

EGYPT  
Project No. 263-0132

# EVALUATION OF THE STRUCTURAL REPLACEMENT AND PROJECT PREPARATION UNIT COMPONENTS

of the  
IRRIGATION MANAGEMENT SYSTEMS PROJECT

ISPAN ACTIVITY NO. 640B

ISPAN REPORT NO. 18



# ISPAN

IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST

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**Irrigation Management Systems Project**

**EGYPT**

**Project No. 263-0132**

**EVALUATION OF THE STRUCTURAL REPLACEMENT  
AND PROJECT PREPARATION UNIT COMPONENTS**

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## **ACRONYMS**

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<b>fd.</b>	<b>feddans</b>
<b>FY</b>	<b>Fiscal Year</b>
<b>IMS</b>	<b>Irrigation Management Systems Project</b>
<b>ISPAN</b>	<b>Irrigation Support Project for Asia and the Near East</b>
<b>LE</b>	<b>Egyptian Pounds</b>
<b>MOA</b>	<b>Ministry of Agriculture</b>
<b>MPWWR</b>	<b>Ministry of Public Works and Water Resources</b>
<b>PIL</b>	<b>Project Implementation Letter</b>
<b>PPU</b>	<b>Project Preparation Unit</b>
<b>RAF</b>	<b>Record of Audit Findings</b>
<b>RIIP</b>	<b>Regional Irrigation Improvement Project</b>
<b>SR</b>	<b>Structural Replacement</b>
<b>TA</b>	<b>Technical Assistance</b>
<b>TMD</b>	<b>Training and Manpower Division</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>WRC</b>	<b>Water Research Center</b>

## ACKNOWLEDGMENTS

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The evaluation team was composed of three U.S.-based members, Planning Economist Mr. D. Auslam, Materials and Design Engineer Mr. S. Jubboori, and Planning Engineer Dr. T. Wickham (team leader), and three members from the Egyptian Ministry of Public Works and Water Resources: Mr. Talaat Muhammed Tahamer, Mr. El-way Mekey, and Mr. Mohammed Ally Zeidan.

The team benefitted from a clear scope of work for this evaluation. With the concurrence of the USAID Mission in Cairo, it prepared a more detailed report than was asked for in that scope.

The team wishes to express its appreciation to the Director of the Project Preparation Unit and his staff for generously making office space and other facilities available.

The thirty-day evaluation was both a professional and personal pleasure for the team members because of the full cooperation and support extended by the Irrigation Department Chairman Eng. Ahmed Mazzen, the Structural Replacement Project Director Eng. Ahmed H. El Sawaf, the Project Preparation Department Unit General Director Eng. Essam El Sheikh, the Harza and R. Nathan Associates consultants to both the Structural Replacement and Project Preparation Projects, and to the USAID/Cairo Mission. The team is also grateful to the dozens of other officers in the field and in Cairo who helped shape its understanding of the two irrigation components of the Irrigation Management Systems Project.

## EXECUTIVE SUMMARY

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An ISPAN team comprised of three U.S.-based members and three Ministry of Public Works and Water Resources staff (MPWWR) members conducted an evaluation of the Structural Replacement and Project Preparation Unit Components of the Irrigation Management Systems (IMS) Project (No. 263-0132) in Egypt from 9 February to 9 March 1989 in accordance with the attached Scope of Work (Appendix A).

The team found both components to have produced useful products of good quality. Structural Replacement (SR) has resulted in more than 7,000 new small- and mid-size masonry and concrete structures to take the place of old or no longer functional structures controlling water in the Nile Basin Irrigation System. About 2,000 additional structures are currently under construction and/or scheduled to be completed by mid-1989. The structures are functional and of satisfactory quality. This component was implemented through contractors supervised by the MPWWR, which has resulted in two additional benefits stemming from the component: contractors have significantly improved their ability to contribute to construction projects in rural parts of Egypt, and MPWWR has developed stronger supervision over such work. The team found considerable evidence that both these benefits are spreading to activities beyond the scope of the SR component.

The Project Preparation Unit (PPU) has produced 11 high-quality reports in English and a number of reports in Arabic assessing the economic feasibility of a wide range of potential investment projects in the irrigation sector. Some of these studies have led directly to construction and completed projects. One helped the Ministry avoid an uneconomic investment. In addition, this component has resulted in substantial numbers of people better trained in feasibility analysis, a skill which needs strengthening in the Ministry.

Both components have benefited from technical assistance provided under IMS. One Technical Advisor has supported the objectives of SR since the beginning of those activities and has clearly contributed to the success of that component. In particular, his on-the-job field training of Ministry engineers and contractors is an excellent example of applied and relevant training. Similarly, the Harza-Nathan team consulting with PPU has made possible both the quantity and quality of the reports published by that Unit. The scale of technical assistance provided to these two components has been quite different: SR has had one technical advisor since its inception, whereas PPU has been advised by an expatriate team ranging between three and six long-term persons (297 person months) plus 22 person months of short-term consultants.

The team found that despite their achievements, neither SR nor PPU will meet all their target objectives within their project activity completion dates (30 June 1989 for SR and 30 September 1989 for PPU). Approximately 2,000 more structures of those now thought to need replacement under SR remain to be built. The PPU, while having completed a series of reports, does not yet have the attributes of a Ministry agency that could be called "sustainable," i.e., capable of producing more high-quality reports in English on its own (without further technical assistance).

At the risk of oversimplification, the team believes that the target objectives for both components, as set out in the Project Paper and referred to subsequently in other documents, were over-ambitious. They were valid as target objectives, but there have been so many unknown factors affecting project implementation that the project accomplishments are more compelling than the shortfalls. In particular, the time needed to institutionalize a new agency such as PPU was seriously underestimated.

For this reason the team recommends that USAID consider favorably the Ministry's recent requests for extended assistance to both the SR and PPU components. In the case of SR, two more years should be sufficient to finish the structures identified as needing replacement. In the case of PPU, the team believes three years is a more appropriate time frame for gauging institutional progress.

In responding to the requests for extensions, USAID should give serious consideration to some important project changes. These changes are particularly important in the case of PPU, for continued support along the same lines will not help it reach greater institutional stability and self confidence. The team recommends that USAID scale down its support of the Unit considerably and that it be limited to one multidisciplinary advisor supplemented with generous short-term consulting support on a project-by-project basis. In the case of SR, the team recommends an extension of the present advisor.

While the arrangements of technical assistance are important to the success of both components, the Ministry's efficiency and ability to resolve implementation problems is much more important. The Ministry is strongly supportive of both components, but also severely constrained by administrative norms and other features normally associated with large government agencies. Because of the seriousness of these constraints, both USAID and the Ministry must be cautioned that the latter's resolution of key implementing issues is essential if both components are to warrant extension.

Key recommendations from the report are summarized below.

#### **Key Recommendations Regarding Structural Replacement**

The team recommends that:

- the Ministry adopt a suitable prequalification procedure for SR, and that it maintain and circulate to its directorates lists of both qualified and unqualified contractors;
- the Ministry carry out a review of contractor performance against completion dates to form the basis for collecting penalties where due, taking over any work more than six months past its completion date, circulating lists of contractors with delays in excess of six months and excluding those contractors from bidding

on SR projects, and requiring contractors to present implementation schedules when bidding;

- the Ministry, with the assistance of the Technical Advisor under SR, complete an inventory of all structures in the Nile irrigation systems;
- the Ministry and USAID agree on comparatively straightforward criteria for selecting structures to be taken up under SR and that they be applied;
- all responsibility for siting, setting up, staffing, and operating the five field-test laboratories be transferred immediately to the Project Director, RIIP, and his staff and consultants;
- the Ministry seek USAID concurrence in adopting a salary incentive scheme based on a small percentage of the value of each SR contract above a standard deduction, to be used for salary incentives of those implementing SR, and that the Ministry of International Cooperation and MPWWR seek a doubling of the special account funds for the same purpose;
- USAID support an extension of the SR component through September 1991, and that the Technical Advisor (TA) assigned to SR continue in that capacity during the extension with minor changes in facilities provided by the Ministry.

#### **Key Recommendations Regarding the Project Preparation Unit**

The team recommends that USAID respond favorably to the Ministry's request for an extension to the PPU Project of IMS, provided that all three of the following conditions are met by the time current project support expires:

- " a backlog or pipeline of appropriate studies be formally assigned to the Unit by an authorized Ministry committee;
- " authorization and budget be conferred by the Ministry to the Unit for at least three staff to be posted directly to the Unit; and
- " a minimum of two, and preferably three, Senior (Rank 1) Ministry staff be assigned who are capable of leading feasibility study teams and free to spend at least 75 percent of their time on substantive work.

**Assuming that these recommendations are fully met, the team recommends that USAID provide technical assistance to the Unit for a three-year extension, at a level of one full-time multidisciplinary advisor and associated costs, and additional short-term TA as needed and that USAID convey to the Ministry not later than December 1990 its expectation of providing further technical assistance support beyond the three-year extension and at about the same level as that of the extension.**

**In the event that USAID is not prepared to convey this expectation by December 1990, the team recommends that the Ministry either explore with other sources of international support the acquisition of the technical assistance, or revise the Unit's mandate consistent with an Arabic-language capability and studies suitable for service to the Ministry.**

**To improve the Unit's efficiency, the team further recommends seven measures dealing with staffing, salary incentives, per diem, training, and equipment, which are discussed in detail in Chapter 3 of the report.**

# 1

## INTRODUCTION AND BACKGROUND

### 1.1 The Nile Irrigation Basin

Irrigated agriculture in Egypt is supported by the world's longest river system, the Nile (6,650 km) and Africa's largest reservoir, Lake Nasser, which is regulated by the Aswan High Dam. Commissioned in 1968, the High Dam provides virtually complete regulation of floods and ensures a reliable supply of irrigation water.

Extending some 1,200 km below Aswan to the Mediterranean Sea, the Nile Basin irrigation system makes possible year-round productive cropping on over six million feddans<sup>1</sup> (fd.) of land. These farms are served by a network of canals with a total length in excess of 31,000 km.

Water is released from Lake Nasser according to allocations made for these uses: irrigation, energy, navigation, domestic, and industrial. Water is diverted from the Nile to irrigation canals by seven large regulating structures and by about 460 pumping stations.

The first two barrages were built to serve the Delta in 1861, and the most recent one was completed in 1950 at Edfina (see table). A new barrage at Damietta has been proposed to command the El Salam Canal. It would replace an existing earth embankment that prevents seawater intrusion. In addition to the area served by these barrages, over 900,000 fd. of land at higher elevation is served by pumps, including some 360 units lifting groundwater.

BARRAGES OF UPPER AND LOWER EGYPT				
Barrage	Dates Distance from Aswan (km)	Original	Remodelled	Area served (feddans)
Upper Egypt:				
Esna	170	1908	1948	557,125
Naga Hammadi	354	1930		407,168
Assiut	547	1902	1938	950,326
Delta:				
Rosetta Branch	965	1861	1939 )	2,065,445
Damietta Branch	965	1861	1939 )	
Zifta	1,052	1902	1954	(flood control)
Edfina	1,176	1950		(flood control)

<sup>1</sup> One feddan = 1.04 acres or 0.42 ha.

The canal system is designed, operated, and maintained by the Ministry of Public Works and Water Resources (MPWWR or Ministry) which supplies water into mesqas (field channels) serving between 40 and 200 farms (100 and 500 feddans) each. The water elevation in the mesqas is typically about 0.5 m below ground elevation so that farmers have to lift the water to irrigate their fields. Farmers take water according to a rotational schedule based on area served and prescribed jointly by MPWWR and the Ministry of Agriculture (MOA).

Virtually all of Egypt's agricultural output comes from the 6,000,000 fd. of land in the Nile Basin. Because annual rainfall in the Basin is negligible, all crop production there is completely dependent upon irrigation. The Government of Egypt, with assistance from the U.S. Agency for International Mission (USAID) and other sources, places high priority on maintaining the Nile Basin system in effective condition and on finding new irrigation projects which are economically productive. These priorities will lessen Egypt's dependency upon imported food, which is currently about 50 percent of total consumption.

### **1.2 The Irrigation Management Systems (IMS) Project**

The program of assistance to the irrigation and agricultural sectors of Egypt is USAID's largest program worldwide. It includes support for agricultural research, production, and credit, implemented by the MOA and the Irrigation Management Systems (IMS) Project implemented by the MPWWR.

The IMS Project began in 1981 as a program comprised of three subproject components, to which seven more were added from 1983 to 1986. Two of the original components directly address the country's concern with maintaining irrigation effectiveness in the Nile Basin and with exploring

new irrigation investments. These are the Structural Replacement (SR) component which seeks to reduce the number of small- and mid-size structures in need of replacement by building new ones to take their place and the Project Preparation Unit (PPU) of the Ministry which carries out feasibility and prefeasibility studies of prospective investment in irrigation.

### **1.3 The Structural Replacement Component**

The network of irrigation canals serving the Nile Basin currently includes approximately 21,000 concrete, masonry, and steel structures to control, divert, and regulate water, or to provide access to people and vehicles crossing the canals. Few of these structures have been replaced or modernized over their lifetimes, so that there is a substantial number of structures which are either not fully functional or are in danger of failing. The purpose of the Structural Replacement (SR) component of IMS, begun in 1982, is to reduce the backlog of structures in this condition by replacing them with new ones.

### **1.4 The Project Preparation Unit (PPU) Component**

A major constraint in Egypt's search to finance new irrigation projects has been the lack of detailed data about alternative investments. While the Ministry makes large annual disbursements for operations and maintenance, it is seeking better criteria to guide decisions on new projects. The recent government policy that all major government investments be addressed by a feasibility report is a reflection of this need.

Rather than being entirely dependent upon outside consulting firms for this capability, the Ministry decided to establish the Project Preparation Unit within its Water Planning Sector; support for the establishment of PPU is one of the original components of the IMS Project, beginning in 1982.

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<sup>2</sup> In addition to the SR and PPU components, the IMS Project currently includes support components to: Regional Irrigation Improvement Project (RIIP), Water Research Center (WRC), Training and Manpower Development (TMD), Preventive Maintenance, Main System Management, Survey and Mapping, Planning and Models, and Miscellaneous Consulting Services.

The Project Paper for the 1987 extension of USAID's support to PPU was budgeted at \$10.7 million. Most of the support has financed up to six expatriate consultants to assist the Unit. Project support has also been extended for training of PPU staff, for purchase of equipment, and for some special account supplements to staff salaries.

The purpose of PPU is to prepare feasibility and prefeasibility reports in the English language which the Ministry can use in evaluating alternative projects internally, and which can serve the needs of international financing agencies considering investing in such projects.

### **1.5 The Evaluation Team**

Both the SR and PPU components of IMS terminate in late FY 1989, while the other eight components terminate in September 1991. The Ministry has requested continued USAID support to both SR and PPU. The original IMS documents call for a final

evaluation of each component near its termination date. This report responds to the need for the final evaluation and may be used to guide consideration of continued assistance to the two components. The Scope of Work is attached (Appendix A).

The three U.S.-based members of the Team were provided by the USAID-sponsored Irrigation Support Project for Asia and the Near East (ISPAN) which organized a two-day pre-departure planning meeting on 6-7 February 1989 in Washington, D.C. The full team assembled in Cairo on 9 February.

The team made visits to the Kafr El Sheikh Directorate in the Delta and to Fayoum, Minya, and Aswan Directorates south of Cairo. It met with over thirty key officers of USAID and the MPWWR and its contractors and made use of transport, office, and secretarial services generously provided by the Director of PPU. Lists of the key people the team contacted in Egypt and the reports it consulted are attached as Appendices B and C.

# 2

## STRUCTURAL REPLACEMENT

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### 2.1 Description of Structural Replacement

The first phase of Structural Replacement began in 1982 and continued until 1984 with activities in five directorates (East and West Dakahlia, Sharkia, Ismailia, and Beheira). In 1984 the component (referred to hereafter as SR) was expanded to all directorates in the Nile Basin through supplementary USAID support. Total USAID commitments for SR then became \$71 million.

Phase 1 provided the experience to judge the number and condition of structures in need of replacing. About 3,000 were replaced during Phase 1. Based on that experience, 9,500 of the total 21,000 structures in the Nile Basin were estimated to need replacement at the beginning of the project.

Several qualifications should be placed upon these numbers. First, SR was only intended to deal with small- and mid-size structures, not major structures such as barrages and primary head regulators. Second, the judgement of which structures need replacement is somewhat subjective. Third, experience with SR has shown that in some cases new structures are needed where none existed before; construction of these structures did not always reduce the backlog.

USAID's primary contribution to SR is to reimburse the Ministry 80 percent of the costs incurred in replacing qualifying structures. The work is done by contractors following prescribed Ministry contracting arrangements, but with strengthened supervision and monitoring by the Ministry. In addition, USAID has financed one full-time expatriate Technical Advisor (TA) and local consultants for SR, and has supported certain training of Ministry staff involved in SR both directly and through the Training and Manpower Division. USAID also financed the purchase of SR equipment including vehicles and computers (Appendix D).

The Ministry implements SR through its 19 directorates and 169 district offices. Each directorate receives an annual Ministry-sanctioned workplan of those structures to be replaced in the coming year. The directorates and districts group these into contracts which normally include between 12 and 18 structures along one to three nearby canals and let the contracts for bid. Typical contracts range between LE 200,000 and LE 300,000 (LE 1.00 = US\$ 0.60). Supervision of the contracts is provided in part by the contractor, Ministry, and Technical Advisor.

In support of the objectives of SR, USAID has agreed to the use of some support generated from Government of Egypt funds in the Special Account jointly administered by USAID and the Ministry of International Cooperation. The funds supplement the salaries of Ministry staff actively involved in SR (and other components of IMS). These salary supplements were sought by the Ministry because it has experienced difficulty recruiting qualified engineers at a time when demand by private firms for engineers has been particularly great and government salaries are less than half those in private companies.

During the initial phase of SR it was anticipated that the Ministry should also maintain structures after they were replaced to protect the investment. This function has since been taken over by the Ministry with assistance from the Preventive Maintenance Component of IMS which began operations in 1983-84.

### 2.2 Evaluation of Key Issues in Structural Replacement

This part of the report is an evaluation of 11 issues which the team believes are of central importance for the SR project to reach its objectives. The sequence for each issue is first a presentation of the

team's observations, followed by its conclusions, and then recommendations. The recommendations are recapitulated in the final chapter of the report.

## **2.2.1 Contract Administration**

### **Prequalification of Contractors**

The Ministry uses formal prequalification procedures for large contracts but not for small ones such as those used for SR. Most directorates judge the suitability of SR contractors by reviewing their certificates of completion for previous work. But occasionally contractors with poor records in one directorate are awarded work in another because the two do not exchange information about contractors.

The team found that key Ministry officials consider that prequalification guidelines which are less rigid than those for large contracts would be useful in SR, particularly in screening new contractors who do not yet have a record on which to be judged. We further found that in mid-1988 the Ministry drafted and reviewed, in Arabic and English, a comprehensive set of procedures which provide for three systems of prequalification depending upon contract size. These procedures (Appendix E) have not yet been adopted, but they provide a reasonable basis for screening SR contractors and, in the future, RIIP contractors.

The team recognizes that general contract administration, if followed thoroughly, would go a long way toward improving the quality of contracting. In that case, careful screening of contractors might not even be necessary. But the team believes that instituting an appropriate system of prequalification procedures, and other administrative tools discussed later in this section, will help achieve better overall contract administration rather than substitute for it.

The team recommends that before the completion of the present project the Ministry adopt and implement the prequalification procedures it has drawn up (Appendix E). It also recommends that the Ministry maintain and circulate among all its directorates a list of all contractors prequalified according to these procedures and another list of all those found to be unsatisfactory.

### **Bonds**

The team found that contractors pay a one percent deposit at the time of bidding and a five percent performance bond when awarded the contract (the performance bond is not required for public corporations). If the contractor is unknown, the performance bond may be increased to ten percent but this is rarely if ever invoked. The amount of the performance bond does not permit sufficient control over contractors.

The team recommends that the bid bond remain at one percent to interest new contractors, but that the performance bond be increased to ten percent for all contractors, private and public.

### **Supervision**

The team understands that contractors are to provide one full time engineer to supervise on-site construction for every contract in excess of LE 50,000. The team did not find these engineers on the limited number of work sites visited, and apparently this is the rule. The team concluded that although it would be desirable to have engineers at all work in progress, widely dispersed construction makes compliance by the contractor and enforcement by the Ministry difficult. The team nevertheless recommends that the Ministry consider levying a penalty of, say, LE 50/day for every day the contractor's works are found to be in progress without an engineer.

### **Delays in Completing Contracts**

The team found that the failure of many contractors to complete their work on schedule is a serious problem. No contractors provided a time-line schedule of contract completion when bidding on jobs. In Tanta there are currently five open contracts more than two years late. Although there is provision for levying penalties for excessive delays, the team could not confirm the extent of penalties collected. The Record of Audit Findings shows LE 102,470 has been collected from 22 contracts in four sample directorates.

The team recommends that the Ministry review contractor performance against completion dates beginning with Directorates of Tanta, Assiut, and Sohag; consider renegotiating or declaring forfeited any contract whose work is incomplete six or more months after its completion date; collect from all contractors whatever penalties are payable under the law; circulate among all directorates the list of those contractors which the Ministry has thus penalized; and require each contractor to provide a written or graphic execution program showing completion dates which he can be held to.

### **2.2.2 Public Company Participation in SR**

The team noted that the original Project Paper makes explicit provision for public corporations to participate in the SR project along with private contractors, but that participation of public corporations was not allowed in the 1987 Project Paper. Nevertheless, PIL 82 in 1987 does allow further public company contracting under SR provided those companies subcontract some of the work to private companies.

In the field the team observed a public contractor, utilizing new construction materials and technology (two-stage pre-stressed beams and slabs) which was beyond what could be expected from private contractors. The introduction of new technology such as this is called for in the Project Papers and in the terms of reference for the Technical Advisor under the project.

The team observed Resident engineers from public contractors supervising field construction, in one case on a Friday, and it was learned that private companies often have great difficulty posting resident engineers to SR sites. From these observations the team believes that the quality of work done by public contractors has been on average better than that of private ones.

Some public companies did not complete their projects on time while others finished ahead of schedule. In this regard there may not be much difference between public and private companies. But delays in achieving the goals of the SR project during the period of its proposed extension will certainly be more likely if public companies cannot participate.

The team understands USAID's preference for awarding SR contracts to private companies, but the present understandings are unsatisfactory on three

grounds: (1) from an efficiency point of view public company participation in the SR project is justified; (2) the present arrangement by which public companies may win jobs under SR is difficult to enforce and invites abuse; and (3) public corporations are important contractors to the Ministry. If they cannot participate in SR neither they nor the Ministry will benefit from the improved quality standards which SR aims to institutionalize. Their exclusion thus runs counter to the long-run aims of the project.

The team recommends that the Ministry seek USAID concurrence to apply the prequalification procedures provided in Appendix E equally to both private and public contractors seeking SR work and that USAID explore legal means to waive whatever impediments may exist to using USAID funds to reimburse the Ministry for work completed by properly qualified public companies.

### **2.2.3 Turnover of Senior Ministry Officials**

The team found that most of the senior officials it met had been in their current positions for less than three months. The team understands that General Directors remain in charge of their departments on average less than 18 months, which is less than the duration of many contracts. The team concluded that few of the directorates have sustained leadership for supervising contracts.

The team recognized that staff placement at senior levels is an important responsibility which the Ministry must exercise without undue interference. However, the relatively frequent transfers of senior officials in the districts and directorates has caused disruptions in project execution.

### **2.2.4 Supervision and Inspection by the Ministry**

The team found that MPWWR engineers inspect structures after they are built, but there was not much evidence of field supervision of contractors during the construction phase. On-site diary entries confirmed that one MPWWR engineer did so regularly, however. The team noted that for contracts above LE 10,000 a car and driver (two cars and drivers for those in excess of LE 100,000) is provided for transporting engineers to the sites, it is concluded that transport is not normally a problem.

The team believes that on average, Ministry engineers should be spending more time than they do in supervising and monitoring the works, especially during periods of concrete placement in larger structures. Current supervision appears to be inadequate. On the other hand, there appear to be enough safeguards built into the SR project that this shortcoming has not yet seriously affected structure quality.

The team noted that MPWWR had hired on a part-time basis two local university professors to assist the Technical Advisor in supervising SR projects but that they were no longer retained. Their value to the project could not be assessed, but MPWWR should consider the use of outside consultants for this purpose from time to time provided they do not substitute for the Ministry's primary responsibility in supervising its work.

The team believes that the problem of inadequate field supervision is ultimately one of commitment to high professional standards and that it cannot be dealt with effectively through SR alone. However, somewhat greater commitment to the objectives of SR could be achieved if the field engineers received modestly higher salaries. In this connection, the team understood that the salary incentives of engineers assigned to SR supervision was about the same as the salary bonus paid to other Ministry staff who do not work on IMS projects. Thus, the team concluded that the IMS-related salary incentives are not very effective in motivating staff beyond their normal work habits.

The team found that there is precedent in other agencies of the Ministry to return a small portion of contract funds to the implementing directorates to be distributed among their staff. A common figure is three percent of the amount of the contract in excess of a standard deduction. Advantages of this form of incentive are that it is tied directly to the volume of work contracted and that it is comparatively simple to identify those people eligible to share it. There is no direct precedent for this form of incentive in the IMS Project, but the contractors' obligation to provide one or more cars and drivers for use by Ministry staff supervising their projects is a form of incentive already built into each contract. The principle of salary incentives has of course been accepted.

The team recommends that the Project Director of SR be provided with lists from each Directorate of

the supervising engineers who have been assigned to each SR contract, and that the field inspections made by the proper staff verify the whereabouts of these engineers during inspection visits whenever concrete formwork, steelwork, or placement is under way.

The team recommends that the Ministry, with USAID's concurrence, implement a salary incentive scheme based on a percentage of each contract above a standard deduction and that its revenue be paid to Ministry staff involved in SR. If the Ministry or USAID is unable to support this recommendation, the team recommends that the Ministry of International Cooperation and MPWWR ask USAID for an increase in special account support in an amount twice as much as that for 1988, to supplement salaries of SR and RIIP staff. We further recommend that the salary incentive be in addition to and not in lieu of normal applicable Ministry bonuses and that District engineers receive a substantial portion of it.

## 2.2.5 Inventory of Structures

The team was informed that there are about 21,000 small- and intermediate-sized structures within the scope of the SR project in the Nile Basin, and that about 9,500 of them were estimated to need replacement when the project began. Each District Office has records of the structures in its jurisdiction (the team inspected them at one office), but many of these records are old and need to be updated. In addition, most of them are handwritten, some are in Arabic, and their format is not common among Districts. In particular, the condition of the structures is not noted in these records. The team understands, but has not confirmed, that a computerized summary of some of these records exists in the Masterplan Office.

It is important that an inventory of structures be prepared as soon as possible to provide a framework for continuing the project in the future and to support the proposed selection criteria (see section 2.2.6 below).

It is therefore recommended that the Ministry, with the assistance of the Technical Advisor, carry out a detailed inventory of all structures in the Nile Irrigation System according to the plan and schedule of Appendix F.

## 2.2.6 Selection Criteria

The team observed that decisions on which structures to replace are usually made at the directorate level based on a combination of factors including the supervising capacity of the directorate, capacity of the contractors, and the time available to execute the works, which is often the one-month period of canal closure. These principles are followed in one way or another among all the directorates, and have resulted in the following structures having been given priority for replacement: (1) those which impede or restrict water flow; (2) failed, failing, or damaged structures; and (3) bridges where there is heavy pressure of traffic. Some directorates initiate selection procedures by soliciting the views of farmers.

Three results of this selection process should be understood: About 60 percent of the cost of structures replaced under SR is for bridges; about 20 percent of the structures are new to the system rather than replacement structures; and the hydraulic capacity of the majority of the replacement structures is greater (sometimes more than twice as great) than that of the original structures.

The importance of bridges under SR stems primarily from population trends: the number of rural people living along irrigation canals has more than doubled in the past twenty years, and today's people expect to commute much farther than their parents did. The pressure of traffic crossing canals has increased sharply during a period when there has been essentially no change in the peak flow of water in the canals. Furthermore, the team understood that repair and maintenance of highway bridges over canals is the responsibility of MPWWR, not the highways authorities. It is thus not surprising that bridges have been a prominent in the project.

Although the SR project is largely a means of replacing old and non-functioning structures, both Project Papers addressed the need, under some circumstances, to build new structures where none formerly existed. The team saw such an example in the Delta: a new headgate was built where originally a canal simply bifurcated without any structure. The original intent to permit these and other new structures was appropriate, and this provision has not been abused.

The team took note of several attempts to adopt selection criteria proposed by USAID and the Ministry during the life of the project. These have been of some value in helping to make sound choices. However, there is concern that more recent

criteria proposed to account for several parameters with numerical weighting may add a substantial data-collection and administrative burden to the directorates. The directorates should also retain enough flexibility to accommodate farmers' preferences and other factors which are not amenable to highly structured criteria.

Simple, clear, and written selection criteria are important to the success of the project; these criteria should be referenced to existing structures; and they should give priority to structures either in danger of collapse and/or those which are not capable of meeting their designed function because they are damaged or undersized in relation to current demand. The team proposes new criteria supporting this (see Appendix G).

The team therefore recommends that USAID and MPWWR seriously consider adopting the selection criteria substantially as detailed in Appendix G. The team further recommend that the Water Research Center or another appropriate body be invited to study the effect, if any, of increased hydraulic capacity of replaced structures on the hydraulic regime of a few pilot canals.

## 2.2.7 Quality Control and Design Specifications

The team inspected approximately 60 structures rebuilt or in the process of being rebuilt under SR. A number of these structures had superficial deficiencies, surface imperfections, or other evidence of imperfect construction techniques such as honeycombing in placed concrete. The team noted that an evaluation conducted in December 1984 recommended that contractors go back and redo the finishing of some of these structures. The team saw no evidence that they had done so.

The team also noted that the design of SR structures was relatively conservative, e.g., concrete wingwalls were normally 40 cm thick. These designs were within acceptable tolerances.

The teams concludes that although construction has been variable, none of the rebuilt structures is in danger of failing, and the team was assured that none has failed. Under the circumstances the conservative design is advisable in view of the variable quality control during construction. In other words, the concession made in design to the so far unavoidable realities of quality control is reasonable and satisfactory.

The recommendations dealing with supervision are adequate to maintain this trade-off satisfactorily.

### 2.2.8 Field Test Laboratories

The team noted that equipment was purchased for five labs to test construction materials in the field. This equipment has been delivered but is not yet operational. The quality control goals of SR are important and would benefit from the services expected from the labs, particularly in the case of the larger structures.

These labs will probably not be fully operational with trained staff until 1990 at the earliest. The team understands that alternative testing arrangements for SR work have been made in the past and that they can be resumed whenever specialized testing is needed in the future.

Although the labs are generally referred to within the context of SR, the team has not found reference to them in the original Project Paper and only passing reference in the 1987 Project Paper. The team concluded that the equipment was found necessary to achieve the quality control standards and was therefore purchased, but it is not clear to the team that it was justified solely for SR, nor that it was ever budgeted under the SR component of IMS.

The team was informed that the original plans for RIIP included provision of five field testing labs for the extensive construction anticipated at the eleven RIIP command areas, but that these plans were dropped due to lack of funds in the RIIP project. We believe that RIIP, like SR, will also need the test facilities, and for an extended period of time. Given the large number of technical advisors now assisting with RIIP, the team believes that the quickest, most effective and long-lasting benefit from the labs would result from their being established through close guidance from the RIIP component of IMS.

The team therefore recommends that all responsibility for siting, setting up, staffing, training, and operating the five field labs be transferred immediately to the RIIP Project Director and his staff and consultants and that SR field-testing also be accommodated at the labs whenever requested.

### 2.2.9 Role of the Technical Advisor

The Technical Advisor under the project is effective in both a technical and training capacity. He seems to be well respected by the key people the team met and by the field engineers implementing the project.

The team recommends that the Technical Advisor be retained for the duration of the extension if it is granted and that his contribution to the Project be strengthened by the Ministry providing the following:

- one pickup and driver for field use (exclusive basis),
- one bilingual secretary (shared basis) to assist in his record-keeping, and
- at least two full-time staff of the level of assistant director of works who will accompany or substitute for the Technical Advisor on weekly visits to the directorates.

### 2.2.10 Training under the SR Component

The team observed effective on-the-job training of Ministry field engineers by the Technical Advisor as part of the supervision and monitoring process. In addition, during the team's period in Egypt the Technical Advisor gave lectures to two groups of general directors and related staff on strengthened selection criteria. A total of 72 three-hour lectures have been presented by the Technical Advisor during his six years on the project, through which he reached about 1,500 Ministry staff (Appendix H).

The team believes that effective training will continue to distinguish the SR project provided the Technical Advisor is associated with it, but we recommend that the two counterpart staff proposed to work with the Technical Advisor take over more of the training responsibilities.

### 2.2.11 Proposed Extension to the SR Project

Through a memorandum from the Project Director of SR to the USAID Project Officer for SR dated 29 January 1989, the Ministry asked USAID to consider extending support to SR beyond the completion date of 30 June 1989 to 21 September 1991. Except for PPU, USAID support to all other

IMS components is due to terminate in September 1991 and the last two months (August and September 1991) are requested as a time to close the books on the project.

During its field trips the team saw some structures in need of replacement. About 7,000 structures have been replaced to date under the project, and about 2,000 more are currently under construction or are likely to be taken up before June 1989. The 9,500 qualifying structures believed to characterize the backlog at the beginning of the project was really an estimate at the time of the Project Paper, and it appears now that about 11,000 structures is a more accurate representation of the total requirement. If that figure is accepted, there remain about 2,000 structures to be taken up during the proposed extension to complete all SR work in the Nile Basin. The primary reasons that the 9,500 planned structures were not replaced by the original completion date were the unprepared nature of contractors, the training required of the Ministry's field engineers implementing the project, and to some extent the reduced participation of public company contractors in the last year. The training of engineers in the field was more time-consuming than anticipated because two separate departments--Projects Departments and Irrigation Departments--had to be trained at each directorate. Similarly, it took more than two years for the small contractors to learn and respond to the new requirements of SR. As discussed earlier in this chapter, many of their contracts were not completed on time.

The team believes that the delays under SR are largely what might be expected of an agency beginning a new project. The pace of construction has increased markedly since 1985 and especially during 1986-1988 (Appendix I). At this accelerated rate, the project will achieve all of its initial objectives by the end of the proposed two-year extension period (21 September 1991).

The team therefore recommends that USAID provide support for an extension of the SR component from 30 June 1989 to 21 September 1991 in line with the content of USAID's letter of 16 February 1989 to the Project Director of SR (with relatively minor exceptions regarding an extension of time to complete the inventory and regarding consideration of alternative selection criteria).

### 2.3 Review of Recommendations from Previous Reports

The two most significant evaluations of SR are the December 1984 Evaluation of the Structural Replacement Project by L. Harris, M. Nasser, M. Hindy, and J. Addink and The Record of Audit Findings (RAF) prepared by USAID's Office of the Regional Inspector General/Audit and issued as a series of memoranda between December 1988 and February 1989. Detailed responses to the recommendations and questions raised by these two reports are found in Appendix J.

Recommendations from the December 1984 report were designed largely to improve the efficiency of SR and the quality of structures built under the project. Most of these recommendations, e.g., offering of construction courses, publication and dissemination of a construction manual with tighter specifications, recruitment of more engineers, increased field monitoring, and contractor conferences have been carried out, but the recommendation to undertake an inventory of structures has not.

The Record of Audit Findings draws attention to a feature of the SR project which is not fully consistent with USAID's accounting policies. Although numerous steps have been taken both by USAID and the Ministry to avoid these situations, it is not surprising that they do occur occasionally. The RAF points out that USAID's financing of SR will slightly exceed 80 percent unless the Ministry passes back, or offsets against future USAID billing, penalties collected from contractors. The team recognizes the accounting principle involved, but believes that project effectiveness is better served by providing maximum incentives to the Ministry to collect penalties. Similarly, the Team does not believe that the RAF recommendation to install USAID plaques on many SR structures would promote the effectiveness of the project or the long-term objectives of USAID.

The RAF also identifies issues which it concludes are not consistent with the intent of the SR project, namely the participation of public company contractors, inclusion of new (not strictly replacement) structures, and inclusion of bridges, three of which were large and in major towns. The RAF recommends detailed supervision by USAID and case-by-case justification by the Ministry in order to stop these practices.

The team believes the RAF was a thorough and largely accurate effort to identify weaknesses in the project, but that it does not adequately capture the intent of the Project Papers, particularly the first PP which specifically identified public contractor participation, and construction of new structures and bridges. The team found that bridges over canals are normally the responsibility of the Ministry and not of the highways authorities, and that road traffic has grown sharply in recent years. Although three of the bridges are larger than most people would describe as small- or mid-size structures qualifying under the project, neither the team nor the RAF found them to be unnecessary or poorly designed or built. The team recognizes that some of the issues which the RAF has identified are important, but believe they could be resolved more effectively and with less risk to future project accomplishment by direct understandings between USAID and the Project Director of SR.

The RAF concludes that the project has been carried out relatively efficiently, that it has had a significant positive impact, and that consideration should be given to a two-year extension. The team concurs in all these assessments.

# 3

## PROJECT PREPARATION UNIT

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### 3.1 Introduction

Development of large water resources projects in Egypt, as in most developing countries, is highly dependent on external financing, which in turn requires detailed documentation of both the financial and economic feasibility of projects prior to issuing long-term credit. To develop the capability of undertaking feasibility studies within MPWWR was the primary purpose in forming the Project Preparation Unit (PPU).

The PPU was established by a decree of the Ministry of Irrigation (precursor to MPWWR) in 1980. The Project Paper called for staffing by ten to twenty Ministry professionals with associated support staff. The Unit was also to have an assigned cadre of expatriate consultants funded by the World Bank and USAID. The objective was to build an institution within the Ministry which could prepare feasibility studies, in English, acceptable to financing sources such as the World Bank.

At the completion of the World Bank's four year program of support, the government requested USAID grant funds to fully finance PPU. In 1982 \$10 million of USAID support to PPU was included as part of the IMS Project. The completion date for this support is 30 September 1989. Consultant support to PPU will have ended on 31 July.

In order to build capacity within the Unit quickly, technical training of the Ministry staff was given high priority, especially during the early years of the Unit before the first feasibility studies were assigned to it. This included off-shore training, in-house technical seminars, in-country course work, and on-the-job training.

In late 1983 the Unit took on quite a different character as it started work on its first project. The study of Drainage Project No. 5 was the first in a series of detailed feasibility studies. It was completed in English and to technical standards acceptable to international financial institutions. In fact, construction of Drainage Project No. 5 has been financed by the World Bank and construction is under way. From that time until recently, less attention was given to PPU training as the expatriate staff applied themselves largely to produce reports. During this period, however, there was some effective on-the-job training of Ministry staff. This cycle lasted until early 1988 when the Unit entered another period of insufficient assigned work.

At present, PPU is finishing an irrigation improvement study of the Bahr El Gharaq Project in the Fayoum Governorate and has little other assigned work. It has been significantly underemployed during most of 1988 and early 1989.<sup>3</sup>

### 3.2 Evaluation of Key Issues for PPU

The objective of this section of the report is to evaluate the Unit by analyzing a series of eight of the most important issues which directly affect PPU's performance.

#### 3.2.1 Mandate

The evaluation team found that PPU has achieved one of its key objectives, which is to prepare bankable feasibility studies. Some have already been financed and are under construction (Appendix K). It has also conducted and benefited from a substantial training function (Appendix L).

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<sup>3</sup> On 28 February 1989, near the end of the Team's mission, three studies were assigned, the first new work since December 1987.

However, PPU has not succeeded in its third key objective, which is to be a self-sustaining unit by June 1989; this finding is discussed in detail in section 3.2.6 below.

An additional objective of the Unit is to conduct "prefeasibility and other technical studies" as may be required from time to time by the Ministry. It is now clear that some of the studies assigned to PPU were not sufficiently defined in scope or intent to warrant full feasibility treatment. It is likely that more assignments of incompletely specified projects will follow. Prefeasibility analysis is an appropriate way to treat such assignments. Prefeasibility is also a cost-effective way to determine whether a proposed project is likely to be viable enough to merit the allocation of substantial resources and time required for full feasibility analysis. The team believes that prefeasibility studies deserve an important place in the Unit's mandate.

It is not clear, however, that other technical studies should be undertaken by the Unit. The team notes that the Water Resource Center has much greater capacity than PPU to carry out water management studies. Although PPU has done a creditable job with the Bahr El Gharaq study, It is questionable whether it fits within the PPU's mandate which should be closely interpreted to include only those studies of a feasibility or prefeasibility nature.

Assignments of studies by the Ministry has at times been far greater than staff capacity and at other times far below it. This is discussed more fully in section 3.2.2 below.

### 3.2.2 Support from MPWWR

#### Staffing Issues

The team found strong and consistent support for PPU from higher management in the Ministry; however, translating that support in operational ways has not been efficient. The unit has consistently had staffing problems in three main areas:

- It has never had the number of effective staff (20 - 30) originally envisaged. It currently has up to ten staff members who could qualify as technical participants on a feasibility study.

- New personnel assigned to the Unit are typically inexperienced. Of the four agriculture staff, three have virtually no professional experience.
- Many staff have inappropriate degree training. For example, the Unit has attempted to staff economics positions with accountants who cannot acquire the necessary analytical skills through on-the-job training.
- The team found very high turnover, absenteeism, and leaves of absence among the staff. The high turnover rate is caused, among other reasons, by poor prospects for promotion. Poor salaries, a serious problem throughout the Ministry, is another. It is also not clear that a Unit created to conduct feasibility studies is an attractive professional home for staff from a parent Ministry which recruits engineers almost exclusively.

The team found that PPU has no allocated and budgeted staff positions; all its staff are seconded from other Ministry agencies. The two PPU staff whom the team consider key professional staff (Eng. Rizk Menhawi and Eng. Loucy Boulos) are seconded from the Water Research Center and the Grand Barrages Sector, respectively.

The team found that seconding staff from one agency of the Ministry to another is widespread and in many respects beneficial. It provides a means by which PPU can acquire staff with a wide range of previous experience. Secondment also permits the Unit to attract for limited periods specialists in a particular field, e.g., drainage, when doing a study on that subject. It also provides more attractive career opportunities for engineers than PPU could offer by itself. For PPU as an institution, however, an exclusive reliance on seconded staff gives it the status of a temporary project rather than a permanent agency of the Ministry. It is doubtful whether PPU can become a self sustaining unit without at least some staff positions allocated and budgeted directly to it.

The Ministry has had difficulty recruiting because the private sector paid substantially higher salaries and because there was a general shortage of degree-trained labor. This situation has changed somewhat

in the last two years, and there now appears to be a surplus of degree-trained labor. The government is now hiring 1984 university graduates, which means that more recent graduates who cannot find jobs in the private sector will likely have to wait several years before they qualify for openings in the government. Government salaries are still much lower than those in the private sector, however, and it is not clear that the Ministry can attract many men and women of the ability required to lead PPU studies.

The high number of vacant positions in PPU and throughout the Ministry is caused primarily by policies which permit official leaves of absence for maternity, to work in another country or unit of government, or to take advanced degree training. Four staff seconded to PPU are currently on extended leave from the Unit and not available to it. Some of them are working temporarily in other countries. These policies are important attractions which the Ministry can offer in competing with the private sector for well qualified staff, and they should be curtailed despite their impact on vacant positions. However, PPU should move more aggressively to fill on a temporary basis those positions left vacant for extended periods of time.

Low annual salaries constitute a key reason for rapid staff turnover. Although the team did not collect data on salaries, the consensus of those interviewed indicated that salaries for professional people in the private sector are at least double those in government. On the other hand, the team understood that job security and opportunities for promotion are better in government than in private firms, which partly explains why many people continue in government jobs.

Although the senior professional staff in the Unit place importance on job security and promotion, virtually the only way they can be promoted is to be transferred from PPU to another Ministry agency. PPU is too small to provide much chance for internal advancement and in any event it has never received sanctioned and budgeted staff positions.

In conclusion, the staff problems that continue to plague PPU need to be recognized as a major reason for the lack of success in institutionalizing the unit within MPWWR. Preparing feasibility studies calls for experienced staff. At a minimum, PPU needs at least three experienced professionals with knowledge in a number of key areas (engineering, economics, and agriculture) to lead other, less experienced degree-trained professionals

to undertake studies successfully. The Unit should give high priority to attracting and retaining these three or four senior staff and lesser importance to filling the rest of the positions. There are obvious benefits in having an economist, an engineer, and an agriculturalist fill the three senior key positions, but their degree-training is not as important as their interest in and commitment to feasibility analysis. Therefore, the Ministry should not rule out training engineers in the techniques of feasibility studies if, as appears likely, it is unable to recruit qualified economists.

### **Data Collection and Processing**

Data collection is an important function in the feasibility study process. PPU has had difficulty collecting data for a number of reasons:

- PPU staff are reluctant to make overnight field trips to collect data because the per diem rates are so low. Current rates for junior staff are reported to be less than LE 3.50 per night. At this rate staff are required to pay expenses out of their pockets. Given the low salaries, their reluctance to make trips involving overnight accommodation outside of Cairo is understandable.
- The team was informed that it is difficult to gather secondary data from many government agencies because higher-level approval is usually required to release data and PPU staff are often not senior enough to make those requests effectively.
- It has been reported that occasionally PPU junior staff collect the wrong data because they do not fully understand the nature of the data required. This confirms the importance of the Unit's training function.

The difficulties in collecting data have greatly slowed the process of conducting feasibility studies. The expatriate staff have collected much of the data themselves which has reduced their time available for training and analysis.

### **Assignment of Studies**

The team was surprised to find that despite its limited number of Ministry staff, PPU is currently underemployed. The only current study, a prefeasibility study of the Bahr El Gharaq project in

Fayoum, has been stretched out in part because there is no other work assigned to the Unit. There appears to be no clear mechanism by which studies are assigned to PPU. The team was assured that this situation could be reversed quickly, and in fact, as noted earlier, three new studies were assigned during the team's visit. But this is not reassuring, for the pendulum may then swing too far in the direction of too many studies to be completed quickly.

PPU would benefit from a more explicit mechanism to regulate the flow of assignments to the Unit. The Ministry Committee of Senior Undersecretaries is the logical body to take on this function as a regular agenda item. To fulfill this responsibility effectively, the Committee would benefit from having PPU prepare lists of proposed studies to be considered.

### **3.2.3 Support from USAID**

Over 85 percent of USAID's support to PPU has come in the form of technical advisory services. The consultants, Harza Engineering with R. Nathan Associates, have supplied 297 person-months of long-term technical advisors and 22 person-months of short-term consultants to PPU (Appendix M). The team believes that the expatriate staff have been well qualified in their respective disciplines, and that they have put their expertise to good use in producing generally high-quality technical reports on tight schedules. The result, however, has been that the technology transfer to Ministry staff has suffered. To the extent that the expatriate advisors have attempted to train, their efforts have been severely hampered by Ministry staff turnover and other staffing problems identified previously in this section. Thus, the Ministry staff is not yet prepared to conduct high quality studies on its own.

In addition to financing the advisors, USAID has supplied office equipment, a computer system, professional and training equipment, and vehicles valued at \$312,000 (Appendix D). Most of the equipment has been suitable, although it is no longer new.

The computer system has been put to good use in support of feasibility analyses and report generation. The computer division provides relatively efficient services to the Unit. However, only a very small fraction of the machine's capability is utilized. Also there are no microcomputers within PPU, and as a result there is no means by which the Unit's

professional staff have access to computer support except through the computer system operators.

### **3.2.4 Training of PPU Staff in English**

Reports prepared for international financing agencies must normally be in English. PPU does not yet have the competency in the English language to prepare such reports. To date, the expatriate staff have prepared and edited all major reports at considerable expense of time and effort.

English proficiency, especially conversational and reading, has improved over the past four years. For those interested in overseas training, Ministry requirements for English competency continue to be strong incentives for further staff improvement. At present, there are two PPU staff who have prepared short reports in English, which shows the direction the Unit should take in future. However, even these reports required substantial editing by the expatriate staff.

Preparing technical documents in English is not yet a PPU capability in the absence of outside support. Although PPU staff may ultimately acquire this skill on their own, serious consideration should be given to providing the Unit with access to professionals with stronger English language skills, and competency tests for those undertaking overseas training should be continued.

### **3.2.5 Technical Training of PPU Staff**

Technical training of PPU staff has included off-shore training, in-country seminars and technical courses, and on-the-job training. According to the records given the team by PPU, non-degree off-shore training (or short courses) have totalled 49.2 person months over the duration of the project (Appendix L). Three PPU employees have gone to the United States for advanced degree training. PPU has not financed the advanced-degree training, but the non-degree programs have been financed with IMS funds.

PPU staff take in-country seminars and technical courses; they also take courses at the American University of Cairo. These courses are financed by the local currency budget of the Harza contract.

On-the-job training has been valuable to the progress of the Unit. Regardless of time pressure, PPU staff have worked closely with the advisors. Time pressure has resulted in the advisors working

as supervisors rather than coaches and has led to their doing essentially all of the report writing. A particularly useful form of interaction is the staff seminars held upon completion of various stages of the studies in which information is freely exchanged and understandings reinforced. These methods of technology transfer have been effective in teaching the art and science of conducting feasibility studies.

The team considers on-the-job training to be the most effective method for technology transfer and believes it should be undertaken together with production work. It appears that most of the course work attempted has been appropriate; however, the net benefit to the Unit has been diluted due to staff turnover. Off-shore training is an important attraction in recruiting PPU staff, but it has not been effective in retaining staff tempted away by more lucrative jobs, sometimes in other countries. In fact, in some cases, trained staff, such as computer specialists, become more vulnerable to enticements to leave the Unit.

### 3.2.6 Proposal for Extending PPU Component

In his February 9, 1989 letter to USAID, the Chairman of the Irrigation Department (and Chairman of the IMS Steering Committee) requested USAID to extend support to PPU for two years beyond the current project completion date.

The team believes that, provided certain changes are made, a case for the extension can be made. An extension which only continues the present direction of the Unit is not appropriate, but an extension for the purpose of establishing PPU as a sustainable unit of the Ministry should be considered. The question of a possible extension thus should be evaluated in the context of PPU's sustainability.

One of the primary objectives for PPU from the beginning was to build a self-sustaining unit institutionalized within the Ministry by the time the project was completed. After six years and expenditure of considerable money, the Unit is being evaluated to a large extent on whether or not it has reached that sustainable status.

To assess PPU on this point it is useful to define what is meant by sustainable. Two definitions guided the team's thinking during the review:

- The ability of a system to generate a flow of outputs that endures after the external assistance runs out

- The ability of a system to produce outputs that are sufficiently well valued so that enough inputs are provided to continue production.

It is evident that PPU is not at present capable of sustaining itself according to the first definition. The team does not believe the Unit could produce high-quality economic studies without continued external assistance.

Evaluating PPU according to the second definition is more difficult. Fortunately, the legacy of high-quality reports from the past six years gives the Unit valuable momentum with which to attract further support. On the other hand, those who may consider providing that support will look critically at the Ministry's inability to provide a regular workload to the Unit and at the fact that PPU has only two senior professionals capable of supervising studies.

The judgement of PPU's ability to sustain itself thus depends upon the choice of definition. It appears that most of the reports written about PPU have assumed a definition closer to the first one. The team believes that the second definition fits the condition of PPU better than the first for these reasons:

- No organization attempting to conduct high-quality economic studies can do without external staff assistance from time to time. Even the most well-respected international firms use consultants freely; and
- PPU is still at a relatively youthful stage organizationally. If there is a case for applying the first definition, it would be after the Unit is more mature.

Even when using the second definition, the team cannot be certain that PPU can truly sustain itself. From a wide range of mixed evidence it would appear however, that its prospects of continuing to provide a useful service to the Ministry are good provided it has access to some outside assistance. In coming to this conclusion the team has taken seriously the Ministry's mandate to subject all its proposed projects to feasibility analysis, and it is noted that a comparable unit has been established, also with external assistance, in the Ministry of Agriculture. We the team also believes that project assistance to PPU in the past has not been structured in a way to promote the Unit's sustainability. Specifically, provision of three to six

full-time expatriate advisors, plus short-term advisors, with responsibility for collecting data, analyzing it, and writing reports has certainly helped PPU to produce high-quality outputs, but it has also had the effect of postponing important decisions which would allow the Ministry and its PPU staff to take on much greater responsibilities themselves.

The team also concluded that the staffing requirements for an effective and sustainable PPU, while posing certain difficulties, are not beyond what the Ministry could reasonably carry out. The key requirement is the appointment to the Unit of at least three senior first-rank Ministry staff, all of whom could be engineers if necessary, who would learn to use the tools of feasibility analysis. The Ministry already has a number of staff with these qualifications. Thus, the team does not believe the fate of PPU should be judged according to whether or not it hires degree-trained economists.

The team therefore recommends an extension of USAID's support to the Unit although at a much lower level of investment and for a longer period of time than has been considered. We outline the nature of the proposed extension in section 3.4 and in the recommendations in section 3.5.

### **3.3 Implementation of Previous Recommendations**

The team was asked to address the extent to which the MPWWR and USAID have implemented the recommendations made in the 1985 mid-term review. In addition, the team reviewed the Record of Audit Findings (RAF) concerning PPU dated February 7, 1989. The team's responses to the points raised in these two documents are found in Appendix N.

The mid-term review raised questions about the need for more emphasis on prefeasibility studies which the team has noted is being given, and stated that training and report preparation should be conducted separately which the Team and PPU strongly believe is unwise because it would remove the basis for on-the-job training. The other points in the review have been dealt with elsewhere in this report.

The RAF raised the central question of PPU--its continued search for sustainability--which has been discussed in the preceding section of this report. In addition, the RAF inquired whether PPU should or should not take up RIIP studies. The team notes that proposed RIIP activities are still in a fluid state

and hence not amenable to feasibility analysis. They are suitable as technical water management studies, but other units of the Ministry are better suited to carry them out. In future, however, the team expect PPU to have an appropriate role in conducting prefeasibility studies on a limited number of RIIP projects which are well defined.

### **3.4 Recommended Features of a Proposed Extension of PPU Support**

The team believes that the proposed extension of support to PPU should be guided by three principles: limited consulting support, adequate time, and strong Ministry support in resolving the key issues identified in this report.

#### **3.4.1 Limited Consulting Support**

The team believes that a major commitment of expatriate advisors would perpetuate the Unit's dependence upon those advisors. One multidisciplinary advisor whose primary responsibility is to support the Ministry staff is optimum. By itself, this would severely impair the ability of the Unit to produce high-quality reports, but that could be addressed by short-term consultants called by PPU on a project-by-project basis.

When a unit such as PPU is assisted by one expatriate advisor, it is extremely important to secure the services of a suitable person. The selection is sufficiently critical that the selection process should include bringing shortlisted candidates to Cairo for interview by a panel to include representatives of the Ministry, PPU, and USAID.

The advisor's technical background should be multidisciplinary, with degree-training in economics, engineering, agricultural science, or other related fields. Although cases can be made on behalf of one or another of these fields, the search should not be limited to any one field because of the trade-offs among these fields and because of the scarcity of candidates with the right orientation.

The personal qualifications of the advisor are equally important. He/she should, for example, help the Unit relate more closely to other Ministry agencies, stimulate new assignments, assist the Project Director as requested, and in other ways help define the Unit's existence within a larger institutional context.

The advisor would be expected to express his/her expertise in high-quality analysis much as a professor would with graduate students, by going over concepts, methodologies, data, and drafts page by page. Unlike the common perception of professors, however, the advisor must welcome and thrive in the real world. A draft scope of work for the advisor is attached as Appendix O.

The team considered recommending two advisors instead of one but does not believe that the objective of promoting a sustainable PPU would be promoted by posting more than one advisor to it. Rather, a wide range of short-term consultants would be more effective and less costly than attempting to supply that expertise through a second full-time advisor.

Finding the right person is closely associated with the issue of identifying an appropriate organizational or contracting vehicle. Although we emphasize the professional and personal qualities of the advisor, it should be recognized that different contractors have more or less experience with the model proposed here. Some would provide a supportive structure to enhance the advisor's effectiveness, but many would not. Well-qualified backstop support would also have to be supplied by the contractor on a flexible basis.

These proposals represent more a shift of emphasis than a radical change in the relationship between PPU and its consultants. But it is a critical shift with complex and subtle effects. The team therefore thinks it would be best for the Unit to participate in the selection of an advisor who has not formerly worked with it.

### **3.4.2 Duration of the Proposed Extension**

The Team believes that the two year extension requested by the Chairman Irrigation will be too short for the Unit to establish itself fully. The team recommend three years. But USAID and the Ministry should understand that even three years will not end the need for outside assistance to PPU. Especially important will be consulting support from economists, environmental and agricultural scientists, and other specialists.

The team was often asked whether it could estimate some date in the future when this assistance would no longer be needed. The team believes an indefinite but limited association with outside consultants will be in PPU's best interests and that the Unit may be considered sustainable while

availing of such resources. USAID should consider the implications of long-term but limited support to PPU and intimate as early as possible whether it will continue the relationship.

### **3.4.3 Ministry Support**

The team was impressed with the Ministry's expressions of interest in continuing support to PPU. Nevertheless there are serious constraints which PPU faces within MPWWR. The Ministry will have to resolve the key issues raised in this report if PPU is to be fully viable during the proposed extension.

### **3.4.4 Fallback Positions**

The team considered seriously two fallback positions for continued support to PPU in the event that either USAID or the Ministry is not prepared to provide support along the above-mentioned lines. Both involve changing the mandate of PPU.

The first is a proposal to change the nature of the Unit's outputs from that of high-quality, English-language studies suitable for international consideration to that of local analysis, in Arabic, suitable for Ministry purposes. This change in mandate could be useful to the Ministry and might be easier to staff in view of the additional constraint imposed by English proficiency. But the team believes that the original purpose of PPU to provide high-quality reports, in English, to international standards was and is an appropriate and useful objective and that the Ministry has other offices in its Planning Sector capable of the level indicated by this fallback position.

The second fallback position is to change PPU's mandate from that of conducting feasibility studies itself to that of a contracting unit which would supervise others in doing the studies. This position would alleviate the Unit of its problems in data collection and would change, although not necessarily ease, its problems of staffing. It would rely on private sector firms to conduct the studies under contract.

Although there is merit in this concept of PPU, it is not consistent with the original objective of institutionalizing the capacity to conduct such studies within the Ministry. Also, it shifts the burden of data collection and analysis from PPU to private firms which may be no better positioned to deal with them and which the Ministry would be reluctant to assist.

Although some private firms with the required capacity do exist in Egypt, Ministry experience in such contracting has not been encouraging. The firms are more expensive than an internal Ministry unit, they need constant supervision of a technical as well as administrative nature, and they face incentives to produce repetitive reports of successive studies using standard methodologies and data. Further, the Ministry could activate the contracting mechanism with or without PPU, although its officials did not indicate to the team an interest in doing so.

In conclusion, both fallback positions reflect modified mandates in response to the problems posed in attempting to build a sustainable PPU. These problems are known and not insuperable, however, and are more likely to be resolved than new and unspecified problems associated with a changed mandate. These positions should thus be taken up at the time of the next major evaluation of PPU after three years of effort directed at establishing a more sustainable unit.

### 3.4.5 Conclusion

The team has concluded that an extension of support to PPU is warranted by the quality of its outputs, its value to the Ministry, and the likelihood of losing the benefit from most of the previous investment if no further support is forthcoming. But this support should be at a much lower level than that of the original project and for an extended period of time.

If this extended support is granted, PPU should be evaluated again against clear expectations. These three considerations should be central to that evaluation:

- Output: Has there been reasonable quality and quantity of studies from the Unit, and have they been in English?
- Have officials of the Ministry or the Unit itself made decisions important to its effectiveness, for example in specifying the nature of short-term consultants needed and calling them? Or have important decisions been avoided.
- Have at least three senior PPU staff been on duty to supervise the studies throughout most of the period of the proposed extension?

### 3.5 Recommendations Regarding PPU

The team recommends that USAID respond favorably to the Ministry's request for an extension of the PPU Component of IMS, provided that all three of the following conditions are met by the time current project support expires:

- the MPWWR commits itself to assigning the Unit an ongoing supply of appropriate studies during the three-year extension;
- the Unit has Ministry authorization and budget to assign Senior (Rank 1) Staff directly to the Unit; and
- there are at least three Senior (Rank 1) Ministry staff capable of leading feasibility study teams and free to spend at least 75 percent of their time on substantive work.

Assuming that this recommendation is fully met, the team recommends that USAID provide technical assistance to the Unit for a three-year extension, at a level of one full-time multidisciplinary advisor and associated costs, and additional short-term TA as needed. USAID ought also to convey to the Ministry not later than December 1990 its expectation of providing further technical assistance support beyond the three-year extension and at about the same level as that of the extension.

In the event that USAID is not prepared to convey this expectation by December 1990, the team recommends that the Ministry either explore with other sources of international support the possibilities of acquiring the technical assistance or revise the Unit's mandate consistent with an Arabic-language capability and studies suitable for service to the Ministry.

The team also recommends that, during the proposed extension of the project, MPWWR improve the Unit's efficiency by:

- taking those actions necessary to fully staff the Unit with appropriate degree-trained professionals;
- providing per diem of approximately LE 20 per day (LE 8 per day without hotels) to permit Unit staff to make overnight trips to the field for data collection purposes;

- arranging for training of PPU staff in the tools used in estimating costs and revenues for feasibility analysis. This training should be focused on one or more of the senior Ministry staff assigned to lead possibility studies as recommended above regardless of their degree training;
- continuing to emphasize off-shore, classroom, and on-the-job technical training. Investigate using a bonding system to retain staff trained abroad. Review all possible training opportunities with the Training and Manpower Development Division to achieve optimum training for PPU staff;
- continuing to provide and to require contracted classroom training and on-the-job training in the English language;
- instructing the Unit to make use of both national and international technical writers (according to the type of work required) in the preparation of drafts and technical reports in English and Arabic and accountants currently with the Unit to assist with routine administrative accounting duties;
- asking USAID for support in the proposed extension to purchase two microcomputers which can interface with PPU's DEC computer, and to purchase other support equipment as needed to replace worn-out equipment; and
- authorizing the Unit to perform studies and provide computer services to other ministries for a reasonable fee, with revenues to be used to strengthen PPU staff salaries.

# 4

## FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

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### 4.1 Structural Replacement

The team believes that the SR Component of IMS has been effective in replacing structures in the Nile irrigation system as proposed in the two Project Papers. The pace of construction started slowly under the project but has increased markedly since 1985. The revised estimate of the number of structures that remain in need of replacement by the end of the current project is 2,000; these are to be completed under a two-year extension to the project endorsed by the team.

#### 4.1.1 Contract Administration

##### Prequalification of Contractors

Contractors are normally rated by reviewing their completion reports on previous work. The Ministry has drafted separate prequalification procedures for three classes of contractors according to size of contract.

Prequalification requirements should have flexibility to encourage participation of smaller contractors. Though none of those procedures have been used yet, they are a reasonable basis for prequalifying SR contractors.

##### Recommendations:

- The Ministry should adopt and implement these draft procedures.
- The Ministry should maintain and circulate a list of all prequalified contractors.
- The Ministry should maintain and circulate a list of all unqualified contractors.

##### Bonds

Currently contractors pay one percent bid bonds and five percent performance bonds. Nevertheless, there are a significant number of contracts six or more months behind schedule indicating that Ministry control over contractors is inadequate.

##### Recommendation:

- The Ministry should increase performance bonds to ten percent.

##### Delays in Completing Contracts

Delays in executing contracts are a serious problem in some directorates but not in others. Contractors do not usually provide a schedule of implementation, and penalties for late completion are seldom collected.

##### Recommendations:

- The Ministry should prepare a record of contractor performance against completion dates.
- The Ministry should consider renegotiating or declaring forfeited any contract whose work is incomplete six or more months after its completion date, to circulate a list of those contractors, and to declare them ineligible for further participation in SR.
- The Ministry should collect authorized penalties from contractors.
- Contractors should provide execution schedules with each bid.

#### **4.1.2 Public Company Participation in SR**

The 1982 Project Paper made provision for participation of public companies but the 1987 Project Paper excludes them. PIL 82 nevertheless allows public company participation with some limitations. On the whole such companies have performed better than private companies in SR work and have introduced new construction materials and technologies. The SR project will be further delayed if public companies do not participate. There has been considerable growth in capacity and interest of private contractors and therefore public companies are not likely to displace private contractors for the majority of contracts because of the small size and remote location of the work.

Recommendations:

- USAID should make both public and private companies eligible for SR participation under the prequalification procedures and on an equal basis.
- USAID should seek to waive any legal impediments which may exist regarding the above.

#### **4.1.3 Supervision and Inspection by the Directorates**

Field supervision is relatively weak, and Ministry engineers should spend more time supervising. However to date adequate safeguards in the project have protected the quality objectives of the project. Salary incentives would strengthen engineers' commitment to carry out objectives of the project more effectively. Currently salary incentives to SR engineers are paid in lieu of and not in addition to Ministry bonuses paid to other staff. Salary incentives based on a percentage of contracted work have precedent in the Ministry.

Recommendations:

- The Ministry should maintain a list of engineers assigned to each SR contract.
- USAID should review whether it can reimburse part of the construction costs when a percent of contracted work above a standard deduction is used for salary incentives.

- The Ministry of International Cooperation and MPWWR should ask USAID to double the use of special account funds.
- MPWWR should confirm that SR salary incentives will be added to all other bonuses paid by the Ministry to its staff.

#### **4.1.4 Inventory of Structures**

An inventory of structures is not available in one place and is important to the success of the project.

Recommendation:

- The Ministry should carry out a detailed inventory of all structures.

#### **4.1.5 Selection Criteria**

Under SR most directorates use good judgement in selecting structures to replace and results have led to some new structures, enlarged hydraulic capacity, and inclusion of bridges. Several selection criteria have been proposed and tried.

Recommendation:

- USAID and the Ministry should consider the proposed criteria.

#### **4.1.6 Field Test Laboratories**

Field test laboratory equipment has been delivered but the laboratories are not yet operational. They would be useful to the project and also for work proposed under RIIP and were at one stage considered for RIIP.

Recommendations:

- The Ministry, with USAID concurrence should, transfer responsibility for siting, setting up, staffing, training, and operating the labs to the RIIP Project Director.
- The Ministry should make the labs available to test SR materials.

#### **4.1.7 Role of the Technical Advisor**

The Technical Advisor has been effective.

**Recommendation:**

- The Ministry and USAID should retain him for the proposed extension.

**4.1.8 Training under SR**

Most of the training carried out by the Technical Advisor on-the-job and through lectures has been effective.

**Recommendation:**

- The Ministry should assign two staff members to assist in training.

**4.1.9 Proposed Extension to the SR Project**

There are approximately 2,000 more structures which need to be replaced and The Ministry has requested a two-year extension. The construction pace has increased markedly since 1985 and the benefits of the project are observed in Ministry procedures beyond the scope of SR.

**Recommendation:**

- Assistance should be extended until 21 Sept 1991 along the lines of the current project.

**4.2 Project Preparation Unit**

The PPU staff have completed 11 high-quality feasibility studies and have benefited from various forms of training provided under the project. The Unit is not yet self sustaining in the absence of outside technical assistance and is unlikely to become sustainable in that sense. With limited consulting assistance, however, it can continue its primary function of producing strong reports while establishing itself more securely within the Ministry.

**Recommendation:**

- The team recommends a three-year extension of USAID support to PPU and a commitment in principle of further support beyond that period.

**4.2.1 Mandate for PPU**

PPU has completed feasibility studies for 11 projects of which most are built or under construction. PPU has also, done special studies for in-country projects,

and capabilities of PPU staff have improved with experience.

**Recommendations:**

- PPU should follow its original mandate to produce feasibility and prefeasibility reports in English.
- The Unit should not be expected to conduct water management studies.
- The Unit should not be expected to carry out its mandate at this time in the absence of all expatriate support.

**4.2.2 Support from the Ministry**

**Staffing Issues**

Higher management in the Ministry is supportive of PPU but the support is frequently expressed inefficiently. The Unit has been consistently understaffed, and new personnel are rarely experienced. Many staff have inappropriate degree training, and the Unit does not have an economist on its staff. PPU has problems of staff turnover and absenteeism and has no staff positions of its own; all staff are seconded from other Ministry agencies.

The Ministry offers lower salaries than the private sector, but better security and chances for advancement. Because PPU is so small it offers limited opportunities for promotion within the Unit. Staffing problems have exacerbated the problem of institutionalizing the Unit. Expatriate technical advisors have spent too much time meeting study deadlines at the expense of training.

**Recommendations:**

- The Ministry should appoint a minimum of two, and preferably three, senior (Rank 1) staff capable of leading feasibility study teams and free to spend at least 75 percent of their time on substantive work in the Unit.
- The Ministry should fully staff the unit with professionals with appropriate degree training.
- The Ministry should arrange to train staff in the tools used in estimating costs and revenues for feasibility analysis. This training should be focused on one or more of the senior staff defined above, regardless of their degree training.

- The Ministry should authorize and provide budget support for PPU to hold some staff positions within the Unit.

#### **Data Collection and Processing**

PPU has not been efficient in collecting data and PPU staff have had difficulty gathering secondary data from other government agencies. They have not made many overnight trips for data collection due to extremely low per diem. In addition, junior PPU staff have not received enough training in data collection procedures and analysis and sometimes collect insufficient or incorrect data. Data collection problems have slowed the feasibility study process and forced the expatriate advisors to spend too much time on this function at the expense of training.

Recommendations:

- The Ministry should pay per diem of LE 20/day (LE 5/day without hotels).
- The Ministry should implement the recommendations in the training section of this report.

#### **Assignment of Studies**

PPU has been underemployed over the last 12 to 18 months and although the Ministry supports the Unit it does not have a well organized mechanism to allocate studies to PPU.

Recommendations:

- The Ministry should give the responsibility for assigning studies to an appropriate body or committee.
- That Ministry committee should provide a continuous pipeline of appropriate studies to the Unit.

#### **4.2.3 Support from USAID**

Over 85 percent of USAID's technical support to PPU has been in the form of technical advisory services. The expatriate technical staff have been well qualified and have produced high-quality reports on tight schedules, but this has reduced their time spent on training.

USAID has provided equipment valued at \$312,000 which is now largely depreciated. PPU has no microcomputers to interface with the PPU computer; this decreases the utility of the PPU computer

Recommendations:

- USAID and the Ministry should procure two microcomputers to interface with the Unit's original computer.
- They should review existing equipment and replace where necessary.
- USAID should support training recommendations of this report.

#### **4.2.4 Training of PPU Staff in English**

Despite their improvements, PPU staff do not yet have enough training in English to prepare reports in English. PPU staff can only gain this capability through focused training and contracted courses.

Recommendations:

- The Ministry should continue to provide and require contracted classroom and on-the-job training in the English language.
- PPU should use national and international technical writers.

#### **4.2.5 Technical Training of PPU Staff**

PPU staff have received off-shore, on-shore and on-the-job training, including 42 months of off-shore training. Closely coordinated on-the-job training has effectively helped transfer experience and knowledge to the Unit and off-shore training is an important attraction to staff. However, while training has been generally appropriate but staff turnover has greatly reduced its effect.

Recommendations:

- PPU should continue to provide off-shore, classroom, and on-the-job training.
- The Ministry should investigate bonding staff to retain those trained abroad.

- PPU should review all possible training opportunities with the Training and Manpower Development Division.

#### **4.2.6 Proposal for Extending PPU Component**

The Ministry requested a two year extension of USAID support. This support will be necessary for PPU to continue as an effective unit which it cannot do without. However, it can continue to improve and produce with reduced assistance. The Unit should not be expected to be self-sustaining at this stage of development and will need consulting assistance well into the future.

##### **Recommendations:**

- USAID and the Ministry should understand that "sustainable" should not preclude all assistance; rather, limited assistance should continue to be available according to the needs of PPU.
- USAID should grant an extension as proposed in this report, subject to Limited consulting support for a three-year period and the Ministry is providing the following to the Unit prior to contact expiration in September 1989:
  - A mechanism to provide a pipeline of assigned studies;
  - An Authorized staff and budget; and
  - Two or three Senior Ministry staff who spend 75 percent of their time on substantive work.

**Appendix A. Scope of Work for Evaluation of the Project Preparation Department and Structural Replacement Components of the Irrigation Management Systems Project (263-0132)**

**A. ACTIVITY TO BE EVALUATED**

Project: Irrigation Management Systems Project (263-0132)

Subactivity: Project Preparation Department and Structural Replacement Components

Implementing Agency: Ministry of Public Works and Water Resources (MPWWR)

Grant Amount: \$340 Million

Grant Period: September 1981-September 1991

The purpose of the Project is to improve the operating efficiency of the total irrigation system and strengthen the Ministry's operation, maintenance and planning capabilities.

**B. PURPOSE OF THE EVALUATION**

This evaluation will focus on the Project Preparation Department (PPD) and the Structure Replacement (SR) of the Irrigation Management Systems (IMS) project. The evaluation is intended to assess progress made by these two project components in attaining defined objectives. The evaluation will:

- assess PPD's progress toward becoming a self-reliant irrigation and drainage project planning unit;
- assess SR's experience in rehabilitating irrigation structures; and
- make recommendations about the nature of future support for PPD and SR after contract expiration in July 1989.

The evaluation results will be used by MPWWR and USAID in determining the duration and nature of future project support commitments.

**C. BACKGROUND**

The overall IMS project represents the results of extensive collaboration between the Ministry of Public Works and Water Resources (MPWWR), World Bank, and USAID in the summer/fall of 1979. The broad areas requiring assistance were identified, a project was developed, and an agreement signed on September 22, 1981. Given the inadequacy of funds available within the MPWWR for

maintenance and replacement, the Project undertook a large program of structural replacement to address the on-going deterioration of irrigation structures while also reducing the replacement backlog. An institution building effort was also initiated to develop the work force to carry out the MPWWR's increasingly complex responsibilities.

More specifically, the original project included the following major activities:

1. Structure Replacement.
2. Operation and Maintenance Planning for Gharbia Directorate.
3. Project Preparation Department.
4. North Zifta System Redesign Feasibility Study.
5. Training and Manpower Development Institute.
6. General Consulting Services.
7. Commodities and Procurement Assistance.

This evaluation is concerned with components one and three listed above.

Project Preparation Department (PPD). The objective was to develop a project planning unit in the MPWWR with the capacity to undertake pre-investment planning and project preparation that will satisfy the requirements of international financing agencies and will turn out full report documents with all necessary materials prepared and produced within the Unit. The development of the PPD is intended to make itself reliant in planning irrigation and drainage projects, and to develop a cadre of staff trained in project preparation skills. Also, to train Ministry personnel who are assigned to PPD.

A technical assistance contract was executed with consultants Harza Engineering Company and subcontractor Robert R. Nathan Associates to provide resident and short-term advisors. Project commodities including vehicles, office equipment, and computer system were procured. In-country and offshore training are provided although primary emphasis is on-the-job training. Project support was scheduled for four years but was extended to 6.5 years with a gradual reduction in the number of technical advisors.

A mid-term evaluation of the IMS project including the PPD component was made in 1985. That evaluation stressed the desirability of improved project selection by means of pre-feasibility studies and recommended extension of technical advisory services to 31 July 1989.

Structure Replacement (SR). The objective of the SR Program is to reduce the backlog of small and medium size irrigation structures that require replacement because of deterioration due to age or deferred maintenance. USAID is reimbursing MPWWR for 80 percent of their SR expenditure. One technical advisor was provided under the Harza Contract. The emphasis in his activities is on improved construction management and construction quality control.

The Program was initiated in five pilot directorates with funding of \$23 million. The first appraisal of the SR component was completed in June, 1983. A second appraisal/evaluation was performed in December, 1984. The findings indicated that the MPWWR, with the assistance of the contractor, has demonstrated a capacity to complete a national program of rehabilitation of irrigation structures. The IMS Project was amended in 1985 to expand the SR Program to all Irrigation Directorates and USAID funding was increased to \$70 million.

Under the expanded SR Program, Harza has also subcontracted with local engineering firms to provide assistance to the SR Program. Through June, 1988, the MPWWR has completed about 8,000 structures with about 2,000 under construction.

#### D. EVALUATION-KEY ITEMS FOR ANALYSIS

The evaluation will be carried out over a period of about one month in Egypt. The evaluation team will make detailed site visits to PPD, SR construction sites, review MPWWR activities and records, and USAID project records. The evaluation will include in its analysis an assessment of the following concerns:

##### Project-Preparation Department

1. The quality of project inputs. Have the technical assistance, training, and commodities been of satisfactory quality and effectiveness? Has the MPWWR provided sufficient and appropriate staff and project support?
2. The quality of project outputs. Have the project plans prepared by the PPD been at a level acceptable to the international financing community? Has the goal of adequate level of self sufficiency of the PPD been achieved in technical/professional skills? in institutional development?
3. Mid-term review recommendations. Have the PPD and MPWWR implemented the recommendations made in the 1985 mid-term review and what is their status?
4. Identify the key progress indicators and impacts this activity has had on Egyptian development.

The output of the evaluation should include recommendations as to the nature of project support, if any, to be given to the PPD at the end of the consultant's contract on 31 July 1989.

## Structure Replacement

1. The quality of project inputs. Has the MPWWR provided appropriate management and monitoring of selection of works to be replaced, design and specifications, selection of contractors, quality of construction, program planning and budgeting? Has the technical assistance been effective in improving construction management and quality control?
2. The quality of project outputs. Do the facilities constructed in the program meet appropriate standards of design and construction? Have construction management and quality control improved? Is the program meeting scheduling and budgeting targets?
3. Mid-term review recommendations. Have the recommendations of the 1985 mid-term review been implemented and what is their status?
4. Review system being used by the MPWWR to mark USAID financed structures and bring up to date an inventory of structures in each directorate, comment on progress and recommend, if appropriate, a simplified method to improve the systems being used.
5. Identify the key progress indicators and impacts this activity has had on Egyptian development.

The output of the evaluation should include recommendations as to the nature of project support (re-continuing construction, technical support, etc.) that should be given to the SR Program beyond 31 July 1989.

## E. TEAM COMPOSITION, RESPONSIBILITIES, AND QUALIFICATIONS

The evaluation will be conducted over a one month period, beginning in late CY 1988 or early CY 1989, by three expatriate specialists working with MPWWR staff, making up a team with a combination of expertise in project planning, construction management and institutional development. Evaluators will be expected to submit a one-page summary of findings prior to the oral debriefings to the Mission and the MPWWR, and a draft report at least five days before their departure date. Based on the comments and questions raised at the debriefings and in response to the draft report, the team will revise and complete its final report to be submitted to USAID/Cairo prior to the departure of the team leader from Egypt.

The qualifications of team members follow:

Irrigation Project Planner, American, Team Leader:

Qualifications

- Candidates for this position must have a B.S. degree in civil engineering (graduate degree preferred) and 20 years of direct experience in planning of irrigation and drainage projects that relate directly to the objectives of the two components.
- Experience and/or training in applied economics preparing irrigation project plans and procedures and environmental analysis is essential.
- Capability to work effectively with multi-national, multi-disciplinary staff and senior level personnel, engineers, agronomists, economists, environmentalists, and related professions is necessary.
- Must be conversant with AID and IDA procedures and requirements for project preparation and feasibility.
- Experience as a head of an irrigation planning project is required.
- Experience in developing countries is preferable.
- Experience with irrigation system mathematical models will be an asset.
- Must have prepared significant feasibility studies and have experience in international funding.

Design & Materials Engineer, American, Team Member

Qualifications

- Candidates for this position must have a B.S. degree in civil engineering (graduate degree preferred) and 15 years of direct experience in irrigation and drainage projects design and implementation.
- Experience and/or training in construction of irrigation structures.
- Must have extensive experience with specifications and use of materials utilized in construction of hydraulic structures.

- Capability to work effectively with a multi-national, multi-disciplinary staff and senior level personnel is necessary.
- Broad experience in water resources management in developing countries.

Planning Engineer, American, Team Member

Qualifications

- Candidates for this position must have a B.S. degree in engineering (graduate degree preferred) with strong background in economics and 20 years of direct experience in irrigation and drainage project planning.
- Must have conducted studies and analysis of irrigation and drainage projects. (financial, economic, social, environmental, etc.)
- Experience and/or training in operation and maintenance irrigation systems.
- Experience and training in administration and management of irrigation projects.
- Broad experience in water resources management in developing countries is preferable.
- Capability to work effectively with a multi-national, multi-disciplinary staff and senior level officials is necessary.

Irrigation Planning, Construction, and Operations Engineer(s), Egyptian (to be provided by MPWWR)

Education

B.S. degree in civil or mechanical engineering or equivalent.

Experience

15 years of professional level experience in the design, construction, and operation and maintenance of irrigation delivery systems in Egypt or other developing countries.

F. METHODS AND PROCEDURES

To initiate the evaluation the team will meet to develop a process for carrying out the evaluation within the time frame allotted.

The team will meet with MPWWR and USAID staff to explain the process and receive guidance on proceeding with the evaluation.

The team will review the documents available in the MPWWR and/or USAID/Cairo to include: Irrigation Management Systems Project Paper (as amended), previous project evaluations, and other documentation and records available in the MPWWR and USAID/Cairo.

The team will arrange for interviews, site visits, and other follow-up as necessary to meet the terms of the statement of work.

The team will prepare an evaluation report providing findings, conclusions and recommendations responsive to the terms of the Scope of Work above, based on the analysis of information obtained while carrying out the work.

#### G. Reporting Requirements

1. The evaluation team will brief the MPWWR and USAID staff mid-way through the evaluation on progress to-date.
2. The team will submit a draft report to the MPWWR and USAID three weeks after they commence work. These agencies will make every effort to provide written comments on the draft within one week of receipt of the draft report. The final report will take these comments into consideration.
3. The team will submit the final evaluation report to the MPWWR and USAID within one week of receiving written comments on the draft report from the MPWWR and USAID.
4. The format for the report should be as follows:
  - Executive Summary, in narrative form, not to exceed three single-spaced pages.
  - Listing of Major Conclusions and Recommendations. This section should briefly summarize the most important conclusions and recommendations in the evaluation, in bulletized or matrix format.
  - Main Report, i.e., information and evidence on which conclusions and recommendations are based. The information obtained through the required tasks, described above, should be qualitatively and quantitatively analyzed, and integrated to respond directly to the key questions in the Statement of Work. The report should not exceed thirty double-space or fifteen single-spaced pages.

- Annexes, as appropriate, including the evaluation Scope of Work, a bibliography of documents consulted, a list of individuals interviewed and their agency affiliation, and other information considered appropriate by the team.
5. The team will conduct debriefings for the MPWWR and USAID personnel to present their major findings, conclusions and recommendations.

## Appendix B. List of Key Persons Contacted

(Listed in order contacted)

<u>Name</u>	<u>Title and Affiliation</u>
Mr. Joe Carmack	USAID/AGR/CAIRO
Eng. Ali Khalifa	USAID/AGR/CAIRO
Mr. Dave Smith	USAID/AGR/CAIRO
Mr. Harry Proctor	USAID/AGR/CAIRO
Ms. Lottie Erikson	USAID/CAIRO
Mr. Shawkey Boctor	USAID/AGR/CAIRO
Eng. Arteen Halim	Undersecretary, MPWWR, Minia
Eng. Saad Adel	Director General, MPWWR, Projects, Minia
Eng. Adel Hashem	Head of Design Office, MPWWR, Gharbia
Eng. Abdel Ziftawi	Undersecretary, MPWWR, Gharbia
Eng. Ahmed Hegag	Office Engineer, MPWWR, Gharbia
Eng. Atef Kashif	Asst. Dir. of Works, MPWWR, Gharbia
Eng. Essam El Sheikh	Director General PPU, MPWWR
Eng. Loucy H. Boulos	Engineering Section Head, PPU, MPWWR
Eng. Essam El Samanudi	Acting Sec. Head, Data Systems, PPU, MPWWR
Dr. Rufus Hughes	Economist with PPU, R. Nathan Associates
Dr. David Fonken	Engineer with PPU, Harza Engineering
Eng. Rizk Menshawi	Senior Planning Engineer, PPU, MPWWR
Abd El-Hamid I. Fahim	Director General, Training, MPWWR
Jean Kamel Abd-el-Sayed	Consultant, Training & Manpower, MPWWR
Sam Shigetoni	Advisor, TMD, USAID
Eng. Ahmed Mazzen	Chairman, Irrigation Department, MPWWR
Eng. M. Nassir Ezzat	Dep. Chairman, Irrigation Department, MPWWR
Eng. Hussain Shoman	Deputy Director RIIP, MPWWR
Eng. Mohammad Safi	Undersecretary, MPWWR, Kafir El Sheikh
Eng. Magdi Kashif	Dir. General, Irrig, MPWWR, Kafir El
Sheikh Eng. Zaki Mena	Dir. General, Proj, MPWWR, Kafir El Sheikh
Mr. Mohammad El Dahshani	Contractor, Kafir El Sheikh
Eng. A. Alim Okasha	Inspector, MPWWR, Kafir El Sheikh
Eng. Ahmed H. El Sawaf	Undersec. and Proj Dir SR & RIIP, MPWWR
Eng. Viola	Asst. Dir of Works, MPWWR, Minia
Dr. Adel A. El Magid	Senior Undersecretary, MPWWR, Drainage
Eng. Nabil M. Sulaiman	Director of Works, MPWWR, SR
Dr. Mahmoud Abu Zaid	Chairman, Water Resources Center, MPWWR
Eng. Evan Kreith	Technical Advisor SR, Harza Engineering
Dr. David Nygaard	Representative, Ford Foundation, Egypt
Eng. Ahmad Hassan Hamid	Undersecretary, MPWWR, Aswan
Eng. Ahmad Hassanian Wahab	Chairman, MPWWR, Aswan High Dam and Reservoir Authority

### Appendix C. List of Reports Consulted

1. Reconnaissance Study for Constructing a New Head Regulator on the Ibrahimia, 1988, Project Preparation Unit.
2. Mid-Term Evaluation Report of the Irrigation Management System Project, W.W. Shaner, et. al., September 1985, USAID.
3. Annual Report 1987, Ministry of Public Works and Water Resources, Water Research Center, Professional Development Project.
4. Record of Audit Finding, Review of Irrigation Management System Project, USAID, Office of the Regional Inspector General/Audit, Feb. 7, 1989.
5. Agricultural Briefing Paper, USAID, Agricultural Resources Directorate, Cairo, Egypt, December 1988.
6. Strategies for Irrigation Development, WMS Report 42, USAID, January 1986.
7. Project Paper, Egypt: Irrigation Management Systems, USAID, Feb. 3, 1987.
8. Technology for Construction and Maintenance of Irrigation and Drainage Works in Egypt: A Preliminary Assessment, M. H. Amer, Ministry of Irrigation, Cairo, September, 1980.
9. Project Planning Report - Drainage Project 5, Main Report, Ministry of Irrigation, December 1984.
10. Channel Maintenance Plan - Inception Report, Project Preparation Department, July 1984.
11. Conservation of Nile Outflows to the Mediterranean - A Preliminary Report, Ministry of Irrigation, October 1985.
12. Report on the Findings of the Irrigation Management USAID Design Team: Egyptian Irrigation Systems Operation, Maintenance, and Structural Replacement, CH2M Hill International, May 1981.
13. Channel Maintenance Plan - A Planning Report, Ministry of Irrigation, November 1985.
14. Economic Evaluation of New Naga Hammadi Lock, Project Preparation Department, Ministry of Irrigation, Oct. 1986.
15. Feasibility of the New Esna Barrage, Main Report and Appendices, Project Preparation Department, Sept. 1986.

16. Pump Rehabilitation Project 2, Main Report and Appendices, Project Preparation Department and Mechanical and Electrical Department, Feb. 1986.
17. El Salaam Canal Project-Second Phase-Preliminary Planning and Prefeasibility Study, Project Preparation Department, Aug. 1987
18. Irrigation Improvement Studies - Bahr El Gharag Project, Preliminary Report, Project Preparation Department, Dec. 1988.
19. Irrigation Improvement Studies - Bahr El Gharag Project, First Progress Report, Project Preparation Department, Jan. 1988.
20. Fayoum Projects, Main Report and Appendix, Project Preparation Department, March 1988.
21. Institutional Sustainability and Rural Development: Issues for Asia and the Near East in the 1990s; Arthur A. Goldsmith, University of Maryland, Prepared for USAID, Aug. 1988.

**Appendix D. List of Equipment Purchased under SR and PPU Projects**

<u>Description of Equipment</u>	<u>SR</u>	<u>PPU</u>
	(US dollars)	
Office Equipment	24,475	210,295
Professional Equipment	8,280	16,880
Training Equipment	-	2,925
Vehicles	<u>20,080</u>	<u>81,860</u>
Total	52,835	311,960

## Appendix E. Procedures for Prequalifying Contractors under SR

### EVALUATION AND CLASSIFICATION

OF

### CONSTRUCTION CONTRACTORS

MINISTRY OF PUBLIC WORKS AND WATER RESOURCES

REGIONAL IRRIGATION IMPROVEMENT PROJECT

#### INTRODUCTION:

The Structural, Replacement and Irrigation Improvement projects is in charge of improving, replacing and reconstructing all the structures along the water courses in all levels.

These structures are mainly Bridges, Regulators, Intakes, Gates, Syphons, Aqueducts, Tail escapes and Weirs. These structures differ in size and are constructed either from Reinforced Concrete, Masonry, Pipes, Steel or Timber.

The first priority in its program is to the improvement, replacement and reconstruction of the structures on small canals and branches which serve improving and increasing the efficiency of the On-Farm irrigation, as bigger and main canals are always consuming the majority of the budget allocated leaving a small portion for the small canals which require reshaping, dredging and periodic weed control according to a certain schedule.

During the follow-up of the execution, it was found that big contractors show no interest not only because of the small valued works, but also because they are scattered on large areas.

Only small contractors (private sector) show their interest in these works and the department is obliged to accept their tenders as long as they fulfill the requirements. It was obvious that they perform the work in an acceptable way, but not to the perfect measures of the technical standards and the 5% guarantee bond of the value of works is not enough.

The Structural Replacement and Irrigation Improvement projects found it necessary to establish a good system which gives the guarantee to perform the work in good satisfactory technical performance and within the financial rules.

## I. PROBLEMS AND DIFFICULTIES:

Field visits to sites in Sharkia and Kalubia governorates discussions with concerned engineers in charge of the execution of the Improvement Projects, listening to their opinions, studying the drawings and the technical specifications written for the existing and under construction structures, gave a full view about contractors and their eligibility to perform and helped identifying the problems and the difficulties as follows:

- A. The contractors fail to perform the work on a good technical standard because of the lack in financial situation and technical experience.
- B. The scattered structures within the area make it difficult to follow up, supervise and check the quality of works.
- C. The lack of modern devices and labs which helps the check up of materials and quality during the follow up.
- D. It is not clear to the engineers supervising the work to what extent they could accept the works and what percentage they could accept otherwise penalties should be applied to contractors.
- E. Rewarding good contractors who perform their work in good quality and in due time should be considered.
- F. The 5% guarantee bond is not sufficient to assure high quality performance and good financial situation of the contractors.
- G. The responsibility of performing the work is only on the burden of the MOI engineer and not his assistants, the responsibility should be shared with them.

## II. SOLUTIONS:

### A. The Choice of Contractors:

1. To be sure to assign the works to qualified contractors the following should be considered:
  - a. Tendering the works among contractors known of their eligible performance, good financial situation and previous experience.
  - b. They should be classified according to their qualification which could be defined when filling a special form APPENDIX 1a, 1b which will be available at the department.

c. In order to give more chance for the choice of contractors their registration should be covering a geographical area covering a number of governorates and not for contractors in a single governorate.

2. The contractors could be representing the following areas:

a. East Delta area covering contractors in governorates Kaliobia, Sharkia, Dakahlia, Port Said, Ismailia, Damietta and Suez.

b. Middle Delta area covering Gharbia, Menufia and kafr El-Shiekh.

c. West Delta area covering Behara, Alexandria and Matrouh.

d. Middle Egypt covering Giza, Beni Suef, Eayoum and Minia.

e. Upper Egypt covering Assuit, Sohag, Kena and Aswan.

**B. Evaluating and Classifying Contractors:**

1. Contractors should be classified according to their financial capabilities and technical eligibility which would become clear after filling the form APPENDIX 1a, 1b.

2. The contractors can be classified into the following categories:

- I - Big contractors: For all levels of works.
- II - General contractors.

Class A: For works not exceeding 1,500,000 L.E.

Class B: For works not exceeding 400,000 L.E.

Class C: For works not exceeding 100,000 L.E.

3. These categories shall be based on:

- a. Capital and liquid money.
- b. Equipment owned.
- c. Qualification of staff.
- d. Previous experience.

4. This is to be as follows:

- a. Big Contractors - who are capable of performing big constructions on main canals such as bridges, barrages and canal lining for all magnitudes of work.

Capital: not less than 1,000,000 L.E.

Liquid Money: not less than 250,000 L.E.

Equipment: Timber, metallic scaffoldings, earth moving equipment, batch plants, mobile mixers, dumpers, water tanks, trucks, canal lining equipment, deep well systems, pumps, generating sets, welding sets, sheet pile driving m/c, etc.

Technical Staff: Engineering department with specialized engineers in executing big structures, assistant engineers, technicians, supervisors and skilled workers.

Experience: Not less than ten years in general construction and an aggregate volume of construction works exceeding 15,000,000 L.E. during the last five years, of which 20% must be in water development area.

- b. General contractors - These are to be classified as follows:

- Contractors of class A: for large construction works not exceeding 1,500,000 L.E.

Capital: more than 250,000 L.E.

Liquid Money: not less than 100,000 L.E.

Equipment: Mixers, 50 M3 of timber for scaffoldings, Tank trailers, Loaders, Tractors, Pumping equipment, sheet pile machines, welding sets, Generators, earth moving equipment, etc. (Owned and Rented)

Technical Staff: Engineering department with qualified engineers, Assistant engineers, Technical supervisors and skilled workers.

Experience: Execution of similar construction works of value not less than 250,000 L.E. for each

individual work for a period not less than 10 years in similar work.

- Contractors of class B: to perform works exceeding 400,000 L.E.

Capital: more than 150,000 L.E.

Liquid Money: not less than 30,000 L.E.

Equipment: Mixers, 30 M3 of timber for scaffoldings, Tank trailers, Pumping units, Welding sets, Generators, Tractors . . . (Owned or Rented).

Technical Staff: Professional Engineers, Assistants, Supervisors and Skilled workers.

Experience: Execution of similar construction works of value not less than 150,000 L.E. for each individual work for a period not less than 7 years in similar work.

- Contractors of class C: to perform works less than 100,000 L.E.

Capital: not less than 60,000 L.E.

Liquid Money: not less than 15,000 L.E.

Equipment: Mixers, 15 M3 of timber for scaffoldings, Tank trailers, pumping units.

Technical Staff: Professional engineer on site technicians and skilled workers.

Experience: Execution of similar works of value not less than 50,000 L.E. for each individual work for a period of at least 3 years.

The contractors will be classified according to the above classes and also areas.

When work of specific value needs to be executed, contractors from the list of records will be requested to submit bids for the work.

C. **Classifying Contractors:**

1. Advertisement will be placed in 3 different newspapers for 3 consecutive times requesting contractors to submit their names to be included in the register of contractors desiring to do irrigation improvement works. "Appendix 2"
2. The Irrigation Improvement Projects departments in the governorates will make the special forms for registration available to the contractors and receive back these forms after filling them by the due date announced in the call for registration. These forms are given in "Appendix 1." When the contractors return the forms they also should furnish the necessary supporting documents.
3. All departments in the governorates are to send these forms to the office of Structural Replacement and IIP in Cairo.
4. The Structural Replacement and IIP office in Cairo will establish a technical committee to study these forms and start the classification of contractors.
5. The committee should study carefully these forms and make sure that all information are correct and apply the merit point system to be able to classify each contractor in his level according to the following:

a. Big Contractors:

To perform construction works of any size and technical difficulty.

Capital: not less than 1,000,000 L.E.

Liquid Money: not less than 250,000 L.E.  
approved by his bank.

They are to be evaluated using the merit point system as follows:

■ Equipment: (50 Points)

Timber and Metallic scaffoldings  
exceeding 200 M3. (10 Points)

Construction equipment owned by contractor  
as follows: (40 Points)

Batch plants and Mixers	7 Points
Earth moving equipment (dozers, scrapers, loaders, etc.)	5 Points

Canal lining equipment	8 Points
Dump trucks, Mobile mixers, Tank trucks, etc.	5 Points
Water suction system and water pumps	5 Points
Sheet pile equipment	5 Points
Generators, welding sets	5 Points

■ Technical Staff: (30 Points)

Qualified Specialized Engineers	15 Points
For 8 Specialized Engineers or more	15 Points Eng.
For 6 Engineers or more	10 Points degree
For 4 Engineers	5 Points
Assistant Engineers	8 Points
For 8 Assistant Engineers	8 Points
For 6 Assistant Engineers	6 Points Asst.
For 4 Assistant Engineers	4 Points Eng.
Skilled Laborers	7 Points
For 12 Skilled Laborers	7 Points
For 8 Skilled Laborers	5 Points
For 6 Skilled Laborers	3 Points

■ Experience: (20 Points)

Performance of work	10 Points
Performing jobs of value not less than 4 million pounds/job	10 Points
Performing jobs of value not less than 2 million pounds/job	8 Points
Performing jobs of value not less than 1 million pounds/job	6 Points
Years of experience	10 Points
Experience not less than 20 years	10 Points
Experience not less than 15 years	8 Points
Experience not less than 10 years	6 Points

b. General Contractors:

Class A Contractors:

To perform construction works up to 1,500,000 L.E.

Capital: more than 250,000 L.E.

Liquid money: not less than 100,000 L.E. approved by his bank.

Evaluation points: 100 points

- Equipment (40 points) as follows:

Timber for scaffoldings exceeding 50m3	(20 Points)
Construction equipment owned:	(20 Points)
Mixers	3 Points
Tractors with water tank trailer	3 Points
Pumping units	3 Points
Generators	3 Points
Welding set	3 Points
Owned or rented: Loader, dozers, eexcavators, sheet pile equipment steel workshop	(5 Points)

- Technical staff 40 points as follows:

Qualified specialized engineers	(20 Points)
For 3 specialized engineers or more	20 Points Eng.
For 2 specialized engineers or more	5 Points deg.
For 1 specialized engineers or more	5 Points
Assistant engineers	(12 Points)
For 3 assistant engineers	12 Points
For 2 assistant engineers	8 Points Tech.
For 1 assistant engineers	4 Points deg.
Skilled labor	(8 Points)
For 3 skilled labor	8 Points skill
For 2 skilled labor	6 Points Labor
For 1 skilled labor	3 Points

- Experience 20 points as follows:

Performing jobs of 250,000 L.E./job	10 Points
Performing jobs of 150,000 L.E./job	8 Points
Performing jobs of 100,000 L.E./job	4 Points
Experience not less than 10 years	10 Points
Experience not less than 5 years	5 Points
Experience not less than 3 years	2 Points

Class B Contractors:

To perform construction works up to 400,000 L.E.

Capital: more than 150,000 L.E.

Liquid money: not less than 30,000 L.E.  
(approved by bank).

- Equipment 40 points as follows:

Timber for scaffoldings not less than 30 m3 or more	(20 Points)
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Construction equipment owned:	(20 Points)
Mixers	5 Points
Tank Trailers	5 Points
Pumping unit	5 Points
Owned or rented loaders, tractors, etc.	5 Points

■ Technical staff 40 points as follows:

Eng.	Qualified specialized engineers	(20 Points)
	For 2 specialized engineers	20 Points
deg.	For 1 specialized engineer	10 Points
	Assistant engineers	(12 Points)
Tec.	For 2 assistant engineers	12 Points
deg.	For 1 assistant engineer	6 Points
	Skilled labor	(8 Points)
ski.	For 2 skilled labor	8 Points
lab.	For 1 skilled labor	4 Points

■ Experience 20 points as follows:

Performing jobs of not less than 150,000 L.E./job	10 Points
Performing jobs of not less than 100,000 L.E./job	8 Points
Performing jobs less than 100,00 L.E./job	4 Points
Experience not less than 10 years	10 Points
Experience not less than 5 years	5 Points
Experience not less than 3 years	2 Points

Class C Contractors:

To perform construction works up to 100,000 L.E.

Capital: 60,000 L.E.

Liquid money: not less than 15,000 (approved from his bank).

■ Equipment 40 points as follows:

Timber scaffoldings not less than 15 m3	(20 Points)
Owned or rented construction equipment:	(20 Points)
Mixer	8 Points
water tanks	6 Points
pumping units	6 Points

■ Technical staff 40 points as follows:

Qualified specialized engineers	(20 Points)
One or more university graduated engineer	20 points
Assistant engineers	(12 Points)

Two or more assistant engineers with technical degree	12 Points
One assistant engineer with tech. degree	6 Points
Skilled labor	(8 Points)
Two or more skilled labor	8 Points
One skilled labor	4 Points

■ Experience 20 points as follows:

Performing or supervising similar jobs in governmental departments or companies (proved by certificate)	(10 Points)
Jobs not less than 100,000 L.E./Job	10 Points
Jobs not less than 50,000 L.E./Job	8 Points
Jobs less than 50,000 L.E./Job	4 Points
Experience in executing or supervising similar jobs in governmental department or companies (proved by certificate)	(10 Points)
Not less than 7 years	10 Points
Not less than 5 years	5 Points
Not less than 3 years	2 Points

The accepted contractor of any class must obtain not less than 70 points. However those who obtain less than 70 points in a Class can be re-evaluated in the less class i.e. the contractor in Class (A) who obtain less than 70 points in Class (A)1 can be re-evaluated to Class (B) and so. Any contractor obtaining less than 70 points in Class C is to be rejected.

D. Registering Contractors

1. Successful applicants (Contractors) may be registered at any directorate of the MPWWR according to the level of their competence A,B or C.

Registration Procedure and Rules:

- a. Registration period is for one year (subject to renewal) form July 1st to June 30th of the following year.
- b. The registration period (regardless of the date of first registration) shall always expire on the 30th day of June following the registration unless the registration is renewed according to III.
- c. Registrations dates for first time applicants may be at any date. Registration for previously registered contractors (renewal of registration) shall be from June 16th to June 30th each year for the period starting July 1st (following year).

- d. Contractors may register to their home area (according to the areas mentioned before) and if they wish they may register to other areas throughout; Egypt.

2. Registration Fees (Annually):

- a. For contractors registering at their home areas 250 L.E. per year or part thereof.
- b. For contractors registering at other than their home (additional) areas 150 L.E. per year or part thereof per area.
- c. Late registration penalties will be 100% additional to the cost of normal registration (late registration fees will be twice the normal registration fees).
- d. A decree should be issued from the officially authorized person in the headquarters department permitting to call for limited tenders among the registered contractors each according to his level and the level of work to be tendered.
- e. At the availability of the budget needed for any work in the Project, the governorate department issues the call for the limited tenders among the registered contractors of the area at the level of work and contractors. The governorate department takes all necessary steps till (?????) awarding.
- f. Contractor has the right to ask for changing his class to a higher one since he can submit the necessary documents after an annual advertisement.
- g. Big contractors who perform works not less than one million pounds per work such as lining of main canals, constructing regulators and bridges, must be registered in a special record. In order to evaluate and select them according to the 3 categories, the following steps are to be adopted:

■ Announcement:

- The appropriate department of the MPWWR will invite contractors to apply and register.
- Contractors desiring to perform these works and have previous experience, financial requirements, manpower could apply for registrations form which is available at the IIP departments at each governorate to fill and return or to the department within date/1988 and get the receipt against submission.

■ Form:

The contractors will receive the form "Appendix 1a, 1b"

- Evaluation:

A certain committee of high technical standard to study and analyze the forms.

The first to be chosen will be in accordance with:

- Owning of equipment needed for the execution (as lining equipment).
- Previous performance of similar works on water courses either local or abroad, considering that the number of contractors will not exceed 10.

E. GUARANTEE, SAFETY AND QUALITY CONTROL:

To ensure safety and quality control of the construction according to specifications and given general conditions, several points must be taken into consideration:

1. The contractor should submit the execution procedure for the job according to the technical specification.
2. Certain time table for every stage of execution, time of termination showing percentage of performance of every stage. This table should be enclosed with every tender.
  - Every contractor must comply to timing to ensure the follow up of execution.
  - The contractor could offer a certain time table to finish construction in a shorter period than that of the tender.
3. Regulations, conditions and specifications must be made clear before the contractor and those who follow up and supervise the execution, showing the rate of tolerance, mentioning the amount of fine due to every case and the limit of deviation that when exceeded requires removal beside the fine of delay.

4. Follow up and good control of execution:

Field visits, follow up of execution and meetings with irrigation leaders, revealed the lack of supervision due to several reasons for which certain solutions were given as follows:

- a. The responsibility of supervision must not be only on the engineer, it should be shared with his assistants as most of the time the assistants do not give the full care because he is not responsible. This responsibility has to be defined

clearly to the assistant in writing, and this letter to be circulated among them for signature. Training should be provided to give them experience needed to perform good job.

- b. Mobile labs is a necessity for testing samples and checking quality to assure performing good work. Each governorate should have a mobile lab with trained staff forming a special department in the governorate and directed by the headquarter department in Cairo, reporting weekly or monthly to the headquarter department and the governorate department the follow-up of the performance of work according to both schedule and quality.
- c. The headquarter department has to take care of training different categories of its staff. The training must also cover the contractor staff and a mobile training service facility may be a good solution and training could take place in the afternoon and near sites. Five units for the five areas will at least be needed.
- d. To achieve the best improvement results:

Standardization of the different structures must be considered and must make use of modern technology and rehabilitation. Precast units could be used in the water structures and the needed drawings and necessary minimum specifications will be made available for the companies interested in manufacturing and supplying such precast structures. The companies must submit their offers indicating the cost of each unit, the ability to manufacture such units and the specifications adopted.

The training program mentioned in (c) will include also the contractors' technical personnel engaged in the field installation of these units.

- e. The names of the contractors not following the technical specifications shall be removed from the contractors's registry and will not be allowed to register again before a period of five years.

## Appendix F. Guidelines for Preparing an Inventory of Canal Structures under the SR Project

More than 21,000 small- and mid-size canal structures qualifying for consideration under the Structural Replacement project are believed to exist in the Nile Basin irrigation systems. These structures are of many types: head regulators, cross regulators, siphons, weirs, tail escapes, bridges, and gated outlet structures. Most of them are original structures built when the irrigation system was first developed beginning as long as 100 years ago.

Keeping records of canals and canal structures is the responsibility of the Irrigation District offices; as a result these records have not yet been collected in a central place and put onto a common format. The purpose of the inventory outlined in this Annex is to assemble such information on all canal structures in the Nile Basin system.

The inventory is important to the success of the SR project because it will help define the qualifying structures from which a selection for replacement may be made. It will also help the Districts keep track of those structures repaired or replaced under the project, and will allow calculation of life expectancies of the structures based on historical record. The inventory will permit the managers of SR to place priorities on those structures taken up under the project, and it will help the Directorates and Central offices of the Ministry in approving the Directorates' annual workplans and associated budgets. Finally, an accurate inventory will provide a framework for establishing an appropriate maintenance program for the network and its structures.

### 1. Form for collecting field data

The Irrigation District Offices will be asked to supply the basic data from their records. The Technical Advisor under the SR project will train the District Engineers in the use of a special form to collect the required data describing each structure. The form, attached to this annex, is a modification of the one published by USAID as part of the "Irrigation Structures Inventory, Directorate of East Minia." It comprises a cover sheet describing the canal whose structures will be enumerated, two additional pages with forms for entering data for all structures along that canal, a page defining terms, and a page with graphical presentation of the terms. For simplicity, terminology in this annex and form is consistent with that used in the above-mentioned document.

### 2. Responsibilities in preparing the inventory.

The District offices will pass this information to the General Directorate and from there to the Office of the Undersecretary at the Directorate level. He in turn will pass the data, together with a plan of all canals in the Directorate and their designations, to the Director, SR Project. He in turn will distribute them to the Inventory Team which will function under the Director's supervision.

This team will consist of the two engineers normally assigned to work with the Technical Advisor, assisted as needed by the bilingual secretary in the Project Office. The team will be advised by the Technical Advisor.

The team will use one of the two desktop computers with 20 mb hard disc capacity already purchased under the project, and d-Base 3+ as the software.

3. The Plan of work.

- A. The District Office will designate one or two engineers to collect the data.
- B. The Technical Advisor will train all those designated engineers in proper procedures for collecting and recording the information.
- C. The engineers will check their records against the present field situation, and will record on the form the condition and any other special features of each structure.
- D. These updated records will then be noted by the supervising engineer and passed on according to the sequence described above.

4. Data Verification.

Data will be verified visually by the Technical Advisor on a spot or random basis.

5. Data-base structure.

Using the equipment described above, the Inventory Team will enter the data according to a suitable format. If necessary, the Team will arrange for computer services from outside companies, or from the PPU, to help install the d-Base 3+ program with appropriate format, fields etc, and help the team start entering data. The cost of this assistance, if any, will be borne by the SR Project.

6. Data entry and sorting.

The members of the Team, assisted by the Secretary, will enter the data one Directorate at a time. During the period while data are being entered, the Team will need some guidance in sorting the data for output purposes. The SR Project could probably arrange for this support from PPU or local companies, but if not a suitable overseas organization could provide it on a short-term basis.

7. Data output.

Data will be printed out according to three fields, or groups: District data, Directorate data, and National data.

Key information to be printed out are: Total number of structures; totals of each structure type; selected listing of all deteriorated structures; and others as necessary.

Those structures replaced under the SR project will also be noted in the data set and could be printed out separately in order to summarize the achievements of SR.

8. Application to RIIP and Preventive Maintenance.

The inventory will be of use to RIIP because that project envisages reconstructing entire irrigation commands and all associated structures. The data-base would also be of significant help in organizing an efficient maintenance program.

## Appendix G. Selection Criteria Proposed for the SR Project

The purpose of these selection criteria is to assure that Ministry officers implementing the SR Project have suitable guidelines in selecting structures for replacement under the project. Use of these criteria will result in only those structures being replaced which contribute to generally accepted development objectives in the irrigation and agricultural sectors. The criteria are designed to be applicable to other system improvement projects of MPWWR.

The criteria have two steps:

### Step One:

Only those structures included in the official Inventory of Structures are eligible for consideration. (See Annex 6 for a description of this inventory.)

### Step Two:

Field engineers at the District level will rate structures which they believe should be considered for replacement according to the two following criteria:

- A. Is the structure in danger of failing or of washing away?
- B. Is the structure no longer able to provide the function for which it was designed, e.g., broken gates or traffic beyond its capacity.

Requests to include any structure in the project must include reference to the structure in need of replacement (Step 1) and must provide information on the two criteria ratings (Step 2).

Field engineers may provide these rating on a suitable form (see attached specimen form).

Rating Sheet for Structure Selection in SR

Directorate \_\_\_\_\_ . District \_\_\_\_\_ . Date \_\_\_\_\_ .

Step One: Designation of the structure proposed for replacement

District \_\_\_\_\_ .  
Canal \_\_\_\_\_ .  
Station \_\_\_\_\_ .  
Type \_\_\_\_\_ .  
Capacity \_\_\_\_\_ .  
Other features \_\_\_\_\_ .

Step Two: (A) Ratings for possible failure

[Yes/No]  
Has the structure already failed? \_\_\_\_\_ .  
Is it likely to fail within two years? \_\_\_\_\_ .  
Is it likely to fail in 3 - 6 years? \_\_\_\_\_ .  
Is it likely to fail in more than six years? \_\_\_\_\_ .

Step Two: (B) Ratings for functional obsolescence

[Yes/No]  
Is the structure broken? \_\_\_\_\_ .  
[If yes, what is broken? \_\_\_\_\_ ].  
Does the break seriously interfere  
with the structure's function? \_\_\_\_\_ .  
Does the structure seriously restrict  
the flow of water? \_\_\_\_\_ .  
In the case of a bridge, does it seriously  
restrict the flow of traffic? \_\_\_\_\_ .  
[If yes, what kind of traffic? \_\_\_\_\_ ].

Proposed Action:

1. Replace entire structure \_\_\_\_\_ .
2. Repair or replace part of it \_\_\_\_\_ .  
[Describe which parts \_\_\_\_\_ ].

Estimated cost of replacement/repairs LE \_\_\_\_\_ .

Name \_\_\_\_\_ .  
Signature \_\_\_\_\_ .  
Date \_\_\_\_\_ .

## Appendix H. Training under the Structural Replacement Project

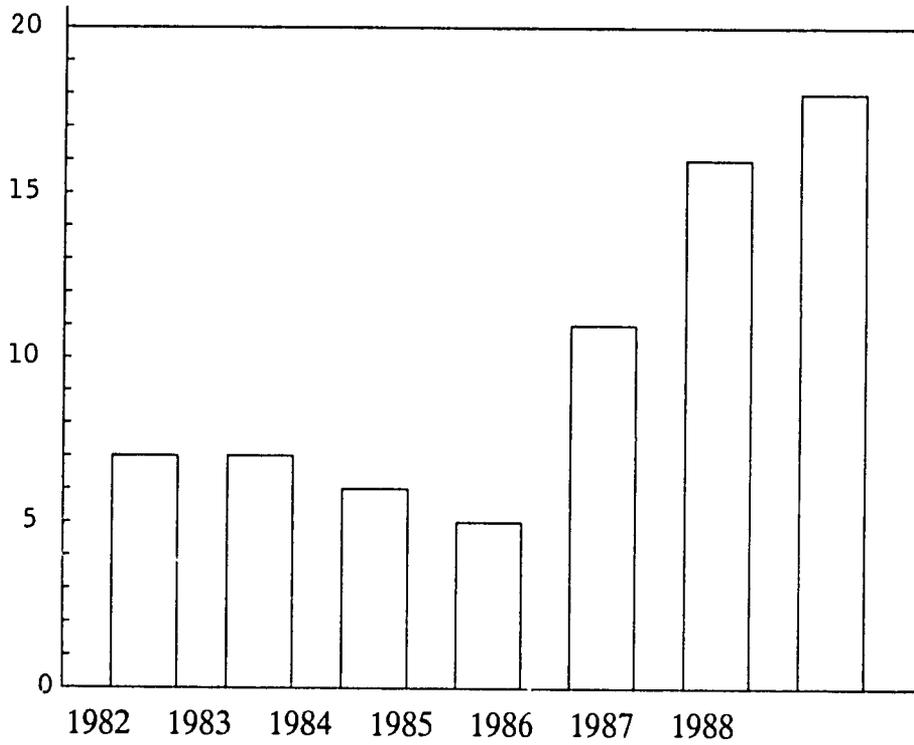
1. The Technical Advisor to the SR project has provided twelve three-hour lectures per year for each of his six years on the project. Participants at these lectures have been approximately 25 entry- and mid-level engineers.

The subjects of these lectures have been:

- A. Mixing of concrete,
  - B. Quality control for concrete, steel and masonry structures,
  - C. Monitoring and contract administration, and
  - D. Repair of defective structures.
2. Additional training financed under SR includes overseas short courses averaging one month each for 60 engineers on the subjects of field irrigation, irrigation methods, small irrigation structures, and similar subjects. Colorado State University organized this training which was conducted by different agencies and at different locations throughout the US. The Team met during its field trips at least two of the engineers who participated in these courses, and noted the value of this foreign training on their commitment and understanding of the SR objectives. In addition, returned participants contribute broadly to the overall aims of the Ministry.
  3. In addition to the above, the Training and Manpower Development Division provided selected in-country training on SR for engineers on the topics of construction management, components of construction for SR, concrete forms and braces, design factors influencing inspection of concrete structures, and design of concrete mixtures.

Appendix I. Annual Expenditure on Structural Replacement Contracts

Million  
Egyptian  
Pounds



Appendix J. Analysis of the December 1984 Evaluation Report and the Dec 1988 - Feb 1989 Record of Audit Findings Regarding the Structural Replacement Project

From the December 1984 Evaluation Report:

Recommendation A: District engineers implementing SR should take the course "Construction Management and Quality Control."

Response: The course was made available to all District Offices and most of the District Engineers completed it.

Recommendation B(1) and B(2): Inspection should be strengthened through recruiting and fielding more District engineers and studying ways to increase their incentive pay.

Response: Significantly more engineers have been recruited and fielded at the District level. At the time of the 1984 report the Ministry was able to fill only about half of its engineering positions; today over 90 percent are filled. The salary incentive issue has been actively discussed at many levels but the Team is not aware that it has been formally studied.

Recommendation B(3): Monitoring should be increased by USAID, the Consultant, and the Ministry.

Response: As the SR project has matured the Consultant has spent more time in monitoring. USAID has designated a person to make periodic monitoring visits. Ministry staff may have increased their monitoring effort, but have concentrated primarily on tighter contract administration at the start of each contract.

Recommendation B(4): Test equipment should be provided and two staff assigned [to operate it] from the Training Division.

Response: The equipment has been provided and the Ministry has allocated space for most of it at five field offices. Staff have not yet been assigned. It is not clear why technical staff to operate testing equipment were to come from the TMD project.

Recommendation B(5): Distribute the existing construction manual to all personnel in the SR project.

Response: The manual has been copied and distributed to each of the 169 Irrigation District Offices.

Recommendation C: Preconstruction conferences should be held with the following: Ministry and contractor representatives and, if possible, the Technical Advisor and USAID representative.

Response: The Team understands that preconstruction conferences are now regularly arranged between the contractor and District engineer when the contract is awarded. The Technical Advisor has attended some of them and the USAID representative has attended a few of them.

Recommendation D: The construction specifications related to concrete placement should be tightened.

Response: The Team saw the revised portions of the Construction Code incorporating these changes and noted that they were being followed on two structures which we saw under construction.

Recommendation E: Repair completed structures with sandblasting and gunite ... to bring them to specification requirements.

Response: We understood that this recommendation was intended largely to improve the appearance of the structures. We did not see evidence that it has been followed. It is unclear who would be expected to make these improvements.

Recommendation F: A data-base of structures should be compiled.

Response: This has not been done and is unlikely to be done until data-base guidelines and computer-related technical support are made available to the SR Project Director and his staff along the lines recommended in this report (Annex 6).

Recommendation G: Farmers should be educated to use less water.

Response: This has not been done and appears to the Team to be outside the scope of the SR project.

#### From the Record of Audit Findings:

The Record of Audit Findings (RAF) has highlighted a series of findings related to SR and concludes each one with one or more recommendations. Many of these issues have been addressed in the main report (Evaluation of Key Issues section). In this part we summarize the RAF recommendation following each finding and briefly outline the Team's response to it.

RAF Recommendations No. 1 and 2: USAID should (1) advise the Ministry that the SR project will not finance costs of new structures unless specifically approved by USAID on a case-by-case basis; (2) a guideline for selecting structures should be used which is based on irrigation benefits expected from the replacements; and (3) there should be individual justification regarding structures estimated to cost above a certain amount.

#### Responses:

(1) These recommendations stem from three large, new bridges built across the Ibrahimia Distributary which the Team visited. The Team believes structures of this size probably fall outside the scope of small- and mid-size structures to be taken up under the project, but we were unable to find in the Project Papers or elsewhere a precise definition of size. We found the SR Project Director and his staff sympathetic with the RAF position on these structures, and understood that he would not include such large structures in future SR plans. We believe such an understanding is the best way to resolve this question and recommend that an appropriate USAID person discuss the matter with the Director. Assuming that discussion were satisfactory, no further action would be required.

The Team found that "new" structures were often built alongside obsolete ones. We cannot find any references in either Project Paper to preclude new structures under these conditions. We believe that in many cases the best and most economical solution to a structure which is still functional but too small is to build a new one parallel with it rather than to demolish it and build a much larger one. Nevertheless, we believe the right starting point in the selection criteria is to refer to existing structures (Appendix G).

(2) It will not be possible to estimate benefits attributable to replacing individual irrigation structures, and efforts to use such measures in the selection criteria will be impossible to interpret. Suitable selection criteria (Appendix G) would provide a satisfactory basis for taking up those structures most in need of replacement. It appears to the Team that the purpose of this RAF finding is to stop or greatly reduce further bridge construction under the project, but we note that bridges are specifically allowed in the Project Papers. In summary, we regard the past emphasis of SR on bridges as quite predictable: population growth, which determines bridge traffic, has approximately doubled since the Aswan High Dam was commissioned; peak canal flows have increased only marginally during this period.

(3) A limit on the size of structure to be undertaken by SR would probably be helpful, and the Team was surprised none had been agreed to at the beginning of the project. We believe there is now close agreement between USAID and the Ministry on a limit.

(1 and 3) The Team questions whether USAID wishes to get involved with the detailed analysis necessary to make case-by-case judgments on matters largely delegated to the Ministry; whether USAID is staffed adequately to do so in a responsible manner; whether it would be cost effective to be so staffed; and whether USAID could not instead reach informed understandings with the Project Director on these and similar issues.

RAF Finding No. 5: The Ministry should report on when electricity is likely to be provided to motorized structures.

Response: For the future, the Team questions whether structures so large as to require motors even qualify as "small- or mid-size" structures under the project. We have no comment on the recommendations regarding the structures in Minia, but note that MPWWR has limited influence in providing new electric service.

RAF Finding No. 6: Contractors should place the USAID emblem on all but the smaller structures.

Response: The Team found Ministry officials responsive on this subject, but we believe it is not necessary or desirable to so identify a large number of small or mid-size structures. We have seen no precedent for such emblems on small structures in Egypt or other countries. If they must be placed, USAID should assist in providing the emblems because the small contractors participating in SR are likely to procure poor quality emblems.

RAF Finding No. 8: Refers to delays in completing contracted construction under the SR project.

Response: The Team agrees in full with this RAF finding and has recommended stronger measures to prevent delays.

RAF Finding No. 9: Refers to public company contracts under SR.

Response: The Team believes that on the whole the participation of public companies in the SR project has been beneficial to the project and that it should continue.

RAF Findings No. 10 and 11: [See RAF Findings 1, 5, and 8 above]

RAF Finding No. 12: [Although this is identified in the RAF as an SR finding, it appears to the Team to be largely one referring to the Preventive Maintenance Project]

RAF Finding No. 16: Refers to the finding that penalties paid by contractors are not being offset against claimed reimbursements.

Response: The Tea agrees with the paragraph of the RAF which discusses the adverse effect on contract administration that is likely to result from an effort by USAID to share in the benefits of penalties. We do not agree with the RAF recommendation that past billings should be adjusted by an offset because it is not stipulated in the project agreements.

The Team does agree with the recommendation that USAID and the Ministry "devise a mutually agreeable way to take penalty revenues into account," and believes that the formula should promote the objectives of the project, especially the objectives of contract administration which we believe need strengthening and through which penalties are levied and collected. We believe discussions of a mutually agreeable way should consider use of penalty funds as a source of revenue in part to supplement the salaries of field engineers. Such a formula -- coupled with higher penalties specified in the contracts -- would have a strong and positive impact upon field supervision, contract administration, contractor compliance, and timely contract completion which we believe need further attention. It should be supervised closely, however, to ensure it is not abused.

We believe a serious effort by USAID to offset penalties against future disbursements would significantly weaken the credibility of USAID staff working with the IMS Project.

RAF Finding No. 17: This is essentially a summary of all previous RAFs on the Structural Replacement project, but it makes the additional recommendation that USAID consider extending the contract completion date.

Response: The Team finds RAF 17 a generally fair and accurate assessment of the SR program's strengths and weaknesses. We do not agree with some of the RAF recommendations as noted above, but we believe on balance SR has been relatively well managed; that it has improved greatly both in management and in the quality and quantity of structures built as the project has gained experience; that the project has largely met its objectives; and that a two-year extension should be granted.

## Appendix K. Studies Completed by PPU and Actions Taken on Them

<u>Name of Study</u>	<u>Resulting Action</u>
1. Drainage Project 5	Financed by World Bank and under construction
2. Pump Rehabilitation Project 2	Financed by World Bank and under construction
3. Channel Maintenance Project	Financed by World Bank and USAID
4. New Esna Barrage	Contractor financed with interim grant funds; construction imminent
5. Ibrahimia Head Regulator	Status unknown
6. Conservation of Nile Outflows to the Mediterranean	Under further investigation
7. New Naga Hammadi Lock	Under construction with Ministry funds
8. El Salaam Canal Project	W. German government investigating
9. Bahr El Gharag Project	Under study
10. North Zifta Irrigation Redesign	Project action deferred; not economically attractive
11. Widening of Ismailia canal	Project constructed

**Appendix L. Training Completed through PPU**

<u>Name</u>	<u>Course</u>	<u>Time</u>	<u>Place</u>	<u>Person Months</u>
Eng. Gamil Mahmoud - Not Present-	- A study Tour in USA	07/21/1980 - 08/08/1980	Phoenix - Canada	.75
	- US Training Survey	10/01/1983 - 10/17/1983	USA	.50
	- Executive Mgmt. Program	06/01/1984 - 06/17/1984	Salt River Proj., Phoenix, AZ, USA	.50
Eng. Mohamed Nasser Ezzat (Not Present), Former director left after September '88	- Management Training Salt River	06/10/1986 - 06/30/1986	Salt River Proj., Phoenix, AZ, USA	.7
Engl. Essam El Sheikh Present (Project Director)	- Agricultural Project Planning	04/27/1981 - 05/29/1981	Washington, D.C. USA	1
	- Water Systems Management Techniques	05/07/1981 - 05/25/1984	Bureau of Reclamation, USA	.25
	- On-Farm Irrigation Design	05/25/1988 - 06/02/1988	Utah State, Logan	1.25
Eng. Rezk Hassan Menshawi (Deputy Director)	- Organizational and Management Development	05/25/1988 - 07/02/1988	Washington, D.C. USA	1.25
Eng. Loucy Helmi Boulos Section Head Engineering	- Engineering Management and Economics	08/11/1986 - 09/04/1986	Fort Collins, CO USA	1
	- Project Analysis for Agri. & Rural Dev.	06/01/1988 - 07/17/1988	Washington, D.C.	1.5
Eng. Abu Bakr Sekkina LOA - To Saudi Arabia	- Analysis of Agricultural Capital Projects	06/01/1981 - 07/17/1981	Washington, D.C. USA	1.5
	- Water Systems Manage- ment Techniques	05/07/1984 - 05/25/1984	Bureau of Reclamation, USA	.25
	- Finalization of the Channel Maintenance Report	06/01/1985 - 01/14/1985	FAO Headquarters, Rome, Italy (OJT).	.5
	- Computer Management	04/03/1986 - 06/08/1986	Washington, D.C., Chicago	2
	- Integrated Computer Systems	07/26/1988 - 08/26/1988	Washington, D.C. USA	1
Eng. Adel Mouselhi (Not Present)	- Analysis of Agricultural Capital Projects	06/01/1981 - 07/17/1981	Washington, D.C. USA	1.5
	- Channel Maintenance project	08/21/1984 - 09/02/1984	FAO, Rome Italy	.5
Eng. Hend Abdel Kerim (Not Present)	- Agricultural Project Planning	04/27/1981 - 05/29/1981	Washington, D.C. USA	1
Mona Morcos Megali (LOA)	- Water Control and Measurement	07/20/1987 - 08/14/1987	Fort Collins, CO	1
Manal Abdel Badie	- Water Control and Measurement	07/20/1987 - 08/14/1987	Fort Collins, CO	1
Eng. Essam El Samanoudy	- Engineering Management	08/11/1986 - 09/04/1986	Fort Collins, CO	.25
	- Micro Computer Stati- stics and Methods	06/19/1988 - 08/05/1988		1.5
Hoda Mohammed	- Irrigation Problems	06/15/1987 - 08/07/1988	Fort Collins, CO	2
Amira Abd El Hady	- and Practices	" "	Fort Collins, CO	
Eng. Ghada Barakat (LOA)	- Engineering Management and Economics	08/11/1986 - 09/04/1986	USA	0.75
Mr. Hamza Abdelmoty	- Study Tour	08/24/1986 - 09/15/1986	USA	.25
Mr. Gamal M. Ali	- Study Tour	08/24/1986 - 09/15/1986	USA	.25

Mr. Samir Ahmed	- Study Tour	07/31/1988 - 08/22/1988	Colorado	2
Mr. Hamdi Abdel Aziz	- Study Tour	" "	California	1.25
Mr. Abdallah Mohammed	- Project Planning for - Agriculture and Rural Development - Economics Study (under the Water Research Institute Finance)	05/04/1987 - 06/05/1987  08/22/1988 - for 9 months	Washington, D.C.  Greece	1  1
Mr. Mohammed Ragy Darwish- (Not Present)	Fellowship Programme	01/01/1983 - 12/31/1983	The World Bank, Robert S. 12 McNamara Fellowship, USA	
Mr. Tarek Tewfic -Not Present-	- Academic Training Soils	08/16/1984 - 12/25/1984	CSU	4
Mr. Fawzi Khalil (Not Present)	- Project Planning for Agriculture and Rural Development	04/01/1985 - 05/03/1985	Washington, D.C. USA	1
Mr. Ahmed El Attar (Not Present)	- Project Planning for Agriculture and Rural Development	04/01/85 - 05/03/1986	Washington, D.C. USA	1
Mr. Abdel Fattah Tolba Present - Economics Section Head	- Project Analysis for Agriculture and Rural Development	05/06/1985 - 06/14/1985	Washington, D.C. USA	1.25
Eng. Salah Eldin Zaky (Not Present)	- Computer Management	04/03/1986 - 06/08/1986	Washington, D.C., Chicago USA	2

**Appendix M. List of Long-Term and Short-Term Consultants to PPU**

Long-Term

<u>Name</u>	<u>Position</u>	<u>Arrival</u>	<u>Departure</u>	<u>Months</u>
R.B. Hughes	Agr Economist/Agronomist	Jan 83	-	61
J. Ringenoldus	Sr. Technical Advisor	Feb 83	-	61
A.K. Long	Project Engineer	Apr 83	Feb 85	25
D.W. Fonken	Irrigation and drainage Systems Engineer	Jul 83	-	56
P. Evangelou	Project Eval. Economist	Aug 84	Jun 88	46
J.T. Haarman	Project Formulation and Evaluation engineer	Aug 85	Sep 87	26
J. Moroney	Computer Specialist	Apr 86	May 87	13
J. Moroney	Computer Specialist	Aug 87	May 88	<u>9</u>
Total				297

Short-Term

<u>Name</u>	<u>Position</u>	<u>Arrival</u>	<u>Departure</u>	<u>Months</u>
Mr. Zahedani	Economics training	Jan 84	Mar 84	2
Mr. Zahedani	Economic training	Mar 84	May 84	1
Mr. Grover	Agronomist	Jun 84	Jul 84	1
Mr. Reeve	Drainage Specialist	Jun 84	Sep 84	3
Mr. Otto	Aquatic Weed Specialist	Jul 84	Sep 84	3
Mr. Demuth	Computer Specialist	Aug 84	Jan 85	4
Mr. Norkus	Pump Rehab Specialist	Sep 84	Nov 84	2
Mr. Fritz	Economist	Dec 85	Apr 85	3
Ms. Moroney	Computer Specialist	Feb 86	Mar 86	1
Mr. Evangelou	Cost Specialist	Sep 88	Nov 88	<u>2</u>
Total months				22

**Appendix N. Analysis of the September 1985 Mid-term Evaluation and the February 1989 Record of Audit Findings Regarding the Project Preparation Unit**

From the September 1985 Mid-Term Evaluation Report:

Recommendation No. 1: Prefeasibility studies should be completed before full scale studies are begun.

Response: This recommendation appears to be in reaction to the North Zifta Feasibility study which concluded that the project was not economic. We can find no evidence that MPWWR has instituted a policy of prefeasibility prior to starting a full scale feasibility study, but we note that all recent assignments made by the Ministry to PPU have been prefeasibility studies.

Recommendation No. 2: There should be a clear division between the training and project functions of PPU.

Response: The MPWWR balances training and project functions simultaneously. The Ministry reacts to the work load of PPU by assigning work when the Unit needs it and holding back projects when the workload is heavy. The Team believes that training and project functions should be operationally combined through on-the-job training which is a key means of achieving PPU's sustainability. The Ministry and PPU follow this strategy.

Recommendation No. 3: The PPU should develop a nucleus of Egyptian staff with mature planning experience.

Response: The PPU does not have the proposed nucleus of staff but there are two engineers on the staff who show promise in this direction. It is our experience that this ability normally takes 7 to 15 years to develop.

Recommendation No. 4: USAID should extend the technical assistance contract two years.

Response: This was done.

Recommendation No. 5: The PPU Project under IMS should provide the expatriate Chief of Party with accounting assistance, and the PPU should obtain the services of an experienced editor.

Response: Neither the accounting nor editorial services has been obtained. The editing function has been performed by the expatriate staff; most accounting is done by the Expatriate Chief of Party.

Recommendation No. 6: PPU should develop a better method for obtaining field data.

Response: The staff of PPU have struggled with this problem with unsatisfactory results as explained in the Main Report.

From the Record of Audit Finding, February 7, 1989:

Question No. 1: Can PPU...achieve its originally stated goal as a unit that will be able to develop studies for international financing without outside assistance?

Response: We do not believe this is a reasonable goal for PPU and do not believe the Unit will achieve it. The reasons and recommendations have been dealt with in detail in the Main Report. We point out here only that even the most experienced and well established firms conducting economic analyses frequently seek outside assistance.

Question No. 2: Can PPU be expected to become viable given the inability of the Unit to attract and retain staff with appropriate experience and language skills?

Response: We do not believe that PPU will become a self-sustaining unit if by that is meant the ability to function at high professional levels without any external assistance. If PPU is obliged to do without all external assistance, we believe it could provide special skills in computer science, agriculture, and benefit-cost estimation to the Ministry if studies are to be prepared in Arabic. With the support of limited external assistance, we believe the original goal of high-quality viability is attainable.

Question No. 3: Should or should not PPU be directed primarily at RIIP studies?

Response: At this stage we believe it would be premature to assign RIIP studies to PPU because the nature of RIIP improvements has not been spelled out in detail. As a result, there is no basis on which to estimate such pivotal parameters as crop output per unit of water and water use efficiency. Even the costs of the RIIP improvements can only be guessed at at this stage, and major changes in RIIP plans are quite likely as that project gains experience in the field. PPU would likely wind up studying a planned development which in fact became quite different in execution. After several years of RIIP experience and a stable data collection program, it would be appropriate for PPU to analyze the economic feasibility of one or more RIIP projects. Even at that point, however, it is our opinion that it would not be advisable for PPU to "be directed primarily" at RIIP studies if the Unit is to serve the larger needs of the Ministry in a responsive and balanced manner. In any case, choice of study assignments should be left to the committee recommended to take on that function.

Question No. 4: Will the Unit be able to encourage staff travel under the current per diem allowance?

Response: No, the per diem allowance should be increased as recommended in the Main Report.

## Appendix O. Scope of Work and Qualifications for Proposed Multidisciplinary Advisor to PPU

The Project Preparation Unit (PPU) of Egypt's Ministry of Public Works and Water Resources has responsibility for preparing feasibility and prefeasibility reports, in English and to high technical standards, to assist the Ministry in finding funding sources of finance for its irrigation and drainage projects. PPU was established in 1982 with support from the World Bank and USAID. More recently it has received support from the PPU component of USAID's Irrigation Management Systems Project.

The Government of Egypt, through the Ministry, and USAID anticipate the need for one multidisciplinary advisor to assist the PPU Ministry staff in fulfilling their mandate. The position is intended to strengthen the capacity of PPU to conduct prefeasibility and feasibility analyses on its own with minimal dependence upon outside technical assistance by the end of the project period (1992).

### A. Detailed Responsibilities

- Consult with PPU staff on methodologies appropriate for the assigned studies.
- Advise PPU staff on the data needed for assigned studies and appropriate data collection techniques.
- Work closely with PPU staff in analyzing the data and drafting conclusions.
- Assist PPU staff in writing reports of the studies
- Consult with the PPU Director and staff to strengthen their decision-making on issues vital to PPU, such as recruitment of project consultants, determination of priorities among alternative studies, preparation of documents proposing that PPU take up certain studies, and other matters which the Director may bring to the Advisor's notice.
- Support the PPU Director and staff in their attempts to generate understanding and solicit professional contributions to PPU from institutions and people outside the Unit.
- Assist the PPU Director in interpreting the work of the Unit to USAID and other international organizations.

### B. Location and Duration of the Position

The position is located in Cairo, Egypt for three years beginning June 1989. The Advisor will be expected to make frequent field trips to study sites within Egypt for periods of time ranging from one day to one week.

The Technical qualifications required for the position include:

- Degree-training, preferably at the PhD level, with major and/or minors in at least two of the following fields: economics, agricultural economics, engineering, agriculture science, environmental science, and public administration.
- Experience in using the tools of feasibility analysis in water projects.
- Experience with data management, preferably including computer-based applications.
- Sound English-language writing skills.

C. Qualifications

The personal qualifications required for the position include:

- Ability to contribute substantively to a national team in ways which strengthen, rather than substitute for, them.
- Ability to advise across a wide range of fields and in both technical and management capacities.
- Ability to derive satisfaction from seeing one's efforts bear fruit through guiding others.
- Resident experience in countries such as Egypt in positions related to institutional development.