector in the development of aquaculture and fisheries sector. For example, the upgraded Central Hatchery and the established recirculation facility at Wasit should gradually take the responsibility and serve as the main centre for supplying good quality improved breeds to farmers as the average farmer cannot raise and maintain their own genetic quality breeders due to space, technology and cost involved in it. As sector matures, government should work to avoid competing with the private sector in seed supply and take on a responsibility for supplying good quality broodstock including improved breeds.

The project generated several specific outputs to address a number of elements in the NDS and ICI, viz, offered opportunities to create employment opportunities through demonstrating diverse fish farming practices and fish breeding techniques of diverse fish species, built capacity to generate new generation of researchers and extension workers by upgrading and updating of technical skills of GBFRD personnel, and generated baseline information on hydrology, biology and socio-economic status of Huweza Marsh to participate effectively in reviving marshes through the development of fisheries and fish farming.

Main activities undertaken and achievements/ impacts:

In order to generate the expected outputs, the project completed the following activities.

i) At the outset the project conducted a workshop in Amman and developed a workplan agreed by all implementing parties of the project, in order to implement project activities in timely manner.

ii) Fourteen fish farms were selected in the neediest areas (7 farms near Baghdad, 4 farms in Babel Governorate and 3 farms in Kut) and rehabilitated by the GBFRD and revived fish farming activities.

iii) In order to strengthen the productive capacity to restore fish seed supply, two hatchery designs for native carp and Chinese carp breeding and fry rearing were prepared, breeding and fry rearing facilities and equipment were identified, specified and procured. Subsequently, the two hatcheries for native carp and Chinese carp breeding and fry rearing were constructed at Huweza Marsh in Messan Governorate and at Central Hatchery facility at Suwera in Wasit Governorate, respectively.

iv) To support the fish breeding programme of native carps and Chinese carps, broodstock and required hormones for induce breeding were procured locally.
At the time of closure of the project the two hatcheries were producing 10.55 million native carp and Chinese carp fish seed.

v) A fish fry transportation facility was identified, specified and procured to support the fish seed supply programme. The fish fry transportation facility consists of a vehicle and five fish fry holding compartments with aeration. Each compartment accommodates 200000 fish fry to transport.

vi) The project identified, specified, procured and delivered the equipment to strengthen the GBFRD capacity to monitor and maintain the aquaculture environment. In order for GBFRD to carry out a monitoring programme of aquaculture environment the project strengthened the existing laboratory facilities at Central Hatchery at Suwera in Wasit Governorate by supplying 21 types of general laboratory and 12 types of microbiological equipment which enhanced water quality, bacteriological and parasitological monitoring of aquaculture environment. The equipment utilisation was supported with supply of 26 types of chemicals and 26 types of glassware and supporting miscellaneous items.

vii) The project conducted a hydrological, biological and socio-economic baseline survey in Huweza Marsh in collaboration with Department of Fisheries and Marine Resources of the Agriculture College, University of Basrah to provide necessary scientific and technical information to facilitate fisheries and aquaculture development. The survey generated valuable baseline data on hydrological, biological and socio-economic data which covered spacial and temporal changes in water quality, primary productivity, hydrological status and fish ecology and reported socioeconomic status of inhabiting communities. The data on fish ecology provided useful information such as species and size composition, relative abundance and ecological indices, food and feeding habits and reproductive potential. This information is useful to help in preparing a management and conservation plan for the surveyed marsh area by any agency.

The data generated from the baseline survey on hydrological, biological and socio-economic status of inhabiting communities also enables the development of a fisheries and aquaculture development plan for the surveyed area of Huweza Marsh in order to

support the enhancement of livelihoods and socio-economic status of inhabiting communities of the marshland, particularly of Marsh Arabs.

viii) Project established two pilot fish cage systems in Kut and Hindia Dams in Wasit and Babile Governorates, respectively, and a close recirculation system at Central Hatchery at Suwera in Wasit Governorate and Huweza Marsh hatchery centre at Myssan Governorate. These centres are acting as demonstration centres of diversified aquaculture systems and practices as well as fry/fingerling and fish production systems.

ix) In order to update and upgrade the skills and knowledge of the GBFRD scientists and technicians on innovative aquaculture practices and good management practices, study tours and tailor-made short-term training were organised and implemented by the project in China , Thailand and Germany for the GBFRD scientists and technicians.

x) Using the acquired knowledge through exposure to international training and established demonstration systems GBFRD trained 89 farmers and technicians as a part of reviving aquaculture activities in most needy areas. The training of farmers also included fish seed production activities using the hatcheries established by the project in Wasit and at Huweza Marsh and diversified aquaculture practices using pilot cage fish culture systems.

xi) To support above knowledge dissemination activities GBFRD prepared and disseminated three aquaculture extension material/manuals on open water aquaculture practices, fish breeding and live fish food and fish culture in Cages.

xii) To support training and extension activities organised and carried out by the GBFRD project provided 5 types of training and extension equipment.

xiii) The project was subjected to a mid-term review by the Government and FAO to fine tune implementation of project activities and six Project Steering Committee (PSC) meetings. Project Steering Committee (PSC) which composed of main stakeholders monitored overall quality control of project management and activities and made recommendations monitored the implementation of recommendations.

Implementation constraints, lessons learned from addressing these and knowledge gained from assessments, evaluations and studies that have taken place during the project:

Project activities were implemented in four governorates. The main potential risk/constraint for the implementation of project activities is the general security situation in Iraq, which sometimes led to difficulties in mobilization of national project staff and resources into project areas.

Such mobilization constraints affected timely implementation of activities, which also prevented FAO staff and international consultants from visiting the required sites in Iraq as needed. Lessons learned from this project on timely implementation of project activities and to generate the expected outputs is to develop a team of capable national project management staff with identified Co-Implementing Agencies/ partners in the project areas to help the NPD and NPD in all technical requirements and reporting. Branch offices of GBFRD in project districts should act as Co-implementing Agencies of the Project for their own districts. Each of these districts should depute a coordinator who will be responsible for coordination and implementation of project activities at the district level and below. To ensure an efficient and smooth operation of the project and timely implementation of the planned activities at the district and lower levels, adequate authority to be delegated by the NPD to the PM so that he/she will be able to coordinate and supervise the implementation of activities in the field on behalf of the NPD. Each of the Co-implementing Agencies to prepare a quarterly plan of activities and submit the proposals to the PM. The PM in turn to examine and process the proposals under the guidance of CTA, make necessary changes as per advice of the NPD and CTA and submit to the FAO for the release of funds. By stationing management personnel to coordinate activities in the project areas, the project management structure will ensure to prevent or minimize the difficulties that may arise due to security situation, in the mobilization of persons and resources into project areas. This arrangement was partially implemented after the mid-term review of the project by increasing the time allocation of the National Project Coordinator to project work and identifying contact persons in project areas to work with.

To maximise the benefits of the project, national project management staff should pay particular attention to: i) establish collaboration and linkages with other planned projects in the area; ii) ensure that the authorities effectively maximise employment opportunities and benefits to the people of Iraq; and iii) transfer ownership of equipment at the end of the project to relevant and correct institutions to put them into productive use..

Lack of suitable, qualified and adequate young scientific and technical staff at the GBFRD acted as a constrained when project management tried to meet the set target to build a trained force to take the lead role in aquaculture development. The GBFRD should explore all possible ways to recruit young suitably qualified scientifis and technical staff It would be fundamental to invest on such technical staff to build a trained force for future development of the sector.

Another implementation constraints experienced in the project was considerable delays in construction work which led to several extensions of the project period. Delayed construction work also hampered the timely implementation of farmer training activities. Therefore, it would be advisable to devote first three months of the project to prepare plans and designs for construction work and initiate required tender procedures. It is equally important that greater part of first year of the project to be devoted to capacity building of master trainers so that the planned fisheries and aquaculture practices can take place according to the time plan along with local capacity building activities. Moreover, to ensure effective implementation of the project a monitoring and evaluation plan has to be incorporated into the project design. Based on the lessons learned from elsewhere, the future projects i should include a livelihood analysis into project design to identify opportunities to rural poor to enter into fisheries and aquaculture practices. This will allow integrating fisheries/aquaculture with their existing livelihoods where possible, opposed to offering packaged technology which may not be affordable by poor. This approach together with implementation of project activities in participatory mode as a measure of local capacity building will ensure sustainability of project outputs.

Future aquaculture and fisheries development projects should have a clear exit strategy. Project's main exit strategy should not only include building of institutional and local capacity but also to include empowerment of communities and adopt community participatory management strategies in order to sustain project outcomes. Employment of participatory approach in the project design is to create on-the-job learning environment for farmers/fishermen to deviate from technology packaging and setting up demonstrations. Adopt a project approach to offer opportunities for farmers and fishermen to enter into aquaculture practices and fishery practices by breaking up of fish life cycle and integration into their other livelihoods to ensure affordability and willingness to accommodate such practices. Moreover, Project design should incorporate approaches such as framer field school with strong management tools into extension delivery and networking, which addresses livelihoods and empowerment of farmers with greater planning, monitoring and decision-making abilities. In this approach farmers discuss lessons learned thorough their own failure and successes and set their own research agendas for solving problems and, therefore depend less on institutional support on the long run.

When projects are designed with components to manage aquaculture and fishery resources, it is advisable to adopt an appropriate participatory conservation and management mechanism as an exit strategy to observe the sustainability of aquatic food and fish resources. Such an approach will sustain even without project support as it provides the sense of resource ownership to communities. It will also empower and provide a voice to disadvantaged groups and women, and an opportunity for different interest groups and actors to present their perspectives in planning, implementation and knowledge transfer. Such empowerment through their participation in this process will also enable better understanding of achievements the participatory conservation and management has made.

An indicator based internal monitoring and evaluation system is suggested to incorporate into the project design in addition to other means of monitoring and evaluations. Half-yearly indicator based internal monitoring and evaluation system will track progress made half-yearly in achieving set outputs in terms of quantity and quality and facilitate a final overall impact evaluation and lessons learned during final stage of the project. This monitoring and evaluation is proposed to carry out on project's outputs in order to evaluate the specific successes and failures that could be learnt. By conducting this process a greater understanding of what project has achieved on output basis towards the four objectives within the overall development objective is expected. Moreover, such monitoring and evaluation will enable to understand what is still pending and what should be the priority actions needed to achieve the project objectives. It is also expected the counterparts to understand

constraints in the effective implementation of the project and to make necessary changes in designs of the ongoing process and take appropriate measures to make the project activities effective during the remaining project period towards achieving the set targets and goals.

Mid-term review assessed the project performance evaluation Report (PPER) prepared and submitted to the review by NPD and CTA in a concise manner, and evaluated the extent to which the Project's scheduled activities have been carried out, its outputs produced, the progress towards achievement of the immediate objectives and related development objectives, and also presented recommendations for future follow-up action arising out of the project in the form of a follow-up phase of the project Moreover, six Project Steering Committee (PSC) meetings were held (see table below) to monitor the project progress and make recommendations and to monitor the implementation of recommendations made therein.

Monitoring and evaluation process	Date
First PSC meeting	21 August 2006
Second PSC meeting	25 March 2007
Mid-term review	01 to 03 July 2007
Technical Review Meeting	4 December 2007
Third PSC meeting	17 March 2008
Fourth PSC meeting	09 September 2008
Project Progress And Review Meeting	1-May 2009
Fifth PSC meeting	10 August 2009
Sixth PSC meeting	14 June 2010

Key partnerships and inter-agency collaboration, impact on results:

FAO implemented this project in collaboration with the MOA's Directorate of Fisheries (GBFRD). Linkage with Cluster A was established as required to explore the governance and human development aspects of cooperation. Project developed a collaborative partnership with Department of Fisheries and Marine Resources of the Agriculture College of University of Basrah to implement a baseline survey on Huweza Marsh. It was an effective collaboration to implement the survey as Department of Fisheries and Marine Resources of the Agriculture College of University of Basrah as a scientific institution has the skilled man power, necessary equipment and access to the surveyed areas. GBFRD developed a collaborative partnership with NGOs (Iraqi Society for Fish Production) to develop local farmer capacity through training 20 NGO persons on aquaculture technologies. This is a useful collaboration as these NGOs are in a position to continue organisation of training with technical inputs from GBFRD beyond project period.

Highlights and cross cutting issues pertinent to the results e.g. gender disaggregation, policy engagement and participation of the public:

The utilization of aquatic resources for fishing and farming activities forms an integral part of the cultural and economic life of most communities associated with inland water bodies. Food security is a critical issue for communities associate with many inland water resources. Often remotely located with traditional cultivation practices and hardly any access to markets make these communities more vulnerable to food insecurity. These disadvantaged communities deserve special attention for priority development interventions. Unless changes are made in the development programmes to take into account the immediate and particular needs of these communities including capacity development improving knowledge and introduction of appropriate alternative fishing and farming practices, enhancing the status of women in the family and in the society, it is unlikely that significant changes can be made in the living standards of these communities despite large government investments. The resulted scientific and technical data through the hydrological, biological and socio-economic baseline survey of the project is of immense help in developing an aquaculture and fisheries development, management and conservation plan for Huweza Marsh in order to enhance livelihoods and uplift living standards of disadvantage communities in association with this marsh.

Innovative approaches to aquaculture and inland fisheries development did not evolve in Iraq as capacity building initiatives among Iraqi fisheries and aquaculture scientists, extensionists and farmers were hindered

as a result of being isolated from the international scientific community due to security situation and sanctions. This has led to the lack of diversity in aquaculture and inland fishery practices and species under production in Iraq, which is an essential feature of a developed aquaculture and inland fishery sector. Despite the availability of diverse inland water resources in Iraq, inland fish production is limited to pond culture of common carp, with a limited culture of grass carp and silver carp and capture fisheries of same species from inland water bodies employing traditional practices without proper management. Progress in inland fish production development is hindered mainly due to lack of essential infrastructure and research and technical capacity. This also resulted in severe shortages in good quality fish seed and appropriate fish feeds and lack of diversity in aquaculture and inland fishery practices. In countries where diversified aquaculture and inland fishery practices had been developed into an industry, aquaculture and inland fisheries contributed to a major share to the national inland fish production, becoming a potential resource for improving household food security and supplementing family income of rural poor. Therefore, the project addressed the above constraints through institutional (GBFRD) and local capacity building so that the relevant state agencies and beneficiary communities to undertake jointly a sustainable development programme in aquaculture and inland fisheries. As a part of institutional capacity building, project exposed GBFRD personnel to innovative and appropriate technologies and in turn trained GBFRD personnel took the lead role in training local farmers, who are currently participate in training voluntarily.

The project did not have any specific gender equality issues to address. However, the project had a special emphasis on gender balance, particularly involvement of women in the project activities and among beneficiaries. In Iraq women are not involved in fish farming or fishing operations. Women do not necessarily own or manage fishing/fish farms by themselves, however, they are partners in fishing/fish farming alongside men. Owing to the qualities of inland fisheries and aquaculture practices that it can easily be incorporated into the livelihoods to diversify the family food production system with women participation, and spread risk, it has been accepted as a powerful production option for reducing rural poverty by providing family food security, empowering women and fighting malnutrition. GBFRD has been made aware of this aspect and urged to encourage women participation in training activities.

The project does not anticipate any adverse impacts on the environment due to project activities during the project period and beyond. The project focused only on the species currently established in the local environment. The aquaculture practices that project dealt with were restricted to native and established species in the environment with a commercial value and thereby avoid adverse impacts on the biodiversity. Moreover, the project focused on small-holder freshwater aquaculture practices with widely known no negative impacts on aquatic environment.

The general security situation in Iraq was a concern during implementation of project activities. Though there were no specific issues in relation to the security situation which were directly related to and interacting with the components of the project, there were issues related to the mobilization of national project staff and resources into project areas, which caused delays in implementation project activies in relation to construction work..

IV. Follow up actions and sustainability

Priority actions that should be supported/implemented following completion of project to build on achievements and partnerships rectify shortcomings encountered and use the lessons learned during the project with strong emphasis on achieving sustainability of the outcomes:

There are three urgent needs to be fulfilled in order to ensure sustainable development of aquaculture and inland fisheries in Iraq by building on the strengths achieved from this project. These are i) decentralisation of fish seed supply, ii) manufacturing of farm made aquafeeds, and iii) development of an aquaculture and fisheries development plan for Huweza marsh to revive aquatic food production to enhance livelihoods of associated vulnerable and marginalised communities of Huweza Marsh

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i) Decentralisation of seed production

Access to reliable supply of quality seeds is the most critical input to develop aquaculture and inland fisheries in any country. Due to fragile security situation for decades and economic embargos the much needed infrastructure in fisheries and aquaculture did not take place in Iraq. Therefore, the project established fully equipped hatcheries and closed recirculation system cum research facilities, to implement research, development and quality fish seed supply. These centres will provide necessary training for other government and private hatchery operators on fish breeding, brood stock management and fry nursing. The urgent need now pending is to build on this strength achieved under this project to develop a decentralised fish seed supply network by establishing strategic linkages between these breeding centres and private hatcheries and fry nursery operators to enable fish farmers gain access to fish seeds. Decentralisation is to privatise fish seed supply. Government hatcheries should gradually restrict their role to supply genetic quality broodstock to private sector fish breeders as government hatcheries have often failed to meet the demand of fish seeds and supply to all farmers. What private hatcheries, particularly small-scale ahatcheries, need is good quality brood fish, often they do not have the capacity to maintain on their own. Decentralisation is a critical need, if the development of aquaculture and inland fisheries is to be sustainable. Decentralisation of fish seed will allow the remote farmers in rural areas, where suitable sites are for aquaculture are located and infrastructure facilities such as transportation is not well developed, have access to fish fry and fingerlings. Hence, the current project achievements should be further strengthened through the establishment of a decentralised fish seed supply system by building capacity in local private fish farmers and offer opportunities for them to enter into operation of mini hatcheries and fry nursing and rearing. Such decentralisation is an effective way of supplying fish seeds to remote areas.

ii) Farm mad aquafeeds

Compared to low-cost fertilized systems, it is known that aquaculture systems rely on fish feeds generally make more efficient use of water and space and thus, likely to grow with future aquaculture development, implicating growth of aquaculture systems rely on fish feeds may favoured than non fed extensive type aquaculture systems. Fish feed represents by far the most important cost in aquaculture production. Fish feed formulation and manufacture in Iraq is at best underdeveloped. The problem lies largely with formulation of fish feeds for specific species and using locally available raw materials. Farmers can boost profits by using raw materials from agriculture, but these have nutritional limitations. Therefore, farmers require supplying with information on nutritional profiles of locally available feed ingredients. Since small-scale farmers can not afford factory manufactured complete balance fish feeds, farmers need to be trained to manaufacture their own fish feeds. One of the main problems with such farm-made aquafeeds is the nutritional balance. Therefore, farmers need to be knowledgeable and trained to formulate and manufacture nutritionally balanced fish feeds on farm using locally available ingredients. The current project built capacity among GBFRD scientists with inputs from international expertise to develop appropriate feed formulae. To build further on the strengths achieved from the current project, it is needed to take a step further to test various technologies through participation of farmers and train them on the preparation of proven farm-made aquafeeds. Promotion of farm-made aquafeeds is a way of decentralizing affordable fish feed supply to farmers.

Farm-made aqua-feeds would make a significant contribution to small-scale aquaculture production, particularly in freshwater aquaculture. It is note worthy that use of farm-made aqua-feeds is not

restricted to small-scale aquaculture practices. According to the FAO's recent analysis based on case studies carried out in six leading aquaculture producing Asian countries 50% to 70% of farms dependon Farm-made aqua-feeds

iii) Development of an Aquaculture Development Plan

The current project generated useful data that is vital to develop a management and conservation plan for Huweza Marsh including aquaculture and fisheries development. The value of such a plan to enhance livelihoods and food security of marsh associated marginalised groups, particularly of Marsh Arabs, was highlighted in foregone sections These data are fundamental to develop such a plan. Such a plan will assess Iraq's potential for development and controlled expansion of aquaculture into an industry, identify constraints and opportunities in this development process and identify the country's strategies to facilitate future growth and development of aquaculture. Without a development plan there will be no proper direction and guidance to develop this sector.

More specifically, this plan is to identify the potential coastal and freshwater resources for aquaculture development and zoning, commodities in priority order that can be produced most easily, and profitably, to help meet food and income requirements in Iraq, to identify the roles of stakeholders that can assist in meeting these needs and indicate how many households could be engaged in aquaculture over period of five years, if the sector is successfully developed. The plan should be consistent with the objectives of National Development Goals and National Development Strategies of Iraq. The development paln should address the following needs:

- Prioritise the aquaculture commodities required to meet the national need for food and livelihoods
- Decentralisation of critical input supply for aquaculture such as fish seed and fish feed
- Establish viable aquaculture enterprises and provide the training necessary and entrepreneurial skill development to expand the sector
- Strengthen the institutional and local capacity to promote value addition of aquatic food produce
- Strengthen the institutional and local capacity to establish and manage aquaculture at all levels
- Ensure financial resources for farmers and attract investment in aquaculture
- Improve existing markets and create new markets for aquatic food and develop competition for export markets
- Provide technical support and ensure access to information for key stakeholders, e.g. farmers, private sector, NGOs and donors
- Develop responsible policies to create an enabling environment for aquaculture development

Indication of major adjustments in the strategies, targets or key outcomes and outputs:

Current project strengthened the government capacity to provide critical inputs of aquaculture. This approach is needed since Iraq has neglected aquaculture development for a long period of time.In order to develop a sector which is neglect for a lengthy period, restoration of the productive capacity of the line state agency/s should precede the development interventions. Since the current project restored the productive capacity of the GBFRD, now the strategy should be to ensure the growth of aquaculture into an industry. The strategy to develop aquaculture into an industry in Iraq should be privatisation of aquaculture input and service supply while the Government change its role gradually from input supplier to play a regulatory, facilitating and nurturing role rather than being a competitor to the private sector. Government's regulatory, facilitating and nurturing role should create an enabling environment that will promote the aquaculture development into an industry, promote transformation and broader participation in aquaculture by creating opportunities for potential farmers and potential entrepreneurs to enter into aquaculture and expand the resource base from the few species currently being farmed to a more diverse array of species and practices

Estimated Budget required:

The estimated budget to fulfil the above follow up actions is million USD 4 millions.

Annex 1 Key Performance Indicators – Log Frame Matrix

Objectives	**Measurable indicators**	**Means of verification**	**Outcomes**
Development Objective *Wider problem the programme/project helped to resolve* The long term objective is to support fish production in Iraq by stimulating the resumption of fish farming through practical demonstrations of improved fish farming techniques, supply at cost of fingerlings, feed and equipment; on-going support of an active applied and adaptive research programme; and capacity building. This will lead to the restoration of depleted commercial fish stocks in inland waters, in support of rural fishing communities.	The quantitative ways of measuring or qualitative ways of judging utilised to indicate achievement of objective Increased production of fish from fish farms. Increased number of fish farms and employment in the fish industry Active research and extension services supporting fish farmers. Preliminary stocking of native carps into inland water bodies Pilot tests of lake-based fish farming systems. Training programme for senior staff and technicians	Methods and sources used to quantify or assess indicators Progress reports. Final report Report of feasibility for expanded project for village level fish farms Increased production of native carp fingerlings from new small hatcheries Operational pilot cage farms in two locations (Kut and Hindia) Operational land-based hatchery, nursery and fish holding facilities (for native and exotic carps)	Key project outcome against agreed benchmarks including the JNA and NDS where possible Strengthened capacity of the GBFRD to produce the critical input, (i) the fish seeds, ii) to monitor and maintain a conducive aquaculture environment, and iii) to diverse aquaculture development through innovative approaches and to take the lead role in capacity building of fish farmers in order to revive fish farming activities from its defunct status. This key outcome impacts a number of elements in the NDS and ICI, viz, offered opportunities to create employment opportunities through demonstrating diverse fish farming practices and fish breeding techniques of diverse fish species, built capacity to generate new generation of researchers and extension workers by upgrading and updating of technical skills of GBFRD personnel, and generated baseline information on hydrology, biology and socio-economic status of Huweza Marsh to participate effectively in reviving marshes through the development of fisheries and fish farming.
Immediate Objectives: *The immediate impact on the programme/project area or target group i.e. the change or benefit achieved by the programme/project* The immediate objective of this project is to: (a) Restore the productive capacity of the Wasit hatchery to supply fish fingerlings to the fish farming industry,	Quantitative ways of measuring or qualitative ways of judging timed achievement of purpose Re-built & re-equipped Wasit hatchery producing fish fingerlings, with production capacity of 25 million carp	Methods and sources to quantify or assess indicators Final report Report of feasibility for expanded project for village level fish farms	Key outcomes against each objective a) Strengthened the productive capacity of Wasit Central Hatchery complex with a new Chinese style hatchery facility and revived fish seed production and equipping the laboratories to strengthen monitoring capacity

(b) Rehabilitate a number of small fish farms in the most needed areas, (c) Demonstrate new lake-based fish farming methods, and initiate stocking of native carps in selected lakes; and (d) build capacity	fingerlings, with 1 t/hour capacity feed mill. Pilot fish farms rehabilitated in 15 locations selected by the line ministry and the stakeholders after the workshops. Pilot lake-based cage farms established in two lakes with supporting hatcheries and nurseries Pilot stocking of native carps into inland water bodies at two locations Five senior staff acquainted with modern fish farming technology applicable to Iraq 13 technicians trained in carp hatchery/nursery methods and carp polyculture; 4 technicians trained in cage culture		of aquaculture environment b) 14 fish farms were rehabilitated to revive fish production c) Two pilot cage culture demonstration fish farms were established in Kut and Hindia dams to stimulate diversification of aquaculture development Pilot stocking of 3.2 million fish seeds was carried out in Huweza Marsh to revive culture based fish production d) Five senior officers from GBFRD successfully completed a study tour in Thailand and China to build capacity of aquaculture development planning in Iraq Skills of four GBFRD scientists were upgraded on fish culture in cages and closed recirculation systems to stimulate dissemination of knowledge on diversification of aquaculture practices in Iraq
Outputs : *The specifically deliverable result which were expected from the programme/project to attain the objectives*	Quantitative ways of measuring or qualitative ways of judging timed production of outputs	Methods and sources to quantify or assess indicators	Key outcomes against projected outputs
1. A plan specifying all the required equipment and facilities for the proposed rehabilitation of the fish sector including established priorities for replacement	Work Plan presented for review	PSC meeting minutes, progress reports	Detailed workplan was prepared and agreed by all stakeholders, all required equipment were specified and purchased
2. Equipment for rehabilitation specified.	Re-built Wasit hatchery, equipment installed and	PSC meetings minutes, progress reports, Wasit and Huweza Marsh	Wasit hatchery recommenced production with 5.85 million fish seeds and the new Chinese style hatchery commenced production with 1.5 million fish seeds in a fish breeding season, laboratories to monitor aquaculture environment fucntional

	operating; production of carp fingerlings; operational feed mill at hatchery On-site (lake) hatcheries and nurseries established and operational Pilot farm and lake sites selected and fish farms and cage farms operating	hatchery records, GBFRD inventories, Final report of Huweza Marsh basiline survey, farmer training reports	The new hatchery complex established at Huweza Marsh with broodstck and fry rearing nursery ponds commenced production producing 3.2 million fish seed in a trial run Fish cages were procured and two pilot cage culture demonstration centres with broodstock and fingerling to market size fish rearing cages are in operation A proposal developed and funding secured for a follow up project on sustainable development of inland fisheries in Iraq
3. Report and proposal submitted for funding continuation of research and extension for the fish industry in Iraq. 4. Fifteen sites selected and rehabilitated for fish farming in the most needy areas 5. Established baseline information on Huweza Marsh. 6. Five Iraqi scientists and 17 technicians trained in modern fish farming methods. 7. Extension materials developed to support the adoption of fish farming in Iraq. 8. Technicians, fish farmers, resource managers and local communities trained in improved fish farming methods, hatchery/nursery management, fish health and marketing.			Seven fish farms near Baghdad, four fish farms in Babel Governorate and three fish farms in Kut were rehabilitated and revived fish production A hydrological, biological and socio-economic baseline survey in Huweza Marsh to provide necessary scientific and technical information to facilitate fisheries and aquaculture development completed and final report submitted Five senior officials from GBFRD were exposed to innovative approached in aquaculture and four GBFRD scientists were trained on fish culture in cages and closed recirculation systems Three extension manuals in Arabic on open water aquaculture practices, live fish food production and fish feed preparation and fish culture by cages were prepared and disseminated to facilitate training of fish farmers. 89 fish farmers were trained on selected aquaculture technologies and aquaculture good management practices

Annex 2 PROJECT COSTS

CATEGORY	UNDG ITF approved budget (As per Original Project Document)	Actual Disbursement and Commitments (as per 31/03/11 non-final and provisional figures)	Percentage of Approved	Budget Revision approved on 27/04/10	Percentage of revision
1. Supplies, commodities, equipment and transport	4 666 000	3 257 774	70%	3 306 982	99%
2. Personnel (staff, consultants and travel)	1 146 800	1 293 919	113%	1 349 512	96%
3. Training of counterparts	450 000	32 442	7%	14 672	221%
4. Contracts	250 000	1 836 657	135%	1 841 634	100%
5. Other Direct Costs	329 920	374 786 **	113%	329 920	113%
6. Indirect support costs	469 457	474 370	101%	469 457	101%
Total Expenditure	7 312 177	7 269 948		7 312 177	99%

* Includes USD 72 916 related to the procurement of equipment