

A. REPORTING A.I.D. UNIT  
(Mission or AID/W Office)

(ES # 81-1)

B. WAS EVALUATION SCHEDULED IN  
CURRENT FY ANNUAL BUDGETARY PLAN

yes  slipped  ad hoc

C. EVALUATION TYPE

interim  final  ex post  other

15/43112

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report)

| Project #          | Project/Program Title<br>(or title & date of<br>evaluation report) | First PRAC or<br>equivalent<br>(FY) | Most recent<br>PRAC<br>(m/y) | Planned<br>LOP<br>Cost<br>('000) | Amount<br>Obligated<br>to Date<br>('000) |
|--------------------|--|-------------------------------------|------------------------------|----------------------------------|--|
| 004220<br>263-0132 | Irrigation Management Systems                                      | 1981                                | 07/87                        | \$139                            | \$73                                     |
|                    |  |                                     |                              | Million                          | Million                                  |

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

| Action(s) Required  | Name of officer<br>responsible for<br>Action                              | Date Action<br>to be<br>Completed |
|---|---|-----------------------------------|
| 1. Carefully evaluate the final report for the North Zifta study to determine appropriate follow-up actions.  | Estains, AGR/ILD<br>MOI Coordinating Committee                            | 12/85                             |
| 2. Take immediate steps to revitalize the Gharbia O&M planning effort; move project to the appropriate MOI Unit, obtain additional technical assistance, complete the study and initiate procurement. | Eng. Badawi,<br>MOI<br>Vice-Minister                                      | 12/85                             |
| 3. Make every possible effort to assign appropriate levels and quality of staff to the PPU and telemetry projects ASAP.   | Eng. Badawi,<br>Vice-Minister,<br>MOI                                     | 2/86                              |
| 4. Provide additional technical assistance to strengthen the in-service training program, and determine the feasibility of its expansion into a national training institute.                          | Estains,<br>AGR/ILD &<br>Project<br>Director, T&M                         | 3/86                              |
| 5. Intensify efforts to foster a dialogue between MOA and MOI field-level staff in the Regional Irrigation Improvement Project areas and through Water Research Center programs.                      | AGR/ILD, AGR/A,<br>MOI/LMS<br>Coordinating<br>Committee,<br>& CID TA Team | 4/86                              |

F. NAME OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION

on 2 day year 1985 mo

Report date:  
9/85

G. INITIALS OF EVALUATION SUMMARY AND ACTION DECISIONS

signature Estains, AGR/ILD  
Typed name Wjanssen, AD/AGE  
date

S. Conly, DPPE/PE  
T. Ware, DPPE/PE  
V. Koldrem, DPPE/PE  
G. Lucato, AD/DPPE  
A. Handy, DD  
F. Kimball, DIP

- |  |   |      |
|--|---|------|
| 6. Determine whether USAID and the MOI should support enhancing and expediting incentive payments to MOI engineering staff, and examine implications of doing so on sustainability and on GOE recurrent-cost burden. | Eng. Badawi,<br>Vice-Minister,<br>MOI & Estains,<br>AGR/ILD | 6/86 |
| 7. Prepare Project Amendment, to incorporate changes recommended by the evaluation which will accelerate the implementation process, re-evaluate key project assumptions, and establish a revised PACD.              | Estains, AGR/ILD  | 6/86 |

The project aims to assist the Ministry of Irrigation (MOI) to improve the operating efficiency of the total irrigation system and to strengthen the MOI's institutional capabilities. This "umbrella" project has eight major components. The largest component - 65% of project funds - supports replacement and rehabilitation of irrigation structures. Since this component was recently evaluated, the current evaluation focuses on implementation progress of the other institutional capacity building components of the project. The major findings and conclusions are:

- \* Most of the project components are behind schedule in meeting expenditure and output targets and the project will require an extension. Delays were partially due to an unrealistic implementation schedule for such a complex institutional development activity, and other design errors which can be resolved. Delays in AID/W approval of the PP amendment and in subsequent obligations also set the project back.
- \* The training program appears to be making a major contribution to upgrading MOI staff capabilities and its further expansion should be investigated.
- \* Achievement of institutional development objectives on the PPU and Telemetry subprojects is seriously hindered by the MOI's difficulty in recruiting and retaining qualified engineering staff.
- \* The Project Preparation Unit has been established, and is meeting its objective of performing feasibility analyses for MOI projects. However, it needs to give greater emphasis to its training objective, and to recruit additional qualified Egyptian staff.
- \* The Gharbia O&M study provides useful information on O&M functions, but requires further work to relate these to conditions in Gharbia Governorate and to develop a step-by-step implementation plan.
- \* The draft feasibility study of the North Zifta area indicates the proposed major remodelling of the irrigation system is not economically justified, because the area is already fairly well served by irrigation and drainage facilities.
- \* The Regional Irrigation Improvement Project will not attain the target acreage for irrigation improvement prior to the PACD. Time required to develop a strategy for transforming the EWUP research approach into a regional production program is greater than anticipated. Approximately one half of the subproject's life was consumed arranging AID approval and getting the consultant on the ground. Moreover, coordination of Irrigation and Agriculture Ministry staff must improve if the project is to be successful.
- \* The telemetry project is on schedule, but there is an urgent need to assign adequate staff to the project and to train them in the operation of this sophisticated technology prior to the departure of the technical assistance team.

I. EVALUATION COSTS

1. Evaluation Team

| Name                  | Affiliation | Contract Number OR<br>TDY Person Days | Contract Cost OR<br>TDY Cost (US\$) | Source of<br>Funds |
|-----------------------|-------------|---------------------------------------|-------------------------------------|--------------------|
| 1. Dr. W.W. Shaner    | CSU         | 28                                    | -                                   | -                  |
| 2. Dr. C.D. Busch     | Private     | 28                                    | -                                   | -                  |
| 3. Dr. F.A. Santopolo | CSU         | 28                                    | -                                   | -                  |
|                       |             |                                       | \$ 53,000                           | Project            |
| Engineer Mohamed Ali  | MOI         | 20                                    | N/A                                 | MOI                |
| Eng. Ahmed Fahmy      | MOI         | 20                                    | N/A                                 | MOI                |

**J. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS** (Try not to exceed the 3 pages provided)  
Address the following items:

- o Name of mission or office
- o Purpose of activity (ies) evaluated
- o Purpose of the Evaluation and Methodology Used
- o Findings and Conclusions
- o Recommendations
- o Lessons learned

USAID/EGYPT  
MID-TERM EVALUATION REPORT  
IRRIGATION MANAGEMENT SYSTEMS PROJECT  
(263-0132)

Background: This project aims to assist the GOE in improving the operating efficiency of the irrigation system, by strengthening the planning, operations and maintenance capabilities of the Ministry of Irrigation (MOI). The project goal is to improve control of the Nile River waters for agricultural irrigation.

The initial Project Agreement was signed in 1981 and included five components with total project funding estimated at \$42 million. By far the largest component is a construction program to rehabilitate and replace damaged and obsolete irrigation structures. The other components are a set of related institution building activities including support for a MOI Project Preparation Unit (PPU) to perform feasibility analyses; in-service training for MOI staff; the North Zifta Feasibility Study, to develop a replicable model for redesign of existing irrigation systems; and the Gharbia Study, to develop a replicable plan for improving the operation and maintenance (O&M) of irrigation systems.

SUMMARY

The project was amended in 1984 to expand the structural replacement program and to add three components; support for the Water Research Center (WRC), to continue research activities initiated under the Egypt Water Use Project (EWUP); the Regional Irrigation Improvement Project (RIIP) to apply EWUP research results on a regional program for improved irrigation management; and a telemetry project to initiate electronic data collection and analysis for improved water control. The total project authorization was increased to \$139 million.

Purpose of the Evaluation: This is a mid-project evaluation intended to review overall progress to-date and to provide guidance for strengthening project implementation. Since the structural replacement program was recently evaluated, the current evaluation is intended to focus on the other, institutional development components of the project.

Key Questions: The scope of work calls for the evaluation team to assess the quality and effectiveness of inputs; the quality and replicability of project outputs; the implications of a complex umbrella project such as IMS for USAID monitoring and management; and the potential for, and financial implications of, nation-wide replication of some of the IMS project components. The scope of work also requires the team to address the extent to which the current project has incorporated the work of EWUP.

Methodology: The evaluation team reviewed relevant project documents, interviewed USAID and MOI project officials, and made field trips to Tanta and Minya to visit project sites and interview field-level MOI personnel.

Date this summary prepared: November 27, 1985

Findings: Project inputs have generally been provided in an adequate manner. With the exception of the Gharbia O&M project, technical assistance has been well received and commodities provided under the original agreement are mostly in country and in use. Training activities - both in-country and in the U.S. - are proceeding on schedule. The GOE has provided key project counterpart staff to direct the various project components. However, the MOI's difficulty in acquiring and retaining qualified engineering staff, owing to low levels of remuneration, has had a negative impact on implementation, particularly in the case of the PPU and telemetry components which require highly skilled technical personnel. A brief summary of the status of the major project components follows.

The PPU (Project Preparation Unit) has fulfilled several of its objectives: it has conducted a variety of feasibility studies of international standards, instituted a staff training program, installed data-processing facilities and collected basic data. However, there are no formal screening procedures for feasibility study proposals. The PPU has been torn between its dual objectives of project preparation and training, with priority generally given to operational needs. Training activities are, however, essential to reduce its dependence on expatriate technical assistance.

The North Zifta study is nearing completion, but is unlikely to provide a replicable model for improvements to the irrigation system as originally envisioned. This is primarily owing to the selection of the study area, which, because it is reasonably well served by irrigation and drainage facilities already, will not benefit significantly from system redesign. Data on potential benefits are also sufficiently unreliable to cast doubt on the study's findings. However, specific irrigation designs developed by the study merit further consideration.

The Gharbia O&M study was completed a year ago, but requires additional work to relate the general O&M functions described in the report to conditions in Gharbia Directorate. Other problems were absence of a step-by-step plan for implementation, and lack of involvement of the MOI Directorate responsible for implementing the O&M plan. These problems must be promptly addressed in order to proceed with procurement and complete the activities in a timely manner.

The Training and Manpower Development component has provided in-service training to 683 MOI engineers and technicians since June 1982. The quality of the training courses appears very good, but further follow-up of trainees is necessary to fully determine their impact. Consideration should be given to expansion of this activity into a national irrigation training institute.

The RIIP and WRC will not achieve the target for improving irrigation systems on 40-50,000 feddans by July 1987. A fundamental difficulty has been the delay in amending the Project Agreement to incorporate these new components and in the arrival of the consultants to assist in developing a strategy for transforming the EWUP research approach into a regional production program. Moreover, the lack of coordination between MOA and MOI field-level staff is likely to hinder the effective implementation of these project components. Initial activities under RIIP have begun, however, and now that the consultant team is in place on both RIIP and WRC activities, the pace of implementation should improve.

The telemetry component is a good example of donor collaboration. It is on schedule and within budget. However, a serious problem is the lack of skilled Egyptian staff assigned to the project. Unless the MOI can assign adequate, qualified staff immediately, it will not have trained personnel to operate the sophisticated equipment once the TA contractor completes its installation.

Overall, the IMS project is contributing to a more functional institutional structure within the MOI. However, progress has been slower than planned, and the project will not achieve all of its targets within the specified time-frame, which did not make adequate allowance for the lengthy processes of institutional development, AID approvals, and contracting procedures. Though the team did not focus on the question of depth, in its opinion, the umbrella approach is a reasonable one, given the linkages between individual project components and the advantages in terms of funding and administrative flexibility.

Recommendations: The report recommends that the Project be extended to provide adequate time for achievement of planned outputs. It also recommends that USAID and the MOI explore ways to resolve the MOI's difficulty in attracting qualified engineering staff. The project should also attempt to improve field-level coordination of MOI and MOA staff through the RIIP and WRC.

The report makes several recommendations specific to individual project components. The most important among these are that USAID and the MOI should not proceed with the design and construction phases of the North Zifta project; they should take immediate steps to complete and to utilize the Gharbia O&M study; and they should consider providing additional inputs for expansion of the in-service training program into a national irrigation training institute.

Lessons Learned: The major lesson is the need to be realistic in formulating assumptions underlying institutional development projects. The team cited several project assumptions which have not proved correct (e.g., the ability of the MOI to recruit needed staff effectively), as well as several implicit assumptions for project success which were never addressed in the project design, regarding the level of institutional change required. The institutional building objectives of IMS have been hindered by the MOI's shortage of qualified engineering manpower. More explicit attention should be given at the project design and negotiation stages as to how project components which require highly skilled manpower for successful implementation can be adequately staffed, given institutional constraints.

A second lesson is the need for screening or prefeasibility studies to precede costly feasibility and design efforts. In the case of North Zifta, the feasibility study for redesign and improvement of the irrigation system did not yield evidence of adequate benefits to farmers to justify implementation. Some form of screening process to determine the appropriate selection of the study area and to estimate the approximate magnitude of potential benefits could have reduced the time and resources expended on this study.

✓

ATTACHMENTS

ATTACHMENTS (List attachments submitted with this Evaluation Summary) always attach copy of full evaluation report, even if one was submitted earlier.

### Evaluation Report

#### COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

This evaluation was intended to focus primarily on implementation issues. It provides a detailed analysis of the status of individual project components and identifies implementation problems. The evaluation report's strengths lie in four areas: its detailed review of component specific implementation problems and recommendations to resolve them; its attention to the overall project problem of MOI staffing and remuneration; its focus on the adequacy of key project assumptions; and its perspective on the incorporation of EWUP into the IMS. The latter three areas are described in more detail below.

Because its focus is on individual subprojects, however, it does not leave an impression of the project as a whole. It does not indicate how the subprojects are related or if they are appropriate to meet the Ministry of Irrigation's institutional development needs. Since so many of the project components have experienced implementation delays, it may be somewhat premature to assess appropriateness of individual components. Nonetheless, we would like to have seen an analysis by the team of the project's approach to addressing MOI institutional development needs, and the potential usefulness of individual components.

The team also gave short shrift to the question of implications of use of an "umbrella project" on USAID monitoring and management. Given the wide range of implementation issues surfaced by the team, one may question whether the umbrella project approach resulted in inadequate attention to design issues and subsequent implementation problems for individual components. The team did not make a convincing case for the efficiencies of the umbrella project.

Finally, the report does not respond directly to the question of replicability of promising project components. The team may have felt implementation progress was too limited to make such an assessment now. Nonetheless, the kinds of implementation problems the components face provide some sense of their replicability.

#### MOI Staffing And Remuneration

The evaluation identifies the MOI's difficulty in recruiting and retaining qualified staff as a major constraint to achieving the project's institutional objectives. The problem is particularly acute with engineers, since they are in great demand and better paid by the private sector. The result is a vacancy rate of almost 50% of established field engineering positions in the MOI.

There is no easy solution to this problem. If USAID and the MOI were to agree on project specific incentives, this may not solve the MOI's overall

MISSION COMMENTS ON FULL REPORT

shortage of engineers, nor lead to sustainability of project activities after project completion. Although the MOI currently provides special incentives to engineers and other scarce technical specialties across the board, the problem of recruiting and retaining qualified staff persists. It is clear that the problem is not fully understood. In any case, the problem must be addressed head-on in preparation of the PP Amendment.

### Key Project Assumptions

The team pointed out several underlying "implicit" assumptions influencing project implementation which, because they were not stated, were not given the attention they deserved in development of the IMS project. The team felt that, had these factors been explicitly considered, some implementation problems could have been alleviated. One was that the technical interventions introduced by the project could be implemented and sustained with only minor adjustments in the MOI's organization and personnel policies. The team felt that as a consequence of this unspoken assumption, the project design did not anticipate the need for a fairly major organizational change in the MOI: an inter-disciplinary team approach to activities such as the RIIP rather than the traditional dominance of engineers. A second implicit assumption which has not proved valid was that Ministry of Irrigation and Ministry of Agriculture staff would cooperate and coordinate their activities at all levels. Absence of such cooperation may hinder implementation of the WRC and RIIP components. The PP Amendment should take care to state and confirm the accuracy of key project assumptions.

### IMS Incorporation of EWUP

Though the evaluation does not directly address to what extent the IMS has built on the Egypt Water Use Project (EWUP) experience, it does identify important constraints to effective implementation of the two components that were intended to build on EWUP: the RIIP and the WRC. The evaluation points out that EWUP was a fairly small-scale research effort, not intended to be a pilot project. To convert the initial research findings of the EWUP to a regional project of a sufficiently large scale to test its economic, financial and administrative merits is fairly complicated. The design of a research program differs substantially from design of a pilot project. To make the transition a suitable implementation approach must be developed, organizations must be built up and staff must be trained. The difference in approach between EWUP and RIIP was not fully identified during design and has contributed to the implementation delays.

The evaluation notes the shift in WRC's research focus from the emphasis on on-farm and mesqua-level activities under EWUP to the IMS emphasis on delivery systems. It notes that the on-farm training course must be broadened from primarily engineers to interdisciplinary teams to implement the RIIP. It notes the need for coordination between MOI and MOA staff at the field-level. Finally, it points out that the expansion of the EWUP approach requires a radical departure from the MOI's traditional, engineer-oriented staffing and organizational structure, and that changes will not occur unless explicit interventions are undertaken to affect them. Like any bureaucratic change, this is likely to be a slow and difficult process. The MOI and USAID need to recognize and address these problems in their efforts to implement the RIIP and WRC project components.

XD-AAS-561-A

ISN 43095

MID-TERM EVALUATION REPORT  
OF THE  
IRRIGATION MANAGEMENT SYSTEM PROJECT  
(263-0132)

by

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THE GOVERNMENT OF EGYPT  
and

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Cairo, Egypt  
September 1985

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## FOREWORD

The cooperation in obtaining information has made working in Egypt on the evaluation of Irrigation Management Systems project with the Ministry of Irrigation and USAID/Cairo a unique pleasure. The U.S. team members, Charles Busch, Frank A. Santopolo and I, join their Egyptian colleagues Ahmed Fahmy and Mohammed Ali in expressing their appreciation for the logistical support received in carrying out this assignment in Cairo as well as in Gharbia and El Minia. The willingness of officials to meet us especially on short notice certainly made our work easier and pleasant. Finally, the assistance we received from Sawsan Aly and Mary Megalli in typing drafts and putting the parts into a completed document was exceptional.

We sincerely hope that this report will assist the MOI in achieving the goals of the Irrigation Management Systems project.

Willis Shaner  
Team Leader

ACRONYMS, CONVERSIONS AND TECHNICAL TERMS

|               |  |
|---------------|--|
| CID           | Consortium for International Development   |
| CSU           | Colorado State University  |
| EWUP          | Egyptian Water Use and Management Project  |
| Exchange rate | 1.00 Egyptian Pound (L.E.) = U.S.\$ 0.81 (official)<br>= U.S.\$ 1.24 (current exchange)        |
| Feddān        | Unit of land measure, approx. 1.04 acres   |
| GOE           | Government of Egypt  |
| IMS           | Irrigation Management Systems Project  |
| Mahrwa        | Head ditch in a field.   |
| Mesqa         | Canal section connecting MOI distributory and farmer's head ditches, serving 25 to 250 feddans |
| MOA           | Ministry of Agriculture  |
| MOI           | Ministry of Irrigation   |
| O&M           | Operation and maintenance  |
| PP            | Project Paper  |
| PPU           | Project Preparation Unit   |
| RIIP          | Regional Irrigation Improvement Project  |
| Sakkia        | Animal powered irrigation pump generally used to lift water from the mesqas                    |
| SR            | Structure Replacement Project  |
| TA            | Technical Assistance   |
| Tambour       | Hand-powered Archimedean screw irrigation pump   |
| TMD           | Training and Manpower Development  |
| U/S           | Under-secretary  |
| USAID         | United States Agency for International Development   |

WMRI Water Management and Research Institute of the Water  
Research Center

WRC Water Research Center

## 1. EXECUTIVE SUMMARY

1.1 The Irrigation Management System (IMS) project, authorized by Grant Agreement in September 1981 and enlarged by an Amendment in August 1984, is a related set of activities designed to improve Egypt's irrigation delivery and on-farm water use. Now entering its fifth year, the project's terminal date is July 1987.

1.2 This summary contains the highlights of our evaluation of nine of the ten components of the IMS project together with what we believe to be the most important recommendations. The technical aspects of the Structure Replacement component was evaluated earlier and therefore was excluded from our scope of work. Six of the activities (Project Preparation Unit, North Zifta Feasibility Study, Gharbiā O&M, Training and Manpower, Commodities, and Consulting Services) were initiated with the original Grant Agreement. The remaining three activities (Regional Irrigation Improvement Project, Water Research Center, and Telemetry) were initiated with the Amendment. The first part of our summary contains general findings, conclusions, and recommendations. We follow this with similar material for specific project activities. The reader will find supporting statements and additional recommendations in the body of the report. The number in parentheses following each recommendation in this Summary refers to the paragraph preceding the recommendation in the body of the report.

### General Findings

1.3 The activities of the IMS project are in line with the GOE's concern for making more efficient use of the Nile's waters. This concern centers on Egypt's need to produce more food for its expanding population.

1.4 The set of IMS activities have an internal consistency that makes their implementation under a single USAID umbrella a reasonable approach. This approach conforms with the GOE's and AID's desire for sectoral funding and provides advantages of funding and administrative flexibility. At the same time, the approach demands increased attention to coordination and monitoring and evaluation of results.

1.5 Apart from the Structure Replacement component, many of the project's outputs are in the form of improved institutional capabilities. The greater time to effect institutional change, coupled with the normal bureaucratic

requirements of two governments, has caused the project to fall behind on a number of its physical and expenditure targets. In general the IMS project is advancing towards its intended purpose and goals as defined in the PP, but at a slower rate than expected. For this reason, the Ministry of Irrigation (MOI) will require more time to complete the project's objectives than allotted in the Grant Agreement.

Recommendation: Because of the inevitable shortfall in arriving at project targets, both physical and budgetary, we suggest that the MOI and USAID initiate plans to extend the Grant Agreement according to some prescribed schedule (para. 8.7).

1.6 The MOI operates under a serious manpower constraint because of the general demand for engineers outside of MOI and the Government's low rate of remuneration. Many of the MOI's aspirations are jeopardized because of its inability to acquire and retain quality staff.

Recommendation: The IMS Coordinating Committee should contact higher level GOE authorities to explore ways for solving the MOI's manpower shortage (para. 4.3).

Recommendation: USAID should explore ways with GOE for enhancing and expediting incentive payments to MOI staff (para. 4.3).

1.7 The relationships between the MOI and Ministry of Irrigation (MOA) are reportedly good at the national and directorate levels; in contrast, we found little evidence of effective integration of their activities at the grass roots level. Because such integration is so essential to efficient water use and the associated improvements in agricultural production, greater effort must be made to bring about such integration. Through its funding support to both ministries, USAID and other donors have an opportunity to encourage these two ministries to enter into more substantive agreements.

Recommendation: USAID should contact MOI, MOA and other donors to discuss ways to bring about more effective cooperation and coordination among the activities of these two ministries. Important areas to start include on-farm water management, data gathering for the Project Preparation Unit (PPU), training the MOA extension staff in irrigation practices, and involving MOA staff in Regional Irrigation Improvement Project's (RIIP) Serry Canal areas (para. 4.8).

### Specific Findings

1.8 The sections below begin with those activities initiated under the original Grant Agreement, excluding Commodities and Consulting Services, as these two activities are progressing satisfactorily. The exclusion, however, does not apply to those commodities funded as part of the other activities, e.g., workshop equipment for Gharbia O&M. Then the three activities authorized by the Amendment are considered.

1.9 The Project Preparation Unit (PPU) has succeeded in fulfilling several of its objectives. It has conducted a variety of studies of interest to the MOI, instituted an appropriate training program for its staff, and has begun developing the infrastructure for an effective project preparation unit by installing up-to-date computer facilities, collecting basic data, and building its library. The Unit however has been torn between its dual objectives of training and project preparation. Given the press of time, training has had to give way. More critical is the Unit's lack of progress in being able to function without major technical assistance. The principal cause of the problem is the Unit's lack of Egyptian staff with mature planning experience capable of meeting the requirements of international donors. As elsewhere within the MOI, the Unit has difficulty in attracting and retaining staff with the professional capabilities suitable to its responsibilities. We also failed to note any formal procedures for screening feasibility studies. This deficiency probably rests more with the directives given from higher echelons than with the Unit itself.

Recommendation: The Coordinating Committee should authorize the PPU to conduct prefeasibility studies on potential projects to learn of their merits before deciding whether or not to carry out a full feasibility study (para. 14.2.11).

Recommendation: The Coordinating Committee should guide the PPU in the appropriate division of its efforts between training and project preparation (para. 14.2.11).

Recommendation: With guidance from the Coordinating Committee, the Project Director should seek out Egyptian staff with considerably more planning experience than those presently staffing the Unit (para. 14.2.11).

Recommendation: The PPU should begin planning for the extension of its technical assistance contract and USAID should be responsive to continued financial support for such assistance (para. 14.2.11).

1.10 The intent of the North Zifta project was to develop a feasible plan to redesign, or otherwise improve, the irrigation system and related facilities so as to increase farm productivity and farmers' income. Equally important was the Government's desire to use this pilot area as a basis for developing programs that could be implemented at the national level. The outcome of the feasibility study shows that these hopes are not likely to be met, for two reasons. First, the study found that the area was reasonably well served by both irrigation and drainage facilities currently in place and therefore would not materially benefit from major improvements to the system. Second, data on project benefits were sufficiently unreliable to cast doubt on the study's findings. Problems in data collection arose from initial lack of cooperation from the MOA, inexperienced enumerators, and the basic difficulty of attributing benefits to specific system changes. The team felt that the profitability estimate of 18 percent for the project, as currently conceived, does not warrant consideration for AID funding the construction phase.

1.11 Despite these negative findings concerning the project as a whole, the PPU came up with an open channel/buried pipe design for mesqas serving farmers at the tail-end of the system. This design, which appears to offer considerable economic advantages over alternative designs, deserves further consideration.

Recommendation: USAID should not support the design and construction of the North Zifta project as revealed in the draft report nearing completion in early September 1985 (para. 14.3.12).

Recommendation: The WRC should field test the open channel/buried pipe concept developed in this study (para. 14.3.12).

1.12 The MOI has taken little action on the Gharbia O&M project since the year-long study was completed in February 1984. While the report provides useful information on O&M functions, the general opinion of those reviewing the report was that it failed to adequately relate these functions to

conditions in the Gharbia Directorate. Explanations for this failure vary, but of critical importance in our opinion was the apparent lack of support from Water Distribution (a unit within MOI's Irrigation Sector), where the improvements were to be implemented. Experiences elsewhere might have foretold that problems could be expected when dealing with operating changes in well established organizations carrying out routine assignments. We also note that the responsibility for this project rests with a Project Director who does not have administrative responsibility for O&M activities once they are ready to be implemented.

1.13 As yet, the recently appointed Project Director has not decided how to proceed: whether to hire a local or expatriate consultant, whether or not to complete the study internally, etc. In the meantime, workshop equipment to be ordered as part of this project has been put on hold. Because a year's time could be required to secure the equipment, the project is in jeopardy of running out of time. Given the need for expert advice on these matters, together with the progress already made by the Harza consultant, we believe that additional technical assistance should be obtained to complete this work. Whether this approach is followed or not, USAID's position paper on the consultant's report should be made available to Harza's Chief of Party.

Recommendation: The Project Director should obtain consulting help to complete the Gharbia O&M study, using results from the completed Gharbia O&M study and relevant sections of USAID's Position Paper (para. 14.4.8).

Recommendation: The Vice Minister should change the Project Director responsible for the Gharbia O&M Project to one from Water Distribution, which will be the implementing unit within the MOI (para. 14.4.8).

Recommendation: The workshop equipment ordering process should recommence as soon as new consulting advice makes this feasible (para. 14.4.8).

1.14 The Training and Manpower project has met its principal objectives of developing suitable training materials, providing courses on a regular basis, and improving the skills of the targeted number of trainees. Course evaluations support the project's accomplishments, with the exception that evaluations have not been formalized to obtain the supervisors'

reactions once trainees are back on the job. Such evaluations, however, are in the process of being formalized. Also, we were unable to obtain much information that would tell us to what extent trained personnel are being properly used once they return to their jobs or to what extent they are lost after being trained. On balance, the project seems to be doing well.

1.15 In the future, the expanded IMS program will call for increasing numbers of trained MOI and MOA staff to meet the objectives of various regional and national programs. Of particular importance in expanding the interdisciplinary approach envisioned under the RIIP program is the preparation of greater numbers of staff to work at the mesqa level. The project also must keep abreast of changing technologies. With this in mind, we see a need for continued staff development for the trainers, for increased numbers of staff who are trained, and eventually, a need to translate this project component into a national training institute. The Project Director could be materially helped were he to be assisted by a long-term expatriate who could assist in staff and curricula development.

Recommendation: The Project Director should secure the services of an expatriate specialist in building a training institute capable of meeting MOI's training needs concerning delivery systems and on-farm water use. The need for training appropriate MOA staff should also be taken into account (para. 14.5.31).

Recommendation: USAID should go ahead with its plans for bringing an assessment team to study the feasibility of a national training institute (para. 14.5.31).

Recommendation: The Project Director should retain the On-farm Water Management course in its original format, and require that the trainee cohort consist of agronomists, economists, and sociologists as well as engineers; the course should be offered in El Minya, and the routine sending of trainees to the United States should be reexamined (para. 15.5.31).

Recommendation: In addition to the present evaluations, the Project Director should implement post-course evaluations immediately (para. 14.5.31).

Recommendation: In recognition of the growing need for quality trainers, the Project Director should institute means

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whereby his staff are able to identify those who have the potential for becoming excellent trainers. Once identified, a program for their development needs to be worked out, including possible training abroad (para. 14.5.31).

1.16 The Regional Irrigation Improvement Program (RIIP) has begun collecting data and preparing designs for canal improvements, but has not started on mesqa or other on-farm improvements. With this slow start in actual improvements to the irrigation system, the target of improving 40,000 to 50,000 feddans by July 1987 will not come close to being attained. Of course, traditional canal improvements, which may be said to help farmers receiving water from the delivery system, might be interpreted as meeting these target values. But such accomplishments fall far short of those envisioned by the EWUP approach.

1.17 Several reasons explain the slow start. First, EWUP's accomplishments were incorrectly perceived as totally fulfilling the needs of a pilot program that could be extended to the regional level. Pilot programs involve replicability of approach throughout stratified areas of commonality that are within the Ministry's financial and administrative capabilities. Second, many technical factors relating to system changes are yet to be considered, such as the implications for converting from continuous flows to rotations, and especially, the way these changes impinge upon farmers' practices and willingness to cooperate. Third, because of this complexity, the RIIP and WRC Project Directors are awaiting the arrival of the CID team which in turn was delayed because of the lengthy AID approval process for the PP amendment and the consultants contract. WRC is involved in RIIP because of its ability to provide technical assistance until the RIIP methodology becomes established. Finally, waiting for the CID team's arrival undoubtedly imposed delays on the Director of the Serry Canal project, both in terms of acquiring the Abyuha staff and formalizing agreements to receive MOA assistance.

Recommendation: As early as possible, both MOI and CID should take up the question of the type of pilot program to undertake. This includes developing details on how to stratify the Serry Canal area and deciding what components of the pilot program to test for technical, economic, financial, and administrative feasibility (para. 14.6.15).

Recommendation: The Project Director needs to come up with a revised timetable for accomplishments and convey this to the Vice Minister (para. 14.6.15).

Recommendation: The MOI should initiate steps soon to formally bring the MOA into RIIP, using the Serry Canal area as a model (para. 14.6.15).

1.18 Under the IMS project, WRC carries responsibility to continue the work begun by EWUP and to assist with the implementation of RIIP. The on-farm water management work associated with earlier EWUP activity will be handled by the Water Management Research Institute (WMRI), which falls under WRC's direction. The WMRI will provide RIIP with their on-farm water management activities.

1.19 Much of the reason for WRC's having spent so few funds under the project stems from the time required to place a technical assistance contractor in the country. However, the rate of expenditure should change now that the CID contract has been signed (May 1985). Recently, the first long-term CID employee arrived in Egypt and the rest of the long-term staff are expected in October 1985; computers and vehicles have been ordered. While only one of the expatriates is assigned directly to WRC, prior relations between WRC and CID should increase CID's effectiveness.

Recommendation: Because of WRC's influence over RIIP, the WRC Director should explore with USAID ways in which MOA extension agents may become members of interdisciplinary teams responsible for improving irrigation at the mesqa level. The means for doing so should include funding for MOA's inputs. This recommendation is similar to an earlier one concerning RIIP's Serry Canal activities, but is more general (14.7.7).

1.20 The Telemetry project provides an example of a well conceived approach for technology transfer which developed over the past eight years. This project makes use of up-to-date concepts in transmission (meteor burst), recording stations,

and computer modeling. Its implementation will greatly facilitate MOI's management of the delivery system and undoubtedly will pave the way for even more effective management techniques. To date, work is on schedule and within the budget. The implementing contractor, RET Corporation of Virginia, signed the contract in July and plans to complete the work within a 15-month period.

1.21 While the project has many favorable aspects, the Director faces serious problems in the lack of Egyptian staff. Though he is presently adequately supported by expatriate technical assistance, in the future when the system is operating he will be dependent upon a few key Egyptians. These well trained and specialized individuals are likely to be in high demand, with potential salary offerings from other organizations far above those the MOI is currently able to pay. Clearly, the problem of attractive remuneration for MOI staff is amplified in this case.

Recommendation: The Project Director should pay particular attention to his future staffing requirements. He should consider acquiring and training backup staff for key positions (para. 14.8.6).

Recommendation: The MOI could help the Project Director in the foregoing recommendation by authorizing significant incentive increases to key employees (para. 14.8.6).

## 2. PROJECT BACKGROUND.

2.1 The IMS project represents the results of extensive collaboration between the Ministry of Irrigation (MOI), 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. The project undertook a large program of structural replacement (SR) to address the on-going deterioration of irrigation structures and replace all non functioning structures (the structural backlog). An institution building effort was also initiated to develop the workforce to carry out the MOI's increasingly complex responsibilities. The IMS project brings together a set of related activities to be carried out within several established organizational units of the MOI. These activities receive advisory assistance, financial support, and physical inputs from USAID.

2.2 The original project included the following activities:

- a) SR in five pilot directorates with emphasis on quality control;
- b) operation and maintenance planning for the Gharbia Directorate;
- c) project preparation unit development;
- d) North Zifta system redesign and feasibility study;
- e) workforce development and training;
- f) commodities; and
- g) consulting services.

2.3 The Project Paper Amendment was approved by AID/Washington in June 1984 and the Grant Agreement was amended on August 29, 1984. The Amendment expanded the SR activity and added the following three new components.

- a) Regional Irrigation Improvement Program (RIIP) to improve irrigation management on 40,000 to 50,000 feddans during the next three years;

- b) Telemetry system, which will collect data for instant transmission to a central location to permit timely water management decisions;
- c) Water Research Center (WRC), to provide continued support for adaptive research for irrigation and land development. The RIIP and WRC activities are direct outgrowths of the Egyptian Water Use Project (EWUP) which ended in 1984.

#### 2.4 In summary, this IMS amendment

- a) continues the effort to redesign, rehabilitate, and improve the Egyptian irrigation system while keeping the existing system maintained and operating,
- b) builds on the experience of EWUP and introduces some innovative institutional arrangements which will permit a more efficient management of the conveyance system as it is extended and improved in the old irrigated lands, and
- c) develops training and research programs that will produce the work force and the knowledge base which will increase the efficiency of water delivery, improve on-farm water management, and raise crop yields.

### 3. EVALUATION METHODOLOGY

3.1 The evaluation's scope of work (see Appendix A) called for a team made up of an irrigation engineer, economist, and sociologist, to conduct an evaluation and prepare its report within a five-week period.

3.2 Despite some time constraints, the evaluation team was able to accomplish its mission because of the excellent support and cooperation from the USAID/Cairo and MOI staffs. A prime example of this support was the addition of two experienced MOI officers to the evaluation team. Together, the American and Egyptian members complimented each other in knowledge, skills and experience which permitted them to identify language, customs and organizational differences which might have become

formidable obstacles. Another example was the initial meeting of the team with MOI Vice-Minister Badawy and the five leaders of the ten subcomponents of the IMS project. This meeting permitted the evaluation team to explain its purpose and to approach the concerned parties. The meeting also provided the team the opportunity to distribute a list of questions which its members expected to ask of the IMS directors in subsequent meetings (see Appendix B). The initial appointments for subsequent meetings were set at that time. The momentum which began at that meeting with the Vice-Minister carried the team along throughout its stay in Egypt.

3.3 The evaluation team had to keep in mind that some of the project activities began at different times. That is, the original agreement became effective in September 1981 and the amendment was first approved by USAID in June 1984 and then signed by the GOE in August 1984. Thus, the availability of hard data with which one could measure accomplishments could not be expected for IMS as a whole. Under these conditions, the strategy was to learn as much as possible about current program activities, describing what has happened, why, and at what cost. Then we examined efforts to coordinate the activities into a consistent project framework. When data permitted, we pursued more intensive analyses.

3.4 The team's itinerary, contacts, and references are described in Appendices C through E, respectively.

#### 4. EXTERNAL FACTORS

4.1 The setting for the IMS project influences its effectiveness. Some of the more relevant characteristics of this setting relate to national objectives and strategies, economic activity, the impact of an engineering shortage on MOI activities, EWUP accomplishments, linkages between MOI and MOA, and the relevance of MOA activities and farmers' conditions.

4.2 The GOE concern over a growing population with limited cultivable land, substantial rural to urban migration that places an increasing burden on urban infrastructure, and a deteriorating food balance (production versus net food imports), leads to a focus on improving agricultural production. Population is growing at 2.7 percent, the labor force is growing at 2.2 percent, 20,000 feddans are being taken out of production annually (compared with a total of 5.8

million feddans of old lands and 0.5 million feddans of new lands under irrigation), and Egypt currently imports about 50 percent of its food (compared with earlier conditions when the country was a net exporter of agricultural products). The General Framework for the 1980-1984 plan accordingly gives top priority to the agricultural sector's investment program (20 percent of the investment budget). This investment program includes a broad range of activities such as irrigation, agricultural technology, credit, agroindustries, and the like. Generally, emphasis is on production rather than consumption, but with provisions to protect the livelihood of those at the bottom of the income scale. With this emphasis, the GOE hopes to conserve water through greater efficiencies, expand areas under cultivation, increase agricultural productivity, reverse the deteriorating food balance, and provide employment opportunities in rural areas.

4.3 The GOE appears to have a serious budgetary constraint that shows up in low government salaries and benefits. We do not fully understand the reasons for the currently low salary levels, but one contributing factor is the GOE's policy of being the "employer of last resort" for its university graduates. Because of the low remunerations offered to its employees, morale and consequently productivity are often low. Moreover, MOI encounters difficulty in obtaining the required staff for its expanding program and in retaining that staff once it becomes trained. Currently, 900 engineering positions remain unfilled out of a total of 2,100 positions. Any MOI program that calls for substantial increases in its engineering staff should recognize this manpower constraint. Such a constraint will most certainly retard the normal rate of expansion based on local staffing and will require more expatriate assistance than MOI appears to desire. The MOI does not have such a problem in hiring non-engineering professionals or technicians. Because the MOI's shortage of engineering staff appears to be a symptom of a broader remuneration problem of GOE employees, its ultimate solution calls for decisions at higher government levels. In the meantime, the MOI should continue seeking ways to increase employee satisfaction through incentives, upgrading job classifications (as with WRC's requirements that its staff have graduate degrees) so that higher pay scales will apply, providing professionally satisfying assignments, and possibly through the creation of additional government corporations (e.g., Authorities) that have more freedom in personnel decisions than do the

ministries. Besides reliance on its own resources, the MOI may wish to seek help from donor countries in providing adequate employee incentives until a more permanent solution is found. One possibility is for more creative use of PL480 funds.

Recommendation: The IMS Coordinating Committee should contact higher level GOE authorities to explore ways for solving the MOI's manpower shortage.

Recommendation: USAID should explore ways with GOE for enhancing and expediting incentive payments to MOI staff.

4.4 AID and other donors frequently raise the issue of cost recovery from beneficiaries of the programs they support. Such recovery becomes important for various reasons: it helps the government raise badly needed revenues, serves to efficiently allocate limited resources, may contain an element of equity in having those who benefit also pay, and tends to foster a feeling of ownership in whatever is being provided. An objective of the World Bank is that project beneficiaries pay for the full costs of operating and maintaining the system and as much of the investment costs as seems feasible and equitable, given the relative income levels of the beneficiaries. Often, governments do not adhere to this objective because custom dictates against such practices, or because of the desire to benefit as much as possible those at the bottom of the income scale, and the difficulty and often-times high cost of collecting the revenues. We raise this issue at this point because of the dire need of the GOE to raise revenues and of AID's support of the general principle of such cost recovery. However, simply applying such a cost recovery principle to Egyptian farmers without careful study could be a mistake. Of the many factors to be considered, perhaps the most serious is the burden already being imposed on these farmers simply by the Government's requirement that they grow certain crops and market them at below their internationally equivalent prices. We raise this issue at this point not because we oppose having farmers share at least part of the improvement costs, but to warn that a variety of issues needs to be considered before taking action. Those who are concerned with the issue of cost recovery should take note of the work in water pricing being undertaken by Cairo University in collaboration with the Water Research Center.

4.5 Returning to the manpower issue, MOI's shortage bears directly on the IMS program with its heavy emphasis on institution building: namely, on the programs of the Project Preparation Unit, Gharbia O&M, RIIP, WRC, Training and Manpower Development, and Telemetry. Rates of staff development will be slower, partly because many of the more aggressive young engineers will seek higher-paying non-government positions; or, after these young engineers are employed and trained for the IMS program, they may subsequently leave with their newly acquired skills for better positions outside the Government. Some evidence of this exodus has already occurred within IMS. The argument that MOI's loss is the economy's gain does not hold true, simply because IMS calls for a critical mass of well trained staff to implement this important program, whereas those leaving are less likely to contribute to such a vital program.

4.6 While all of the above-mentioned programs would be damaged by the departure of those trained under IMS, the PPU and Telemetry projects would probably be damaged the most. The PPU occupies a key position within the MOI because of its responsibilities to prepare projects for GOE and international funding. Failure on this count produces the well known absorptive capacity constraint. The Telemetry project is particularly vulnerable because of its dependency on a relatively small number of highly qualified individuals. More will be said about these two projects in Section 14.

4.7 EWUP's applied research program in irrigation, with its heavy emphasis on on-farm water management, influences the IMS project in several ways. It conditioned many of the MOI staff as to the relevance of the linkages between main system design and operation and farmers' use of irrigation deliveries. It brought out the relevance of understanding farmers' preferences and practices. It stressed the importance of interdisciplinary teamwork as a means of identifying farmers' and system problems through discussions with farmers, observations and field measurements. These influences show through today when talking with those who were closely associated with EWUP. Thus, EWUP broke much new ground in the way MOI and MOA staff look at irrigated agriculture. The process by which EWUP operated was to investigate in considerable detail a range of topics cutting across many areas. This process did not end when CID completed its work in December 1984. WRC, primarily through the Water Management

Research Institute, continues with some of this work. Implied in the EWUP approach, if not explicitly stated, was the generation of information that could be used to implement EWUP's findings on a regional scale with a minimum of further justification or research. The feeling has been expressed within the MOI and AID that after seven years of EWUP research, the country is now ready to begin implementing the improvements without further delay. This anticipation shows up in RIIP and explains the feeling of urgency for action. More will be said about the overly ambitious targets set for RIIP in Section 14.

4.8 EWUP forged a link between the MOI and MOA through official agreements, joint planning, and mutual involvement of their staffs. However, EWUP's accomplishments in bringing these two groups together were more like the first few steps of a long journey. To guard against losing the momentum gained under EWUP, more aggressive action will need to be taken to bring about the integration of MOI and MOA at the implementation level. An important starting point for the MOI will be with RIIP in the Serry Canal area.

Recommendation: USAID should contact MOI, MOA and other donors to discuss ways to bring about more effective cooperation and coordination among the activities of these two ministries. Important areas to start with include on-farm water management, data gathering for the PPU, training the MOA extension staff in irrigation practices, and involving MOA staff in RIIP's Serry Canal areas.

4.9 The current five year plan lends credence to the importance of activities under the responsibility of the MOA, through references to the importance of agronomic inputs, extension, research, credit, and agroindustries. Thus, while MOI is rightfully concerned about improving the efficiency of water delivery and use, farmers' practices and conditions are also relevant. The following are some factors to be taken into account by the IMS project when planning its activities.

- a) Controlled prices for some of the farmers' crops and crop quotas lower farmers' income, including their ability to hire farm labor and pay for irrigation water supplies.
- b) Subsidies on some of the farmers' inputs somewhat offset the suppression of farm income, but also distort farmers' choices.

- c) One of these distortions, especially important in forms of irrigation used, is the highly subsidized price of diesel fuel. By making water so much easier to lift, much of the earlier control over farmers' water use may be lost.
- d) MOI's subsurface drainage program, supported largely by the World Bank, uses a civil works approach to maintaining water table levels that contrasts with EWUP's on-farm water management approach to accomplishing the same, as well as other, objectives.

## 5. KEY PROJECT ASSUMPTIONS

5.1 Of the 28 important assumptions listed in the Logical Framework of the Project Paper and the Amendment's Addendum (see Appendix F), the following have yet to be validated:

| <u>Assumption</u>  | <u>Status</u>   |
|--|---|
| II.1.a.b<br>The MOI will be successful in working out incentive pay arrangements to improve productivity of present staff and prospects for recruitment.         | Incentive pay has been authorized but is inadequate as an effective means of recruiting or retaining staff. |
| II.1.a.c<br>Plans for improved O&M will be adopted by the MOI and applied as rapidly as resources can be mobilized to implement them in successive Directorates. | The Gharbia O&M Planning Report is still to be satisfactorily completed.                                    |
| II.1.b.b<br>Engineering oriented management leadership will accept the important role of other disciplines in reaching feasibility decisions.                    | Non-engineers have yet to emerge in decision making positions or have their own career ladders in MOI.      |

II.1.c.b

The purposes and requirements of the North Zifta study will be reviewed by the Cabinet of the GOE and its broad aims adopted as a Government effort rather than just a MOI effort.

This assumption presumes the North Zifta Feasibility Study would present an attractive package for development; this is not the case.

III.5.c

A staff recruitment drive will be carried out successfully.

Current recruitment is for 20 engineers, while vacant engineering positions number about 700.

Equally as important as the stated assumptions are the underlying implicit assumptions influencing project implementation. It is our aim in this section to focus on three implicit assumptions which we believe were made, but not given the attention they deserved in the development of the IMS project. These three examples will permit us to demonstrate the problems which might have been avoided, or at least anticipated, had the underlying assumptions been considered.

First Assumption

5.2 The most significant one can be stated in this way: once the technical irrigation system in Egypt has been designed to meet current and future water requirements and has become operational, the institutional and organizational structures required to operate this "new" irrigation system will be in place with few minor adjustments made in MOI's organization and personnel policies. We believe more than minor adjustments can be expected.

5.3 The IMS umbrella concept is in itself an example of an organizational adjustment to meet new situations. Another example comes from the EWUP experience which demonstrated the need for disciplines other than engineering to be placed at the mesqa level and organized into an interdisciplinary unit to teach farmers to use water efficiently under a different delivery system. It is basically this type of unit that RIIP expects to extend to various regions. Yet, the EWUP experience and on-farm portions of IMS to date are radical departures from

MOI's traditional organizational structure. Moreover, this interdisciplinary unit, to be effective, needs to be supervised by administrators with different management skills than those previously used in MOI. The use of non-engineering professionals has revealed that the MOI does not have personnel policies particularly attractive to non-engineers.

5.4 There is an old adage among social scientists that if one really wants to know how a system works, one makes some significant changes in that system. The reactions will reveal the actual organizational networks and their interrelatedness. We have heard about some of these reactions.

5.5 The implicit assumption stated above prevented MOI from anticipating the need to incorporate non-engineers as equals in MOI. Yet the PP's Logical Framework gives the project's purpose as being to "expand and improve MOI planning/analytic capability," based on the assumption that "...engineering-oriented management leadership will accept the important role of other disciplines in reaching feasible decisions." If this is interpreted narrowly, it means these non-engineers are brought in for a feasibility assignment and then dismissed. If read more broadly it could mean a more permanent relationship will develop. We believe a broader reading should be made, and understand that MOI plans to correct this situation.

5.6 As important as the non-engineers case may be, it is not in our opinion as critical as the need to consider a more drastic institutional change. Such a change will be necessary to accommodate the "new" irrigation system.

5.7 For example, we see the telemetry project as one step toward the development of an irrigation system in the future which can be roughly characterized as a computerized "push-button" system. To implement the telemetry project and similar ones will require the hiring and retaining of young persons, engineers and technicians, exposed to knowledge, skills and work environments which are significantly different from those of their supervisors who have acquired their administrative/management experience within a non-electronic environment and the seniority promotion scheme. The potential conflict between the "new technologists" and the "traditional generalists" as well as the reward systems for both must be

anticipated now. These nontraditional projects must be carefully observed and monitored in order to forestall conflict. Adjustments must be made to keep the integrity of the MOI intact and the morale of all staff high.

5.8 These few examples challenge the implicit assumption that the organizational structure to run the technical system will just evolve. Without direct intervention there will be considerable lag in the development of an organizational structure to manage a considerably modernized technical system.

#### Second Assumption

5.9 The second implicit assumption that recurs in the various documents concerning Egyptian irrigation and agricultural schemes and in discussions with administrators of MOI and MOA is that cooperation and coordination can be expected from MOI and MOA whenever their programs interface. It is thus further assumed that:

- a) MOI and MOA staffs have agreed on farmers' needs, on intervention strategies to meet these needs, and on their respective responsibilities and tasks as well as on a coordinated work schedule, and
- b) the MOI and MOA have assigned specific responsibilities to an organizational structure that extends an integrated program down to the mesqa level.

5.10 These are some of the outcomes one could expect if the basic implicit assumption was valid. Joint committees have been established at the ministerial and directorate levels and we detected no personal or organizational antagonisms between MOI and MOA. Yet we have very little evidence that the expectations are being realized. Perhaps this coordination is suffering from "benign neglect." Whatever the cause, we believe the matter deserves more attention at all levels of both ministries. Nothing we saw at the mesqa level demonstrated coordinated action, though this is where it must occur.

#### Third Assumption

5.11 Another implicit assumption concerns the training program. The IMS Training and Manpower Development Program is not an academic degree granting activity. It is an in-service

training program. Its purpose is to retrain MOI professionals and subprofessionals in certain topics by upgrading them in jobs that require specific knowledge, skills and even attitudes. Retraining implicitly assumes that job specifications have been written, that the concomitant knowledge, skills, and attitudes have been identified for those jobs, and that this information has been provided to the trainers. Again these expectations fall short. This is not to say that the training program has developed out of thin air. On the contrary, the trainers have done a commendable job of collecting a general description of training needs for all course areas. In years past many senior MOI personnel were given in-service training by their own supervisors. When asked for training suggestions they were able to provide the trainers with considerable information about staff needs recalling these earlier experiences. Detailed job specifications are needed for any training program, as much as design and material specifications are needed for the construction of a bridge. They also must be developed with the same meticulous care. These job specifications, to our knowledge, have not been provided.

5.12 In summary, we have identified three basic assumptions which are implicit in the development of IMS.

- a) Once the technical irrigation system is in place, the institutional and organizational structures required to operate it will be operational.
- b) Cooperation and coordination can be expected from representatives of MOI and MOA whenever and wherever they interface.
- c) MOI job specifications are written in enough detail to identify the knowledge, skills and attitudes associated with those jobs for which training courses have been selected.

5.13 We have selected only three assumptions which are implied in the development of IMS. By concentrating on these three we tried to demonstrate the seriousness of overlooking them. Therefore, we urge that more attention be given to identifying the implicit assumptions, especially when they involve institutional development.

5.14 In reading many documents on Egyptian irrigation projects we have noted that other underlying assumptions were identified. We chose not to repeat those already mentioned in previous reports but to extend the examples. The EWUP End of Project Evaluation Report by A. Alvin Bishop, et al. (March, 1985) listed several implicit assumptions which also have significance for the IMS project. As Bishop states in this evaluation (p.10), "The 'important' project assumptions listed in the project paper logframe were in reality basic administrative/logistic requirements applicable to almost any project."

## 6. PROGRESS SINCE THE LAST EVALUATION

6.1 This section is not applicable, since no prior evaluations have been made for the portions of the project being considered in this evaluation. That is, of the ten components, only Structure Replacement has been evaluated, and this component is not part of the the present evaluation's scope of work.

## 7. INPUTS

7.1 Inputs supplied in response to the PP have generally been acceptable. Harza Engineering's supply of technical assistance has been well received, with the exception of the Gharbia O&M Report (see Section 14.4). Commodities for the original project agreement are now in-country and mostly in use; again, an exception relates to the Gharbia O&M activity. Training programs both in-country and abroad are proceeding on schedule.

7.2 The commodity inputs specified under the PP Amendment are largely awaiting completion of a procurement plan that in turn awaits arrival of the CID Technical Assistance team in October. Also, a new training plan for PP Amendment additions is soon to be prepared by the CID/CSU contractor in collaboration with MOI and USAID. Positively, telemetry system inputs are all contained in the RET contract, which is on schedule and within budget.

7.3 GOE inputs have generally stayed abreast of IMS project requirements. Each project component has an assigned Project Director within MOI; these Project Directors meet as a Coordinating Committee under the chairmanship of the Vice Minister.

## 8. OUTPUTS

8.1 This section contains a summary of expenditures as a reflection of project outputs, summary statements on nine project activities (SR was evaluated earlier), remarks about MOI's Coordinating Committee, and recommendations. More detailed discussion of the nine projects, together with specific recommendations, are contained in Section 14, Special Comments.

### Expenditure Summary

8.2 The rate of output as influenced by the level of inputs is substantially behind target. For example, as of August 1985, AID accounting records show that only \$39 million of the \$139 million IMS program have been spent; that amounts to 28 percent expenditures against an elapsed time that is 67 percent of the total. By simple extension of these values, we can predict with considerable confidence that the full level of expenditures will not be reached by July 1987, the end-of-project date. However, to gain a clearer picture of IMS accomplishments and shortcomings, these global figures need to be broken down.

8.3 The bulk of the total budget and expenditures to date is for Structure Replacement (SR), a project component with which the present review team is not dealing. Subtracting out values for Structure Replacement leaves \$6 million spent for the nine other IMS activities against a budget of \$47 million. This amounts to an expenditure rate of only 13 percent — a much starker picture than for the overall IMS program. However, comparing expenditures against time and recent accomplishments moderates this pessimistic view.

8.4 In August 1984 a Project Amendment went into effect which provided \$29 million additional funds for WRC, RIIP, and Telemetry to be spent over three years (August 1984 to July 1987). AID recording for these three projects shows only \$18,000 spent to date. However, this expenditure rate does not reflect real progress for these three activities. In May 1985 a contract of \$5.0 million was signed with CID for the WRC and RIIP activities and CID is in the process of procuring equipment amounting to \$6 million. In July another contract of \$3.3 million was signed with RET for the Telemetry project.

These three figures come to \$14.3 million, or nearly half of the additional funds added by the Amendment. The remaining amounts of \$14.7 million for the three new projects and \$12 million from the non-SR projects initiated in 1961 bring the total to be spent over the next two years to \$26.7 million, or 65 percent of the non-SR budget. The rate of expenditure is therefore better than indicated earlier, but still behind schedule.

8.5 Thus, on a budgetary basis, as well as in physical terms, we can safely say that the IMS project will not meet the targets set out in the Project Amendment. While some of the delay has been caused by MOI's slowness in mobilizing its forces, a good share of the delay lies beyond the MOI's control. That is, the Grant Amendment envisioned a three-year implementation program for the additional activities by extending the project completion date to July 1987 -- three years from the date of AID approval. However, the CID contract was not signed until May 1985 and the full long-term staff will not arrive until October, 14 months into the three-year period. As explained in Section 14, further delays will be occasioned before the CID team can initiate the types of improvements envisioned for RIIP. The contracting procedures for both AID and the host country are simply too lengthy to meet such tight schedules, especially for technical assistance contracts. In contrast, the RET contract is in better shape. Although it was not signed until July 1985, its implementation schedule is only 15 months.

#### Project Summaries

8.6 Following are brief summaries of accomplishments for each of the nine project activities. Detailed discussions are found in Section 14.

8.6.1 PFU: The Unit has succeeded in fulfilling an important need of the MOI by analyzing a variety of projects that generally meet the standards set by international funding institutions. The Unit has offered a substantial number of training activities and has begun to institute important functional capabilities such as a computer system, collection of secondary data, and acquisition of library materials. However, the Unit has been unsuccessful in bringing Egyptian staff to the point where their takeover of the Unit's functions can be foreseen. Also, we have been unable to identify any formalized procedures for systematically screening projects to be studied in detail.

8.6.2 North Zifta: This feasibility study, involving an interim report and a final report, is nearing completion after having spent some 2.5 years of professional effort. The quality of the feasibility study was generally good, especially in the area of a staged approach to selecting topics for study and in evaluating alternative technologies. Unfortunately, weaknesses in hard data concerning project benefits seriously undermine the project's conclusions. Lessons learned about the difficulty of collecting data will undoubtedly be carried over to future feasibility studies. The Unit will be able to apply the procedures to future feasibility studies, provided the Egyptian staff continues to receive close supervision from expatriates.

8.6.3 Gharbia O&M: A year's study involving a consultant's report was completed in February 1984. Since then, little has been accomplished, due largely to the report's perceived deficiencies. While the report provides useful information on O&M functions, what they are, and why they are needed, it fails to adequately relate these functions to the existing O&M structure. We heard various reasons for this failure, but perhaps the most serious was that the officials responsible for preparing the report were not from within the unit ultimately responsible for its implementation. During this interim, the MOI has been unable to decide how to proceed. Consequently, a useful model for improvement has yet to be developed.

8.6.4 Training and Manpower: This project has met its principal objective by providing appropriate courses on a regular basis, using good course syllables. We have observed a common set of capabilities, knowledge, and values among those having received this training. Informal surveys of supervisors reveal that those who received the training perform better than those who have not, but our sources of information did not allow us to reach conclusions as to whether the trainees are being properly used and retained. While the foregoing conclusions are generally favorable, we also conclude that course material and trainers need to be continually upgraded to meet the large demands for training and to remain abreast of advances in technology. Perhaps the best way to meet these needs is by developing a national training institute.

8.6.5 RIIP: Little will probably be accomplished under this activity until the CID team arrives and can provide management and technical guidance. By that time, the planned physical target of improving 40,000 to 50,000 feddans before the end of the project period will scarcely seem achievable. \*

The institutional requirements of this program are bound to be substantial, but have not been specified by the work up to this point. Planning for a series of pilot projects should help identify these institutional requirements and potential constraints.

8.6.6 WRC: This project has only begun to actively make use of project funds. With assistance primarily from the Water Management Research Institute and from CID, WRC will continue the work begun by EWUP and provide strategic inputs to RIIP, especially early in its implementation.

8.6.7 Telemetry: This activity appears to be on schedule and experiencing no abnormal difficulties. A contractor has been selected and should arrive soon, equipment is in the process of being tested, and technical advisors are on hand. Once installed, the telemetry system should materially assist the MOI in gathering widespread data rapidly and accurately, which can then be fed to computer models to improve canal operations. An important aspect of this project will be the contractor's effective training of Egyptian staff and the MOI's ability to retain these staff once trained.

8.6.8 Commodities: Items supplied under this contract, both under the commodity heading and as part of individual projects, most certainly have served a useful purpose. Important items are the telemetry equipment, vehicles, textbooks and references, laboratory and field equipment necessary for training and project activities, gates to be tested as part of canal improvements, radios for communications, and computer equipment. Less obvious is the need for construction equipment, which we assume might be used directly by the MOI to implement RIIP. Also escaping our understanding was the need to provide equipment as a separate category from that provided by individual projects.

8.6.9 Consulting Services: Little use of this resource has been made to date, other than for individual short term consultants and project evaluations. However, such a category provides the IMS project with needed funding and technical assistance flexibility.

#### Coordinating Committee

8.7 The ten IMS activities are managed by five Project Directors, who in turn are governed by a Coordinating Committee

headed by the Vice Minister. The Committee meets monthly to decide on matters arising during the intervening period. We are unclear as to how details are handled between periodic meetings, but comments by one of the Project Directors suggests that more specific direction is needed than is currently being provided. For instance, the Project Director felt that potentially overlapping responsibilities of the five Directors could create problems. Large equipment purchases by one of the Directors might preempt purchases by another (at least until AID obligations could be increased), and a central point for channeling communications is needed.

Recommendation: Because of the inevitable shortfall in arriving at project targets, both physical and budgetary, we suggest that the MOI and AID initiate plans to extend the Grant Agreement to some prescribed schedule.

## 9. PURPOSE

9.1 The purpose of the IMS project as stated in the Logical Framework is:

1. To improve the operating efficiency of the total irrigation system and strengthen the Ministry of Irrigation's operation, maintenance and planning capabilities. To achieve this purpose the project contains components:
  - a. To improve the operating efficiency of the irrigation system and of the structure maintenance program.
  - b. Expand and improve MOI planning/analytic capability.
  - c. To identify a plan for redesign of the irrigation system (to be tested in one district) which is judged feasible for ultimate national implementation.
  - d. Establish MOI staff development program.
  - e. Supplement MOI capacity for review and analysis of irrigation development and water management problems by consultant services during 'building up' while IMS project is operating."

9.2 In general the project is advancing towards its intended purpose, but at a slower rate than expected. We discuss specific factors influencing this progress in Section 14.

## 10. GOAL/SUBGOAL

10.1 As stated in the Amended Logical Framework, the project goal is to "improve the control and allocation of Nile waters for agricultural irrigation." The subgoal is to "improve the operating efficiency of the agricultural irrigation system in Egypt."

10.2 The measures of achievement are: "agricultural production and productivity increases...; farmers have adequate and predictable water supplies required for crops; support structures in irrigation system (bridges, etc.) facilitate agricultural production...."

10.3 The Evaluation Team believes it would be unrealistic to expect hard data sufficient to apply these indicators to the IMS project at this time. However, if we consider some intermediate indicators, especially those related to irrigation efficiency, our assessment would be on firmer ground.

10.4 Efficiency of any organization is dependent, for the most part, on the quality of staff, decision-making patterns, and the institutional network which will manage and operate the system. Since the IMS project places heavy emphasis on institution building, several observations on that subject are in order. First, the Irrigation Management System, as conceived, is in place and operating. A Coordinating Committee has been created by MOI under the Chairmanship of the Vice Minister, Engineer Ismail Badawy. Full-time Directors for all component projects have been appointed and are on duty. The MOI has retrained 490 MOI engineers through an in-service program and these men and women are back on duty. The first member of a five-man expatriate team has arrived to work with the Water Research Center (WRC) and the Regional Irrigation Improvement Project (RIIP). The Project Preparation Unit (PPU) has been preparing and evaluating projects and has provided

training for its Egyptian staff. From these observations one can deduce that the MOI is progressing at a reasonable pace to increase its efficiency in operating the agricultural irrigation system, but not at a pace sufficient to meet the end-of-project target. These intermediate indicators are discussed in more detail in Section 14. Suffice it to say that the quality of the staff is improving through training and actual experience. As staff quality improves, the process of self-evaluation permits the IMS to self-correct as problems arise. All these activities will improve the efficiency of the irrigation system as specified in the stated goal of the project.

## 11. BENEFICIARIES

11.1 Because social changes occur slowly, they cannot be measured with confidence in the short run. Physical changes in the irrigation system can be measured far more easily.

11.2 The beneficiaries of this project are essentially people. The first group of beneficiaries are the staff of MOI. The IMS project, through its umbrella concept, is creating new organizational structures and reorganizing others, thus creating new institutional networks. MOI staff from various levels are being sent to in-service courses conducted by the Training and Manpower Development Unit. The dynamics of working in a changing organization and receiving professional training is bound to have a favorable impact on MOI personnel. Though the data to measure these impacts are soft, the present indications are positive. If this positive impact is maintained, MOI will benefit from an upgraded staff and a more functional institutional structure.

11.3 The second beneficiaries are the farmers, who will benefit from improved water distribution thru reduced irrigation time and better access to fields. These results can only lead to improved socioeconomic conditions for the rural population served by the project and ultimately to the entire society. No one expects a development project to receive full marks. This is no exception. Still, we were impressed with the positive changes that could be observed in the personnel, especially in their approaches and attitudes towards farmers, and in their optimism.

## 12. UNPLANNED EFFECTS

12.1 Every development scheme experiences both positive and negative consequences that could not be anticipated, no matter how careful the planning.

12.2 One positive consequence we observed is the improved communication between members of different levels of authority within MOI. The social environment now seems more conducive to open dialogue between members of different rank. The staff offer differing views on significant issues that are freely discussed. Another positive consequence is the acceptance of the evaluation process as positive and constructive. We observed that various project officials were evaluating their own activities and making adjustments according to the evaluation results. Several times, various staff members told us, "Tell it as it is."

## 13. LESSONS LEARNED

13.1 Of the many lessons that may be learned from our review of the IMS project, we have singled out the following for emphasis.

13.2 The IMS project is behind schedule on a number of activities and will not reach its end-of-project targets. The problem lies heavily with the nature of the activities and the bureaucratic process. Implementing a multi-faceted program involving institution building and promotion of regional programs takes more time than single-purpose projects involving transfer of proven technologies. AID and the MOI need to be more cognizant of the time requirements both to set the program in motion and to obtain suitable results.

13.3 One of the more obvious lessons that surfaced during our review was that if conditions within the Ministry are not conducive to obtaining and retaining highly qualified staff institutional building efforts will not be fully successful. MOI, GOE, and AID should jointly explore ways to assure that conditions are improved so that the required staff are retained on the job and are provided the motivation to perform effectively.

13.4 We found little evidence of effective integration of MOI and MOA activities at the operating level other than the residuals carrying over from the earlier EWUP effort. Such integration is unlikely to occur unless these two ministries make a concerted effort. RIIP provides a suitable focal point for bringing about this integration.

13.5 The rate of progress in developing a mature Project Preparation Unit has been slower than anticipated. The Unit encountered difficulties in securing and retaining seasoned Egyptian staff with an interest in project preparation. Also, their limited writing capacities in the English language significantly diverted the expatriate staff's attention from more productive activities. Little may be accomplished in developing an effective, Egyptian-staffed unit until the problems associated with the presently low remuneration levels are corrected.

13.6 The North Zifta feasibility study dramatically brings to light the necessity for pre-screening projects before undertaking intensive and costly feasibility studies. The study also points to the need for obtaining good data on project benefits early in the analysis process, as well as to the difficulty of doing so.

13.7 We believe the problems associated with the Gharbia O&M study stem largely from failure to obtain the active support and participation of the Under Secretary for Water Distribution. Those proposing changes in organizational structure and operating procedures involving considerable numbers of staff can expect to encounter substantial organizational obstacles.

13.8 Another element of the IMS project that drew our attention was RIIP's slow rate of progress in moving from EWUP's research phase to a regional program centered on the Serry Canal. Clearly, more thought needs to be given at the tail end of the research phase and the beginning of the regional program; pilot programs serve as a suitable focal point.

13.9 Finally, the expatriate members of this evaluation team operated under considerable time pressure in reviewing the many parts of the IMS project. Our job would have been easier and more effective had we received much of the background material before departing for Egypt.

## 14. SPECIAL COMMENTS

14.1 We have reserved this section for more thorough analysis of each of the project activities that were summarized in Section 8 on Outputs. The order of our presentation is as follows: PPU, North Zifta, Gharbia O&M, Training and Manpower, RIIP, WRC, Telemetry, Commodities, and Consulting Services

### 14.2 PROJECT PREPARATION UNIT

#### Purpose

14.2.1 Following a 1980 MOI Decree, the Project Preparation Unit (PPU) was established to prepare full feasibility analyses and technical reports for new projects. These responsibilities covered collecting data, carrying out analyses, preparing reports, facilitating discussions with financial institutions, monitoring and evaluating results, and helping set project priorities. As originally planned the PPU would have from 10 to 20 professionals supported by an administrative staff. Functional divisions would be created to deal with agriculture, engineering, economic and financial analysis, sociology, and surveys. The PPU was to develop the capacity to prepare feasibility studies according to international standards. Heavy reliance would be placed on expatriate advisors funded by both AID and the World Bank. Institution building is implied by the provision for long and short-term training, but no target date was set for turning activities completely over to the Egyptian staff.

#### Accomplishments and Activities

14.2.2 The current staffing of the PPU consists of a Project Director, five long-term expatriate advisors with planning expertise, and 15 MOI staff (seven agronomists, five engineers, and three economists). The number of MOI professionals is within the range of 10 to 20 envisioned in the Project Paper.

14.2.3 In 1983, during the initial phase of the Unit's activities, emphasis was placed on training partly because of the importance of training but more importantly because the Unit had few authorized projects. However, by the year's end, the Unit was authorized to work on Drainage Project Five. Since then project activity has grown steadily and now

the Unit is heavily loaded. Major projects occupying the Unit's time over the past three years include North Zifta, Pump Rehabilitation Project Two, Channel Maintenance Plan, as well as the drainage project. Other project activities included helping to prepare the Unit's Master Plan, assisting the Delta Coastline Protection project, working on the Winter Closure project, investigating a Public Sector Company for Engineering, and providing general consulting services to the MOI.

14.2.4 During the dearth of activities at the outset, the Unit was able to concentrate on training, including provision of in-house courses, seminars, and enrollment of staff in local and foreign courses. This training activity peaked in the first half of 1984 when the unit gave the equivalent of a 14 week course entitled Project Preparation and Evaluation, to all of its economic and agricultural staff. The Unit's approach to its combined responsibilities for project preparation and training is expressed in Harza's Ninth Quarterly Report (February - April 1985): "Training of PPU staff is primarily through guided on-the-job experience in performing actual project planning assignments. This training is supplemented by in-house seminars, formal classes and seminars in Egypt, and by out-of-country academic courses and study tours." Important in these training programs are instructions in English and computer applications.

14.2.5 Concurrently with the above, the Unit is developing a capability for improved project analysis in the future. These efforts include the installation of a VAX 370 digital computer, establishing a reliable data base on agricultural commodity yields and prices and input prices, estimation of accounting values, and development of project preparation and analysis procedures for its training programs. Additional details on the Unit's activities can be obtained by reviewing Harza's quarterly reports and individual project reports, some of which are listed in Appendix F.

#### Problems and Issues

14.2.6 The Unit is caught in the difficult position of having to respond to project assignments and completion deadlines set by the MOI, while also having responsibility for preparing an inexperienced Egyptian staff to eventually carry out feasibility studies acceptable to international donors.

The hope sometimes expressed, though not stated in the Project Paper, that the current Egyptian staff will soon be able to take over these responsibilities without expatriate assistance is unjustified. To begin with, effective project preparation calls for mature staff with considerable experience in the planning process. Judgments are needed on a wide range of technical topics, critical decisions must be made concerning the level of detail required and when outside expertise is needed, proposed investments must be viewed critically concerning technical, economic, and financial feasibility, and so on. Senior engineers who have spent much of their professional careers within their relatively narrow disciplines are almost as inappropriate for the job as are young staff without practical experience. Yet most of the current Egyptian staff fall within these two categories. Of course, experienced, technical staff with an interest in planning can learn the elements of good project preparation and analysis through courses and close on-the-job association with those experienced in planning, such as that currently available under the Harza contract.

14.2.7 Overall, the PUU has performed well. The newly appointed Project Director comes with considerable experience within the MOI, is well liked by his staff, and is actively learning the technical requirements of his new position. The Harza contract, including Nathan's and other inputs, is staffed by persons with considerable overseas experience. The Unit has established itself as valuable to the MOI, if the increase in projects being handled is a reliable indication. The Unit's staff is collaborating with international organizations experienced in project preparation, such as the World Bank and FAO. The topics chosen for emphasis in project analysis, such as discounted cash flows, accounting prices, and sensitivity analysis, are right on target. Use of J. Price Gittenger's text on project planning for agricultural investments is a good choice; this text is widely accepted throughout the world. Also, the choice of technical subjects for the Unit's seminars is appropriate, including soil-water-plant relationships, drainage, salinity, and CPM/PERT. Instructions in computer programming and English will produce long-run benefits for those being trained. However, the weak link in such training, brought out in Section 4 on External Factors, is whether those so trained will remain with the Unit. Already, two engineers and an economist have left after receiving such training.

14.2.8 While the foregoing conclusions are positive, one can take a pessimistic view about performance to date and wonder whether, at the current rate of development, the Egyptian staff will ever be able to stand on its own. This issue takes on even more importance given the strong interest of the GOE in reducing its reliance on technical assistance. When judged in this light, the Unit's performance is less satisfactory. Identifying where the fault lies, however, is not so obvious. One would have hoped that the nucleus of the Unit would have comprised mature Egyptians with substantial prior planning experience. We did not receive a clear picture as to why such individuals were not provided. The explanation that Egypt does not have such individuals should not be accepted until a more probing search is made.

14.2.9 Another aspect of this manpower constraint is the dilemma the Unit faces. On the one hand it is expected to meet the MOI's requests for preparing or supervising studies on a broad range of topics (e.g., drainage, coastline protection, on-farm water improvement, winter closure). The expatriates' feeling of being under extreme pressure to meet these demands shows up in frequent references in the quarterly reports inferring that training is being given a low priority. This response to MOI's needs for completed studies is not out of line with the pressure AID has placed on the MOI. We refer to pg 27 of AID's CDSS for FY 1986, "AID support for the Ministry of Irrigation's Water Research Center would be limited to the current Irrigation Management Systems program and to technical assistance — unless GOE policies improve in policy area (6), noted above." Policy area 6 requires "improvement in investment decision processes within the Ministries of Irrigation and Land Reclamation, requiring full feasibility studies and formal economic evaluations of irrigation command areas as inputs into GOE decisions to expand the irrigation system or to develop new lands." The financial implications of this directive are forthright, even blunt. The Unit's decision to focus on preparing quality reports responds directly to AID's dictum. On the other hand, the Unit is expected to become self-sufficient as soon as possible. The capabilities of the Unit's local staff below the Project Director do not favor an early time when this takeover might occur. Besides the Egyptian staff's technical limitations, they are even more limited in their ability to prepare reports in English — a requirement for most technical reports directed to international financing institutions. An important amount of the consultants' time is thus spent writing and editing reports in English, with little or no assistance from their Egyptian counterparts.

14.2.10 The foregoing duality of purpose unduly stresses the Unit's capabilities. Several responses present themselves. The Project Director, in consultation with his expatriate advisors, can take stock of the Egyptian staff's rate of progress in reaching self-sufficiency. He can then make a concerted effort to identify and secure those with the appropriate credentials. If such individuals can be secured, they should be brought into the organization quickly. Possibilities for securing top-level Egyptian planners would be enhanced by raising the Unit's level within the MOI hierarchy. Concurrently, the Director may want to obtain authority to contract out assignments to local consultants. By so doing, the Unit would be able to shift part of its project load to others, thereby speeding up the training program. Even with improved Egyptian staff, the question remains open as to when they might be able to take over. Even under favorable conditions, at least one or two expatriate advisors should probably be retained for some time to come. Such dependency on expatriates, especially as concerns project preparation for international financing, occurs among countries further along in the development process than Egypt.

14.2.11 We close this section with a discussion of a conglomerate of topics.

a) AID raised the question as to whether the feasibility screening process has improved. Our reading of how the Unit operates is that it receives directives from the IMS Coordinating Committee as to which projects to study. For example, the Unit's assignment to participate in the Drainage Five project could scarcely have been turned down. However, the Unit should have a process for screening projects including "go ahead" approval of the IMS Coordinating Committee before a full scale Feasibility Study is launched.

b) Our review of the North Zifta study did not reveal an analysis of the proposed improvements from the farmers' point of view. By this we mean an analysis of farmers' investments, increased output, and changes in operating costs. Such an analysis would show the extent to which farmers a) might be interested in the proposed scheme and b) have the financial capacity to contribute to project costs.

c) Given the heavy responsibilities of the Unit, the expatriate team should be relieved of as many routine tasks as possible. Two comparatively simple areas to take care of would

be to provide the expatriate Chief of Party with more effective accounting assistance and to obtain the services of an experienced editor. The latter should assist both the Egyptians in the elements of good report writing and facilitate the publication of those reports that must be written in English.

d) The Unit experienced some difficulty in gathering field data for the North Zifta project. Explanations rested with some delays occasioned by the Ministry of Agriculture, inexperience of enumerators, etc. While these difficulties may be expected when a new organization, such as the Unit, first undertakes such work, reliable and efficient data collection at the field level is essential. In fact, the deficiencies encountered for the North Zifta project jeopardized its outcome. We therefore strongly urged the Unit to seek a better method for obtaining field data on future studies — advice that undoubtedly could go unsaid.

e) A longer-run solution to the data problem would be for the Unit to take the initiative in instituting an effective monitoring and evaluation (M&E) program for major IMS projects. (Note that M&E is listed as one of the Unit's activities under Purposes, above.) Data collection and analysis for agricultural projects using this approach requires perhaps six or more years: data collection for two years prior to implementation, perhaps a year during construction, and three or more years following improvement or until results stabilize. The World Bank often makes such M&E a required part of its loan agreements. Good references on the subject are available from the World Bank; particularly useful is the Handbook on Monitoring and Evaluating Agriculture and Rural Development Projects.

Recommendation: The Coordinating Committee should authorize the PPU to conduct prefeasibility studies on potential projects to learn of their merits before deciding whether or not to carry out a full feasibility study.

Recommendation: The Coordinating Committee should guide the PPU in the appropriate division of its efforts between training and project preparation.

Recommendation: With guidance from the Coordinating Committee, the Project Director should seek out Egyptian staff with considerably more planning experience than those presently staffing the Unit.

Recommendation: The PPU should begin planning for the extension of the technical assistance contract and USAID should be responsive to continuing financial support for such assistance.

#### 14.3 North Zifta Feasibility Study

##### Purpose

14.3.1 The Project Paper provides for a feasibility study of North Zifta District in Gharbia Directorate. The study's purpose is to redesign, or otherwise improve, the irrigation system and related facilities so as to increase farm productivity and farmers' income. "Emphasis will be given to the replicability of such a pilot program for ultimate national application by examining the cost of services and O&M in relation to benefits including farm output, energy savings, relative cost of water saved versus other alternative means to obtain such supplies, etc." Reasons for selecting North Zifta for study were its representativeness of an older system needing repairs and the self-contained nature of the irrigation system.

14.3.2 An elaborate scope of work appended to the PP lists the many components of the proposed North Zifta study. The scope's components include mapping; surveys in hydraulics, hydrology, ground water, water management, and farm practices; irrigation system plans for main and branch canals, laterals, and mesqas; O&M, organization, budgeting, and training; drainage system plans; conjunctive use of water; construction procedures and plans; implementation and construction schedules; system redesign, rehabilitation and improvement costs; land leveling; estimating agricultural potential through consideration of improved services; implementation plans for agricultural credit, agricultural inputs, extension, and marketing; environmental assessment; etc.

14.3.3 The PP's budget for this effort provided \$2.1 million plus an allowance for escalation for 3.5 man years of long-term staff and 48 man months of short-term staff in sociology; environmental study, hydrology, program engineering, and other areas.

### Accomplishments and Activities

14.3.4 The Harza team began the project in February 1983 as one of its first assignments under its present contract. Staff built up gradually until December 1983 when three expatriates formed the team; these, together with seven Egyptian professionals, nine technicians, and six service staff, essentially completed the staffing requirements envisioned in the March 1983 Plan of Work.

14.3.5 Progress was initially slow. The team was hampered by staffing shortages, inadequate transportation, difficulties in obtaining data (notably from the MOA), and false starts that normally accompany new activities of this sort. The team produced an inception report by May 1984 that contained its findings to date and plans for the final report to be completed approximately one year later. The final report is now nearing completion some 30 months after the study's inception, compared with the scope of work's target date of 18 months.

14.3.6 The North Zifta study began by looking at a range of irrigation system improvements: canal, branch, mesqa, and drainage improvements; soils; crop moisture requirements; farmers' problems, and the like. Before long, however, the team zeroed in on mesqa improvement as the more relevant change to the system. Alternative mesqa designs included lined and unlined improvements to the existing channels, raised designs with gravity flow, low pressure pipe, and a pipeline to serve the tail-enders. Other elements of the proposed improvement package included repairing the main and branch canals, installing automatic recorders, constructing diesel pumping stations, revising O&M plans, and Extension. The team concluded that Extension's plans for improving farmer services, including soil conditioning, would contribute importantly to whatever irrigation improvements were made.

14.3.7 Overall results from the study, however, proved disappointing. Detailed study of both secondary and primary data revealed that farmers' conditions in the area were relatively favorable: cropping intensities were close to 2.0; yields were good according to national standards; water was relatively abundant, and ground water problems were to be addressed by the World Bank subsurface drainage program.

Consequently, benefits to be derived from improved control over the irrigation system and deliveries to farmers proved to be small. This result in turn limited the amount of physical improvements to the irrigation system that could be suggested. Only the buried pipeline serving the tail-enders could show an acceptable profit. Even these results depended on assumed benefits to the tail-enders from increased water supplies that could not be verified from the data or observation. One of the more promising improvements would come from extension, which was to be implemented with or without the North Zifta project. A fuller account of these findings may be found in the draft final report.

14.3.8 By January 1985 field work had been completed. The Planning Engineer finished his assignment in February, and in April all of the MOI staff were reassigned. Since then the PPU has been working on the final report. A decision on implementation must then be made.

#### Problems and Issues

14.3.9 The results of this study provide substantial food for thought. After spending 2.5 years and \$ 1.0 million (over one million under budget) the study has essentially failed to demonstrate major benefits from irrigation improvements of the type formerly considered as being good. Water was not found to be seriously wanting, even among the tail-enders; precision land leveling was rejected; water table depths are to be maintained through the subsurface drainage program, and main and branch canals improvements were limited by the potentially low level of on-farm benefits. Principal benefits were derived from an expanded Extension program, which does not depend on the North Zifta project. To our knowledge, few studies of large scale on-farm improvements in irrigation have been made in the Delta. Consequently, these results need to be taken seriously. At the same time, note should be made that the report's authors are less than satisfied with the quality of the field data on potential benefits from changes in irrigation deliveries. They encountered problems with both the data collection process and in isolating irrigation's contribution to benefits from other contributing factors.

14.3.10 These negative and uncertain results argue against project implementation as the project now stands. The preliminary profitability estimate of 18 percent would normally

be acceptable, especially since the major beneficiaries would be the tail-enders — often a deprived group. However, the draft version of the final report provides ample warning of the weakness of the data and the assumptions on which this profitability is based. Consequently, the team feels that the project in its current state should not be implemented using AID resources.

14.3.11 These results dramatize the following points:

a) Feasibility studies seldom proceed as planned, as witnessed by the team's various difficulties in collecting data. This result stresses the importance of flexible approaches. Fortunately, the PP's scope of work did not govern the study, and the feasibility team was able to work through the IMS Coordinating Committee when seeking program changes. The PP's scope of work contained far too many requirements, many of which depend on intermediate outcomes.

b) The quality of the field data can become critical, especially for those data relating to potential benefits from system changes. Our comments concerning M&E, noted in Paragraph 14.2.11, had this importance in mind.

c) Some form of screening process to separate good from poor project opportunities can reap handsome savings from not studying unproductive projects. Close scrutiny of reasons for undertaking a study would help. Note the rather flimsy reasons for selecting the North Zifta area mentioned earlier. Prefeasibility studies provide an intermediate step. These studies can often be conducted within a few months for modest cost. Prefeasibility studies go through many of the same steps as a full feasibility study, but with much less detail. The main objectives of such studies are to gain an order of magnitude estimate for overall profitability and to learn if any of the project's components are sufficiently uncertain or negative to warrant the project's rejection.

14.3.12 Having spent so much effort on this study, the MOI would be remiss were it not to take some advantage of the results. We found the comparison of alternative mesqa designs especially interesting. The preferred mesqa design, with its initially open channel and then buried pipeline, comes out considerably ahead of a range of alternative designs.

Moreover, the design concentrates on the tail-ender problem, which often attracts interest in mesqa improvement. Even though the North Zifta results were based on limited data and generous assumptions, the level of benefits assumed is not unreasonable. Certainly, some areas in Egypt can be found where benefits of this magnitude or greater would be realistic. By testing the design under several conditions, a useful standard for mesqa improvement might very well be developed. Those familiar with Pakistan will recognize that much of its on-farm water management program currently centers on low-cost improvements no larger than those being discussed here.

Recommendation: USAID should not support the design and construction of the North Zifta project as revealed in the draft report nearing completion in early September 1985.

Recommendation: The WRC should field test the open channel/ buried pipe concept developed in this study.

#### 14.4 O&M Planning for Gharbia Directorate

14.4.1 The Gharbia O&M planning effort is to encompass the full range of operation and maintenance concerns thereby providing a workable system of preventive maintenance and repair. When applied, the upgraded O&M operation should ensure continual high performance of the irrigation system. Ultimately, the improved O&M in the Gharbia Directorate is intended to be a model for other MOI directorates. The PP mentions O&M funding support to one or two additional directorates as a possible future amendment to the project.

14.4.2 A one-year study of Gharbia O&M was completed by an expatriate irrigation engineer with assistance of MOI Gharbia Directorate personnel. The report, submitted to MOI and USAID in February 1984, covered many elements of O&M operations and provided a detailed list of workshop equipment (estimated at \$1.6 million) needed to upgrade the central, inspectorate, and district levels of the Gharbia Directorate.

14.4.3 USAID expressed concerns about the adequacy of the report in a position paper transmitted to MOI in March or April 1984. (See Appendix G). The O&M Plan, it was felt, did not contain enough specific information about conditions as they exist in Gharbia, nor did it present a detailed plan for step by step implementation. The position paper inferred incorrectly that implementation per se was the intent of the PP.

14.4.4 In the subsequent year and a half, little progress occurred on Gharbia O&M planning. The workshop equipment has also been put on hold pending completion of an acceptable plan.

Problems and Issues

14.4.5 The Gharbia O&M Planning Report is indeed short on specifics for both the current and upgraded scenarios. Items 1 through 4 on page 8 of the USAID Position Paper innumerate the O&M Report's shortcomings.

14.4.6 A problem in the O&M Planning Report preparation was insufficient involvement by both MOI and USAID. For example, the O&M study received no feedback on progress reports, beginning with the study's third month, and insufficient technical support was provided in Tanta; only in the study's eleventh month was the requested inventory of structures made available. At issue therefore, is the MOI's institutional commitment to effectively reorganizing, staffing, and funding O&M so that irrigation structures receive more timely maintenance.

14.4.7 With an estimated year required for procurement, further delays in equipment ordering will leave little project time before the present Project Assistance Completion Date is reached.

14.4.8 Differences of opinion exist between MOI and USAID in the extent of the Gharbia O&M implementation commitment. While the ultimate objective is for field implementation of an upgraded O&M operation, the PP and Grant Agreement only focus on planning and the funding of needed equipment for an upgraded O&M Directorate.<sup>1/</sup>

Recommendation: The Project Director should obtain consulting help to complete the Gharbia O&M study, using results from the completed Gharbia O&M study and the relevant sections of USAID's Position Paper.

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<sup>1/</sup> PP, p. 24, 2b; p. 29, 2.; Annex II, Purpose, EOPS; Annex II, Outputs, 2.; possible exception p. 26, a.3; Grant Agreement Annex I A.2.c., 3., and Annex I.C. are not contradictory to this planning interpretation

Recommendation: The Vice Minister should change the Project Director responsible for the Gharbia O&M Project to one for Water Distribution, which will be the implementing unit within the MOI.

Recommendation: The workshop equipment ordering process should recommence as soon as new consulting advice makes this possible.

#### 14.5 Training and Manpower

##### Purpose

14.5.1 The Manpower and Training component of the IMS project was established to provide a core of short courses for engineers and technicians in the fields of 1) Irrigation Design and Construction, 2) Administration and Management, 3) Operation and Maintenance, 4) On-farm Water Management, and 5) Construction Management Methods and Quality Control. Through this core curriculum and an array of special courses MOI would improve and maintain the capability of its staff within the limits of an in-service training program.

##### Activities and Accomplishments

14.5.2 This program has built upon the training experience of EWUP in setting objectives and developing training techniques compatible with Egyptian conditions. Project staff have devoted considerable time to obtaining the opinions of administrators and staff members of different departments in MOI concerning training needs. This process has given the trainees, who will eventually be trainers themselves, an opportunity to contribute their knowledge and experience to the training program.

14.5.3 The training program for graduate engineers is divided into categories of common and specific courses. The common courses were mentioned under Purpose, above. The specific courses are: 1) Modern Irrigation Systems; 2) Open and Tile Drainage (Design and Construction); 3) Using Pipes in Irrigation Projects; 4) Structural Replacement Project; 5) Irrigation Improvement Project; 6) Modern Theories in Design of Bridges, and 7) Modern Equipment to Control Water Level and Discharge. The common courses cover subjects which were designated by the PP and subsequent studies as being top priority among MOI engineers. The specific courses have been included to meet specific needs as experience dictated.

14.5.4 The Training and Manpower Program now has a full-time Director, who also serves as an instructor, and a part-time instructor who was recently upgraded to full-time status. One instructor position is allotted to a group of engineering faculty which constitutes a pool upon which the training program can depend when covering an instructional program. In addition, another instructor serves part-time. Within the context of the Training and Manpower Program, an instructor is a course leader who organizes a course, supervises its implementation, and sometimes lectures. A lecturer is one who actually teaches. One instructor and several lecturers are provided for each course.

14.5.5 This project is now geared to teach from 12 to 15 courses per year with each course having an enrollment of about 20 to 25 trainees. The annual target of trainees for the next three years is 300. Below are the number of courses completed by trainees from June 1982 to mid-August 1985. Appendix H gives more detail on course offerings.

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|             | <u>1982*</u> | <u>1983</u> | <u>1984</u> | <u>1985**</u> | <u>Total</u> |
|-------------|--------------|-------------|-------------|---------------|--------------|
| Engineers   | 57           | 131         | 188         | 114           | 490          |
| Technicians | <u>0</u>     | <u>42</u>   | <u>68</u>   | <u>83</u>     | <u>193</u>   |
| Totals:     | 57           | 173         | 256         | 197           | 683          |

\*June 1 to December 31

\*\*January 1 to August 15

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14.5.6 Estimated course completions for engineers and technicians for the whole of 1985 are 224 and 108, respectively, bringing the total for the year to 332. We have no reason to doubt that this annual rate can be maintained, or even improved upon. (See Appendices I through M for course evaluation forms and schedules.)

14.5.7 Of the 490 engineers trained, the following characteristics were noted:

Male: 91%  
Over 35 years of age: 54%  
Less than 20 years in MCI: 66%  
Trainees from: Irrigation Department: 45%  
Irrigation Projects Department: 23%  
Overseas Training: 29%.

14.5.8 The staff is continuing a course evaluation process which was initiated by EWUP for the On-Farm Management course in 1979. Evaluations are obtained for all courses and consist of

- a) Pre-tests and post-tests
- b) A required trainee course evaluation completed anonymously
- c) Instructor evaluations
- d) Post-course evaluations of trainees by supervisors.

14.5.9 The first three evaluations are given regularly on a formal basis. The post-course evaluation has been conducted informally during the early months of 1985. A questionnaire to obtain post-course evaluation data has been developed and will be distributed for the first time in the fall of 1985. Future post-course evaluations are expected to be conducted six months after course completions.

14.5.10 Evidence indicates that these evaluations are used to make course improvements. Initially, courses for technicians were two weeks long. The evaluations clearly indicated the need to extend the courses to three weeks, which is now being done. The balance between lectures and field exercises is an unsettled issue, as is the relatedness of various lectures to each other. All of these notions arose out of the course evaluations.

14.5.11 We believe that as long as these evaluations are conducted systematically and objectively and are used to improve course offerings, one can expect demonstrable improvement.

14.5.12 What improvements can be documented? First, the pretests administered during the first day of a course are essentially the same as the post-tests. These post-tests may have slight modifications when given as final exams, which

match changes made during the course. All trainees are told that a failure on the post-test will be reported to their immediate supervisors in writing. All reports from the field supervision indicate that trainees are noticeably better than non-trainees in specific job performances. The trainee evaluations, when restricted to the specific subject matter, indicate that a substantial majority of trainees have gained knowledge and skills that will lead to better job performance. The evaluations also revealed displeasure with living and travel arrangements, food, and recreational facilities.

14.5.13 Since MOI employs about 1200 engineers and 490 have received training, 710 remain to be trained assuming that is MOI's target. At 300 trained per year and considering the needs of new employees, training this group could take about three years. By then, the initial group will need additional training in new subjects and refresher courses in the older subjects. Thus, the need for training continues. This need has its counterpart in the United States, where major corporations provide training to their staff and universities offer sabbaticals. The corporations found that their technical staff require upgrading an average of every five years to meet newly developed positions. The sabbaticals offered after five to seven years are intended to free university professors from their teaching responsibilities so that they may upgrade their skills and knowledge.

14.5.14 Not to misinterpret the foregoing, we emphasize again that the training program under discussion should not become an academic, degree granting program. The training program as currently constituted has an important task in the on-going retraining and upgrading of the MOI staff; it also needs to train MOA staff concerned with on-farm water management. Looking ahead, training staff must be expanded and greater stability and continuity provided the program. What to do about advanced degree programs is another issue.

#### Problems and Issues

14.5.15 This section touches on a variety of problems and issues, including: the need for a long-term expatriate advisor, the idea of a national training institute, problems of the continued retraining of MOI staff, the importance of the On-farm Water Management course and the interdisciplinary makeup of both those giving the course and

those receiving it, validity of the trip to the United States, RIIP's training requirements, trainers' needs for refresher courses, the value of a computerized data bank, the need for setting job specifications for those being trained, preferences for field and laboratory instruction, the interrelatedness of course material, and class composition according to experience of those attending.

14.5.16 Whether or not MOI decides to set up a national training institute, the Training and Manpower Project could make ample use of an expatriate specialist in institutional training. Such an individual could work with the Director and his staff to advise and assist them in the overall administration and development of a training program that anticipates the changing needs of MOI personnel. His assignment might include some teaching, course and curriculum development, choosing and evaluating instructors, evaluating courses, and designing suitable statistical tests and data management procedures. After the long-term advisor has had an opportunity to assess the current training program, he and the Egyptian trainers should consider the need for short-term technical advisors who could help with audio-visuals, training of trainers, library development, and other specialized areas. The expatriate could take on considerable responsibility for identifying the needs for such short-termers and coordinating their activities.

14.5.17 The question has been raised concerning the establishment of a national training institute. If MOI's short and long term staffing needs are to be met, then a national training institute should be given serious consideration. An acceptable mix of trainees with different years of experience is still on trial. A national training institute with a permanent staff and good physical facilities would help considerably in meeting the present and anticipated training needs of the MOI. We support AID's plans to bring in an evaluation team on training this fall (1985).

14.5.18 Various groups which have studied the MOI estimate that the staff vacancy rate is 45 to 65 percent. Averaging the numbers of vacancies presented in these several reports we get an average of 670 vacancies. The present Training Program cannot be expected to fill those vacancies. The current in-service training program has helped the MOI in upgrading its regular staff and in preparing recent entrants

for their assignments. Even then, the MOI experiences staff attrition because these better trained engineers are lured away by local or foreign firms. The MOI, therefore, must find ways other than training to counter this "brain drain." For example, MOI might consider an advancement policy that permits junior officers to move into responsible positions more in line with their professional capabilities rather than one that simply counts the years since their last degree. Twenty or 30 years of experience does not mean much if all it includes is the first year's experience repeated 20 or 30 times.

14.5.19 The On-Farm Water Management course, one of the more important among the common courses, is the only one offered by an interdisciplinary training team. Its members have been working together for approximately five years. Despite its good record, several points need to be made.

14.5.20 First, the basic format of this course assumes that the trainees will consist of a mixture of engineers, agronomists, economists, and sociologists. While the training team reflects this composition, the last two courses have been offered only to engineers. We were unable to find the reason.

14.5.21 Second, from the EWUP experience one can conclude that good on-farm management will probably not occur on much of Egypt's land until a mechanism is established to permit interdisciplinary teams to work directly with farmers. Thus the training program should be paced to produce enough of these units to keep up with the expansion of the RIIP program. The RIIP component is the only MOI activity set up to implement this interdisciplinary approach. When RIIP expands to its target rate of activities, it will require substantial numbers of appropriately trained interdisciplinary teams. In anticipation of this need, the Training and Manpower Project will need to expand the On-farm Water Management course offering to more than its current rate of once per year. The following activities are suggested.

a) Kafr El Sheikh site:

This location provides an ideal training site for the Delta area, but is not suitable for Middle and Upper Egypt. El Minya should be considered as a second training location, especially in providing staff to develop the Serry Canal area.

During our visit to that area we were told that adequate facilities and accommodations could be made available to meet course needs.

- b) Number of On-farm Water Management course offerings per year:

To meet RIIP's potential demand for interdisciplinary teams, the trainees need to learn about irrigation systems improvements like those they will encounter on the job. Sending trainees to the United States may be an incentive to gain their interest in the program, but the direct contribution to RIIP is less obvious. Considerable time would be gained, not to mention the money saved, were the trip to the United States eliminated from the basic version of the On-farm Water Management course. Our observations about sending trainees to the United States does not mean that such trips are not useful, but only that tying the trip to the On-farm Water Management course seems inappropriate for those to be trained as part of the RIIP and similar activities.

14.5.22 The priority, as we see it, is the mass production of interdisciplinary teams that can function effectively with Egyptian farmers at the mesqa level working under Egyptian conditions. We believe that a minimum of four courses in On-farm Water Management should be offered in 1986 (two each in Kafr El Sheikh and El Minya) and that this number should be increased to six beginning in 1987 with three given in each of these two sites. This effort would consume 26 training weeks in the first year and 42 in the second. A key issue is MOI's ability to recruit sufficient people for its expanded RIIP activities who would be expected to attend this course.

14.5.23 Also, one can readily see the strain this would put on the present training staff. Therefore, we suggest bringing new trainers into the course to assist and observe the present trainers while learning the training techniques which have been developed so far. Capable candidates for these jobs exist in El Minya and Kafr El Sheikh. Even if these additional courses are not offered, the present trainers need refresher training courses themselves. They have been teaching the courses based on materials developed several years ago and revisions are necessary.

14.5.24 An advanced On-Farm Water Management course may also be needed for those who have taken the basic course and have advanced to more responsible positions. The visit to the United States could be part of this advanced course instead of having them repeat the basic course.

14.5.25 As the training program expands, the staff will be collecting considerable data on demographic characteristics of trainees, course evaluations, and the like. With more data being collected with each course offering, opportunities for having a computerized data bank expand. Such a resource makes periodic monitoring and analyses feasible, thereby facilitating preparation of reports so useful in revising courses and curricula.

14.5.26 In our discussions with MOI officials we discovered detailed information on job specifications (see Section 5). Various techniques have been developed for training extension agents in other countries. One such technique is known as the "critical incident" technique. Because of the lack of job specifications, the training staff might use such techniques to develop job needs in a systematic way by involving the trainees as knowledgeable informants.

14.5.27 Another problem noted is that trainers have had little formal training as trainers, whether they be university faculty members or field men. Training of trainers in teaching techniques through use of audio-visuals, development of course syllables, and curriculum and lesson planning are needed now while the program is in a formative stage. Once procedures become established they are more difficult to change. Nothing can kill a training program more quickly than stagnation and rigidity.

14.5.28 Because the Training and Manpower activity is an in-service applied program, the ratio between lectures and labs should remain heavily in favor of the latter. This means that formal lectures should be kept at a minimum and remain functional. The lectures should be sufficient to explain principles as they relate to field or laboratory exercises so that trainees understand what they are doing and why. We have some indications that this principle may not be practiced.

14.5.29 Another problem that needs closer inspection is the interrelatedness of one lecture to the others in a course. Team teaching is difficult to apply. When one has to depend on lecturers who appear one day and are gone the next it is even more difficult. We suspect, but cannot confirm, that some courses suffer from this problem.

14.5.30 Some of those who have received training told us that mixing trainees with different levels of experience can be counterproductive. Some material was too elementary for those with several years of MOI experience; for them, the course lost credibility. This situation demonstrates that what works for one course may not work for another.

14.5.31 To summarize, in-service training programs should be carefully designed, administered, and monitored. Such courses have less room for error than do academic programs.

Recommendations: The Project Director should secure the services of an expatriate specialist in building a training institute capable of meeting MOI's training needs concerning delivery systems and on-farm water use. The need for training appropriate MOA staff should also be taken into account.

Recommendation: USAID should go ahead with its plans for bringing an assessment team to study the feasibility of a national training institute.

Recommendation: The Project Director should retain the On-farm Water Management course in its original format, and require that the trainee cohort consist of agronomists, economics, and sociologists as well as engineers; the course should also be offered in El Minya, and the routine sending of trainees to the United States should be reexamined.

Recommendation: In addition to the present evaluations, the Project Director should implement post-course evaluations immediately.

Recommendation: In recognition of the growing need for quality trainers, the Project Director should institute means whereby his staff are able to identify those who have the potential for becoming excellent trainers. Once identified, a program for their development needs to be worked out, including possible training abroad.

## 14.6 Regional Irrigation Improvement Project

### Purpose

14.6.1 According to the Project Amendment prepared in December 1983, RIIP was funded to "apply the pilot program findings of EWUP to some 40,000 to 50,000 feddans during the next three years, building on the experience gained at the original sites in Giza, Kafr El-Sheikh and Minya governorates." RIIP thus builds on EWUP experience and IMS improvements to the irrigation infrastructure, with the ultimate goal of transferring this regional program to the national level. An MOI policy paper supports the nation-wide implementation of an irrigation improvement program. According to the Addendum to the AID Amendment, this "policy paper has since passed through the legislative process, leading to a decree under which it has now become a national program and, as such, has been included in the MOI's Five Year Plan."

14.6.2 EWUP has provided the basic information and experience to begin RIIP which in turn will be the Pilot Program for the National Irrigation Improvement Project. In time, MOI hopes that RIIP will be able to take on greater operating responsibility similar to that of the Drainage Authority. RIIP and/or NIIP targets include "(1) Minimizing seepage losses; (2) Reducing water table level and pressure on drainage networks; (3) Controlling water distribution from barrages to the mesqa outlets; and (4) Improving water availability at the tail ends of canals and mesqas."

14.6.3 The Amendment shows AID contributing \$4.8 million for equipment purchase and the GOE contributing the equivalent of \$8.4 million, of which \$5.0 million will also be for equipment. The justification for the project arises from the earlier work of the EWUP team, which led the MOI to conclude that such an expansion of activities was technically and economically justified. This conclusion was supported by a six-page economic analysis in the Addendum to the Amendment of the Project Paper.

### Accomplishments and Activities

14.6.4 Since the First Amendment to the Grant Agreement went into effect in August 1984, the MOI has focused on the Serry Canal area as the point for initiating its activities. This Serry area forms part of a larger, five-year program to involve 438,000 feddans in 10 of the most productive

directorates in the country. The MOI set up an administrative unit in Minya Directorate headed by a Director and staffed by an Assistant Director and five engineers. In time a sociologist, agricultural economist, and agronomist from the EWUP Abyuha area may be added to the team. In April a CID consultant submitted a Working Paper outlining a three-year program for approximately 130,000 feddans (see Ruff, 1965). WRC helped the Project Director in reviewing this report and will continue providing substantial help until RIIP develops into a mature organization. The WRC Project Director anticipates providing assistance to RIIP himself and through the staff of the Water Management Research Institute and those CID team members who fall under his supervision. Help can also be expected from the PFU and from the IMS Coordinating Committee.

14.6.5 The Minya staff now has plans to work in two pilot areas within the Serry Canal command. One of these areas, involving 3,600 feddans, borders the entrance to the Serry Canal. The staff have been gathering data on the area such as measuring cross channel sections, gathering soil samples, and taking flow readings, and have prepared designs for canal improvement intended to increase flow and provide better water control. Possible changes include improving canal cross sections, straightening canal sections, reducing the number of barrages, building bridges, and installing control gates for three branch canals. The Director believes that some of this work can begin during this winter closure (specifically, the first three control structures). However, he plans to wait for the CID team, due to arrive in October, before instituting other major changes to the main system and to wait until the non-engineering staff are assigned to his organization before proceeding with the on-farm portion of the program. The Director also anticipates the need for staff training in on-farm water management.

14.6.6 The other area, comprising 2,000 feddans, lies close to the Abyuha headquarters. The Abyuha team took the lead by gathering data and opinions from MOA staff and identifying five candidate villages experiencing irrigation problems. About five months ago one of these was selected for further study and improvement, but a final decision on its acceptability has yet to be made. This delay may result from the Project Director's wish to wait for the CID team's arrival, since some on-farm improvements tie in closely with main system

improvements. Among the topics likely to be assigned to the CID team are possibilities for continuous flows, demand deliveries, better canal regulation, mesqa improvement, precision land leveling, water user associations, and the like. The Project Director anticipates that the interactions between main system operation and on-farm water use can be conveniently analyzed through desk-top computer modeling.

14.6.7 The CID agreement, signed in May 1985, provides for three long-term expatriate staff to assist RIIP. These three are a Main System Design Engineer, a Minya Field Irrigation Engineer, and a Planning and Irrigation System Design Engineer. The agreement also provides for another engineer, assigned to WRC, and a Senior Administrator who will probably be asked to provide occasional assistance to RIIP. Besides these long-term staff, short-term staff with a variety of disciplines may be called in from time to time. CID's headquarters in the United States has already initiated action to purchase project vehicles and computers.

#### Problems and Issues

14.6.8 Two overriding issues concern RIIP. These are the inability to reach the project target of improving 40,000 to 50,000 feddans by July 1987 and the many problems associated with transforming EWUP results into a regional program that in time will serve as the basis for a national program.

14.6.9 Starting with the end-of-project target, one out of the three years has passed, due to delays in the PP amendment approval and contracting procedures, without any direct improvement to the areas. Moreover, aside from traditional-type improvements to the delivery system that may be implemented during this winter's closure, on-farm improvements may not occur by this time next year. First of all are a set of problems noted in the EWUP final report, including the need for coordination among farmers and the time necessary for forming water users associations, the limitations in precision land leveling due to small field size and varying fallow periods, problems to be overcome with leaky mesqas when they are elevated, and local contractors' inability to follow design specifications. Secondly, RIIP staff are waiting for the CID team to arrive and advise on improvements to both the

canal network and on-farm systems. The first month after arrival, the CID team will probably be occupied with settling in and becoming acquainted with their responsibilities. Then, a plan of work will need to be finalized, data collected and analyzed, problems identified, and solutions proposed and tested before much can be done with actual improvements. Of course, the MOI staff will be able to prepare the way, some of the CID staff will have experience from EWUP, and certain activities can progress simultaneously. Even so, shifting from EWUP's applied research approach to a regional program calls for substantial preparation, which brings up the second concern.

14.6.10 The more serious problem concerns the need to fill the gap between EWUP's accomplishments and the requirements of a regional program. This gap needs to be filled by what may be termed a pilot production program. By that we mean a program that converts initial research findings into an implementable program on a sufficiently large scale to effectively test its merits technically, economically, financially, and administratively. The technical test requires the changes to be reasonably adaptive to varying conditions and to be within the grasp of local MOI staff. The economic test requires identifying cost effective means for improvements that interest both the Government and the farmers. The financial test requires that the program be within the budgetary constraints of the Government; for long-term success, this means a program that can be developed and maintained with equitable cost recovery from the farmers and minimal inputs from foreigners. The administrative test requires the ability of the MOI to efficiently manage a wide ranging program. These tests call for substantial thought and experimentation until a finely tuned approach evolves. In this sense, the pilot phase is still very much research in that alternatives are conceived, tested, and modified until an acceptable solution is found.

14.6.11 Clearly, designing a pilot program differs substantially from designing a research program. Because EWUP was not intended to reach the large pilot stage, considerable work remains to be done before a suitable approach can be developed even for areas of perhaps 5,000 or 10,000 feddans. Then, organizations must be built up, staff acquired and trained, and so on. A good model for the development of a regional program is that developed for on-farm water improvements in Pakistan's Punjab. Zandstra et al. (1982) of the International Rice Research Institute provide further information on the concepts of pilot production programs

applied to agricultural development. The International Conference, budgeted in the AID Amendment, could be a convenient setting to gain information from Pakistan and other third-world countries about their experiences in implementing such programs.

14.6.12 Some of the uncertainty about what still needs to be done and how to go about developing the pilot programs that eventually lead to a national program undoubtedly stems from not having made an economic feasibility study for RIIP. Those unfamiliar with such studies often fail to recognize their true value, which lies as much in thinking through the details of a program as on some measure of overall acceptability.

14.6.13 By the foregoing statement, we do not suggest that the MOI now take up such a feasibility study, although we find it curious that no such study was undertaken, in the light of AID's strong position with the MOI about such studies (i.e., point six of the CDSS for 1986, mentioned earlier). RIIP has already gained approval for the program from both AID and its own government, and the overall benefits of RIIP are probably sufficient given the knowledge gained from EWUP. Instead, we suggest that as RIIP is implemented, part of what is normally accomplished by a feasibility study be carried out. That is, the technical, economic, and financial validity of various RIIP components need to be studied as the program progresses. This can be done during the design of pilot activities by using estimated values, and afterwards, when monitored values become available, by using actual values.

14.6.14 Important in conducting a pilot program is to stratify the area into sections with common environments and problems. The Serry canal probably contains enough diversity to make this a useful concept even within this single commanded area. Certainly divisions can be made according to head and tail reaches, to high and low ground water conditions, and by gravity and lift systems, to name a few possibilities for classification. Then, the importance of the divisions and their problems and the likelihood for improvements can dictate which and how many of the divisions to select for study. When approached in this way, the most relevant portions of the area will have been selected and results according to different conditions can often be interpolated or extrapolated to different areas. These concepts contain elements of a systems approach to regional development.

14.6.15 Finally, we have two additional points. First, in meeting with the Abyuha team, we learned of their uncertainty about the role they are to play in RIIP's Serry Canal program; we also learned of their ability to obtain help in data gathering from the local MOA offices. We wish to stress, as others before us, the importance of non-engineering inputs to on-farm improvements and of effective cooperation between the MOI and MOA at the grass roots level. Second, as noted at the outset, RIIP has funds for nearly \$10 million worth of equipment. We assume that much of this will be for construction equipment. If so, that could mean that RIIP is moving strongly into actual implementation of the physical works. We simply raise the question whether at this stage of development if that is the best role for RIIP to play. An alternative would be for it to concentrate on system investigation, design, engineering layouts, quality control, and monitoring and evaluation, leaving construction to the private sector.

Recommendation: As early as possible, both MOI and CID teams should take up the question of the type of pilot program to undertake. This includes developing details on how to stratify the Serry Canal area and deciding what components of the pilot program to test for technical, economic, financial, and administrative feasibility.

Recommendation: The Project Director needs to come up with a revised timetable for accomplishments and convey this to the Vice Minister.

Recommendation: The MOI should initiate steps soon to formally bring the MOA into the RIIP program, using the Serry Canal area as a model.

#### 14.7 Water Research Center

14.7.1 The CID proposal, involving the Water Research Center (WRC) and RIIP programs, aims at increasing WRC's institutional capacity by supporting the activities listed below.

- o interdisciplinary research on branch canals and mesqas
- o interdisciplinary on-farm water application research

- o . computer-assisted design of improved watercourse networks
- o development of economic analysis methods for irrigation improvements
- o . continued development of methods to involve farmers in irrigation improvements
- o conjunctive use studies of surface, ground, and drainage waters
- o development of feedback mechanisms from RIIP for MOI and WRC
- o completion of unfinished EWUP projects at Abyuha, El Mansuriya, and Abu Raya Field Sites

14.7.2 In addition, the proposal also provides for training activities and equipment procurement to occupy WRC and consultant staff time.

14.7.3 All in all, the list of activities seems meant to be all encompassing rather than realistically definitive of the IMS project time frame. After all, seven years of EWUP left numerous projects unfinished.

#### Progress toward Implementation

14.7.4 A \$5.0 million contract was signed in May 1985 between USAID and CID. CSU is CID's lead institution. The contract covers provision for technical assistance, training, and equipment procurement for both WRC and RIIP. Through future contract amendments the WRC funding is expected to reach \$18.3 million and the RIIP portion to reach \$6.7 million.

14.7.5 The full complement of the CSU team is expected to arrive in Egypt by October 1985. Technical assistance to WRC is limited to one long-term irrigation specialist plus an unspecified input from the contract's 36 months of short term technical assistance.

14.7.6 Interestingly, the estimated date for contract completion is June 1, 1988, although the PACD specified in the Grant Agreement, First Amendment, is July 31, 1987.

14.7.7 Potential problem areas are as follows:

a) Farm and mesqa level concerns: On-farm and mesqa problems encountered in the EWUP program and elaborated in the EWUP Final Report will also be constraints to WRC progress as it undertakes completion of unfinished EWUP activities. The problems include:

- o time limitations as to when land leveling is possible;
- o time requirements to organize the farmers on each mesqa and formally link the mesqa organization to MOI;
- o local contractor's lack of experience, especially coordination of construction with breaks in crop and irrigation rotations

b) Manpower requirements to undertake the WRC portion of the IMS project: WRC starts the implementation of its expanded research and development program activities with essentially the same staff that worked on the EWUP project and with substantially less outside technical assistance. In addition, the \$1.89 million dollar funding for equipment will require a substantial recruitment of skilled operators who are nationally in short supply.

c) Redirection of technical emphasis: Under the EWUP program about 90 percent of the activities related to on-farm and mesqa research and development, with the other 10 percent relating to delivery systems. The total activities planned by the Water Management Research Institute (successor to EWUP in the WRC) provides for 80 percent of its recurring program to delivery systems, leaving only 20 percent to on-farm mesqa research. To the latter, however, will be added the responsibility of providing major help to RIIP concerning on-farm management. While we have no problem with the intent of the Institute to work according to this scheme, we caution that the Institute may be pressed to adequately carry out both emphases as planned. We would hope that should such workload pressures on the Institute occur, that its Director will recognize the importance of still unresolved issues in on-farm water management.

d) Anticipated delays in equipment arrival: The procurement planning for WRC equipment is an activity to be accomplished in cooperation with RIIP, technical assistance, and USAID after the CID team has arrived. It is unlikely that new equipment for the program will arrive before late summer 1986.

e) MOA's involvement in the IMS project: Relations between MOA and MOI are excellent on the Ministerial and Directorate levels. However, at the program execution level, coordination and cooperation are poorly defined. MOA has representatives in the villages; MOI reaches only to the district level. MOA extension agents give advice on agronomic practices but not irrigation practices; MOI is reluctant to get into the extension business. Since the IMS program does not contain a funded MOA component and USAID is helping fund MOA extension through the Small Farmers' Mechanization Project, USAID does not in effect actively encourage coordination and cooperation between the MOA and MOI at the irrigated on-farm level. The MOI should take whatever steps seem appropriate to bring the AID-funded, village-level extension agents into the interdisciplinary field research and development activities for mesqa improvement, on-farm water applications, and farmer involvement.

Recommendation: Because of WRC's influence over the RIIP program, the WRC Director should explore with USAID ways in which MOA extension agents may become members of interdisciplinary teams responsible for improving irrigation at the mesqa level. The means for doing so should include funding for MOA's inputs. This recommendation is similar to an earlier one concerning RIIP's Serry Canal activities, but is more general.

#### 14.8 Telemetry

14.8.1 Better water use through less waste and fewer irrigation water shortages is the purpose of the electronic data collection and analysis (telemetry) system. Management decisions to increase or diminish water flow will be improved by computer-modeled results that are based on timely and accurate water level information transmitted from all major water control and diversion structures throughout Egypt.

### Accomplishments and Activities

14.8.2 The telemetry system is a classic example of good cooperation among agencies (MOI, UNDP, IBRD and USAID) and of a well planned development. The telemetry concept was originally tested in the Menufia Telemetry System which was designed in 1977, became operational in 1980, and was extended to additional stations in 1982 and 1983. The present telemetry system is a component of the Nile River Water Master Plan developed by MOI/UNDP.

14.8.3 Operational computer models to make use of the telemetry system data were developed in MOI with technical assistance provided by USAID. Tests of a meteor burst communications link between Aswan Dam and Cairo, plus validation of the operational computer model, were successfully completed in the spring of 1985. In July 1985 a \$3.3 million, 24-month contract was signed with the RET Corporation of Virginia for implementation of the system that includes approximately 250 measuring stations, computer facilities at Cairo and Aswan, and data receiving equipment at all 18 field directorate offices. The contract includes a comprehensive training program for all staff levels. Backup feasibility documents contain a proposed organization within MOI for implementing computer assisted irrigation.

14.8.4 To date, all work is on time and within budget. In fact, the contractor is following a 15-month schedule that could result in early completion of the project. Also, to assist in monitoring installation, a telemetry specialist, funded by USAID, arrived in August 1985.

14.8.5 The modeling work of Professor Wylie appears to justify continuation; we understand that further refinement of his models can be accomplished at modest cost.

### Problems and Issues

14.8.6 At present the MOI Telemetry Project is without staff. Monitoring of the contractor will be largely by expatriate consultants whose assignments end shortly after the system becomes operational. Therefore, MOI will lack personnel who understand the complexities of installation and thus have limited capacity for extending the system to second order water control structures. Furthermore, on-the-job training opportunities will be lost.

Recommendation: The Project Director should pay particular attention to his future staffing requirements and should consider acquiring and training backup staff for key positions.

Recommendation: The MOI could help the Project Director in the foregoing recommendations by authorizing significant incentive increases to key employees.

#### 14.9 Commodities

14.9.1 IMS commodity procurement serves to support technical assistance office and field activities and to fund elements of project development such as land leveling and rehabilitation of mesqas and supply canals. Commodities specified under the original agreement have largely been procured, with the exception of approximately \$1.8 million for the Gharbia Directorate O&M Workshops (see Section 14.4). The procurement status of commodities added by the project amendment is as follows (source: Addendum to Irrigation Management Systems Project, Amendment, p. 16):

| <u>Activity</u> | <u>Amount</u> | <u>Status</u>   |
|-----------------|---------------|---|
| SR              | \$ 500,000    | Gates purchased   |
| WRC             | 2,400,000     | Commodities await TA arrival to help develop procurement plan |
| RIIP            | 3,780,000     |   |
| Telemetry       | 3,030,000     | Contract signed, completion scheduled for July 1987           |

14.9.2 Commodity procurement can be a lengthy and time consuming process. Based on Harza's experience, we estimate that a year's time will elapse before the Gharbia O&M equipment arrives. This estimate allows for all procedures, from the review of bidding documents to delivery to Egypt.

14.9.3 Purchase of equipment for WRC and RIIP programs may require somewhat less time in the approval phases, but collaborative preparation of a procurement plan, procurement document preparation, and advertising probably will not be finished until early 1986.

14.9.4 Even if all goes well, the summer of 1986 seems to be the earliest time for equipment arrival. Consequently, the present PACD of July 31, 1987, leaves only one year for WRC and RIIP field activities.

Recommendations: (Covered earlier in this report.)

14.10 Miscellaneous Consulting Services

14.10.1 Unforeseen IMS problems which have specific requirements for specialized expertise are funded through this category. To date, consulting services have been utilized to provide a member of the Esna Barrage design group and various evaluations. The flexibility available for funding future consultants can serve admirably to help explore the future directions which IMS or follow-up irrigation projects should consider. So far, approximately 10 percent of the money allocated for this purpose has been used.

## APPENDIX A

### SCOPE OF WORK FOR EVALUATION TEAM

#### Scope of Work

The team will use the Project Evaluation Summary (PES) and the Project Logical Framework as guidelines for measuring progress. The second annual report and evaluation on the structure replacement was conducted in December 1984 and its findings will provide a basis for this evaluation. The team will be able to focus its efforts on the other components of the project. The team should pay particular attention to the following areas:

1. What are the implications of a complex umbrella project such as IMS for USAID monitoring and management? Has donor coordination between USAID, UNDP and IBRD been adequate and effective?
2. Assess the quality of project inputs. Are the commodities, technical assistance and training inputs effective? Is the MOI providing sufficient counterpart support?
3. Evaluate the quality of project outputs:
  - A. Are the project feasibility plans developed under the Project Preparation Unit at a level acceptable to the international funding community? Has the feasibility screening process of GOE-funded activities improved? Has adequate progress been made in the development and institutionalization of the MOI Project Preparation Unit?
  - B. Assess the quality and replicability of the North Zifta Redesign Feasibility Study. Do the study findings merit USAID funding of the design and construction phases?
  - C. Evaluate the operation and maintenance plan developed for Gharbia Directorate. Will this activity serve as an adequate O&M model for other directorates? Are the necessary components of a well managed O&M activity provided for? What changes, if any, need to be made in order to have a replicable O&M model for the other 18 Directorates?

- D. Evaluate the quality of the training and manpower development component of the project. Are courses offered regularly? Can trainees and supervisors identify improvements that have resulted from training? Should the MOI establish a national training institute and what form should USAID support take? Are the individuals trained under the project being properly utilized and retained by the MOI?
  - E. Analyze the institutional requirements and potential constraints to implementing the Regional Irrigation Improvement Program.
  - F. Describe the contribution of the commodities, equipment, and consulting services procured under the project to the operations of the MOI.
4. Discuss the financial requirements of IMS interventions and analyze the implications for nationwide replication. What kind of resources will the MOI have to mobilize in order to implement project activities on a large scale?
5. To the extent feasible, assess the appropriateness of the \$101 million amendment and identify those components of the project that appear the most promising for expansion on a national scale. How effectively has the work of the Egypt Water Use Project been incorporated into the Irrigation Management Systems Project?

## APPENDIX B

### GENERAL QUESTIONS ASKED OF DIRECTORS

1. Were the staff members knowledgeable about the objectives of their component?
2. Did they have ready access to specific reference documents which described their authorized activities?
3. Did the plans of work reflect the expectation of the project?
4. Were the levels of the expenditures synchronized to the project documents?
5. What principal reports (e.g. evaluations, quarterly, special) were available and how were they used in the management of the project?
6. Were organizational relations diagrammed for internal relationships and responsibilities?
7. Were inter-organizational networks identifiable?
8. Were these networks used?
9. What staffing patterns were planned and how many were filled?
10. What training programs have been implemented?
11. What training programs are planned?
12. Are staffing needs known?
13. Are job specifications identified?
14. Are training programs related to job needs?
15. What did MOI staff members present as major program accomplishments?
16. What major issues did they consider as problematic?

These questions opened the discussions. Some questions were asked in group sessions. Other questions were asked by various team members as they linked up with the individuals responsible for a specific topic area. Sometimes the MOI team members accompanied an American team member and, at other times they would pursue an individual assignment such as collecting data which were available only in Arabic.

## APPENDIX C

### ITINERARY OF EVALUATION TEAM

#### August

- 3 Shaner and Santopolo departed Ft. Collins about 8 a.m. for Denver and NY/JFK. Busch arrived from Atlanta and the team proceeded to Cairo non-stop.
- 4 Arrived Cairo about 11:30 a.m. Customs prevented Shaner from bringing his computer and printer into Cairo. The procedure took considerable time and we did not arrive at the Nile Hilton until about 3 p.m. Shaner contacted E.Stains/USAID who suggested we wait until Aug. 5 to meet with USAID staff.
- 5 Met with USAID staff (Stains, Carmack, Conly, Ali Khalifa) and were joined by our MOI team members, Engs. Mohamed Aly and Ahmed Fahmy.
- 6 Evaluation team met at 8:30 a.m. to discuss scope of work. About 12 noon we met with Eng. Badawy, Vice Minister of MOI, and the IMS directors. Later, we met with Dr. Abu Zeid, Director of the Water Research Institute.
- 7 Visited Dir. Nassa Ezzat, Director of Project Preparation Unit, and senior Harza representative J.C. Ringenoldus.
8. Visited Under Secretary Farouk Shahin who directs RIIP, Commodities, and SR components.
9. Team read project documents and related reports.
10. Departed for Tanta to visit Gharbia/North Zifta staff and see project activity and system conditions, returning about 5 p.m.
11. Met with Eng. Fahim, Director, Training Program, and his advisor, Engr. Jean Kamel. Discussed training program and inspected facilities.
12. Assembled at USAID office before visiting Giza office of the Telemetry project to meet with Director Mohsen El Syaed and Rod Vissia, UN advisor.
13. Met with Dr. Abu Zeid to discuss IMS overall and Water Research Institute. Later, met with Dr. Rady, Director of WRC and Dr. Mona El Kady, Deputy Director of WRC.

14. Team returned to Shubra offices but divided their visits among various project staff.
  15. Met with engineers from El Minya office in offices of Under Secretary Shahin. Plans made for Minya visit on 17th and 18th.
  16. Team read materials specific to assigned portions of the evaluation report outline.
  17. Departed for Minya at 5:30 a.m. by train, arriving about 10:30. Visited former EWUP office at Abuyah Canal. Were given a review of that project's history and accomplishments. Visited mesqas and other structures of the irrigation system. Returned to Directorate office for other discussions.
  18. Visited Serry Canal site areas which will become part of the RIIP development scheme. Returned to Cairo about 7 p.m.
  19. Returned to Shubra offices to locate data that had been requested.
  20. Prepared preliminary report for meeting with the Vice Minister.
  21. Same.
  22. Met with Vice Minister and IMS project director for informal discussions of preliminary findings. Met with MOA officials concerned with mesqa level cooperation between MOA and MOI.
  23. Team met to discuss reactions to Vice Minister meeting.
  - 24 to 30 Writing and assembling draft of final report; checking draft with USAID offices.
  - 31 Busch and Santopolo depart non-stop for U.S.
- September
- 1 Shaner distributes draft to Vice Minister and IMS Director.
  - 2 Shaner prepares for meeting with MOI and USAID debriefing meetings, meets with USAID Project Review Committee at 3 p.m.
  - 3 Shaner meets with Vice Minister and IMS staff, 8 a.m.
  - 4 Shaner departs for U.S. non-stop.

APPENDIX D

KEY PERSONNEL INTERVIEWED

| <u>Title / Affiliation</u> | <u>Name</u>   |
|----------------------------|---|
| Eng. Ismail Badawy         | Vice Minister / MOI   |
| Dr. Mahmoud Abu Zeid       | Sr Under Sec, WRC/MOI   |
| Eng. Farouk Shahin         | Under Sec, RIIP/MOI   |
| Eng. M. Nassa Ezzat        | Director, PPU/MOI   |
| Eng. Mohsen El Sayed       | Director, Telemetry/MOI   |
| Eng. Adel Fahim            | Director, MTP/MOI   |
| Dr. Mohamed A. Rady        | Director, WMRI/MOI  |
| Dr. Mona El Kady           | Deputy Dir, WMRI/MOI  |
| Eng. Jean Abd El Sayed     | Instructor, MTP/MOI   |
| Mr. Ed Stains              | ILD/AGR/USAID   |
| Mr. W. Joe Carmack         | ILD/AGR/USAID   |
| Eng. Ali Khalifa           | ILD/AGR/USAID   |
| Ms. Shauti Conly           | DPPE/USAID  |
| Mr. J. Ringenoldus         | Team Leader, Harza Eng.   |
| Dr. Rufus Hughes           | Ag Econ/Harza Eng.  |
| Mr. Evan Kirth             | Eng./Harza Eng.   |
| Mr. Rod Vissia             | Team Leader, UNDP   |
| Eng. Abdel Raouf Hassan    | Gen Dir, El Minya/MOI   |
| Eng. Artin Halim           | Under Sec, El Minya<br>Irrigation   |
| Eng. Hamid Abdel           | Directorate/MOI   |
| Mr. Abdalla Saber Aly      | Under Sec, Tanta/MOI  |
| Dr. Mahmoud Noor           | Team Leader & Soc.,<br>Abyuha Project/MOI   |
| Dr. Mohamed Salaam         | Dir Gen,<br>Planning/Project<br>Director, Small Farmer<br>Productivity/MOA<br>Deputy Dir, Extension<br>Training Research<br>Institute/MOA |

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OPERATION AND MAINTENANCE

ELEMENT OF

IRRIGATION MANAGEMENT SYSTEMS

OVERVIEW:

One of the objectives of the Project Grant Agreement between GOE and USAID was to provide assistance to the GOE to develop the capacity to prepare and execute and improved O&M process.

In early 1984 a year long study and planning effort was completed in the Charbia Directorate. A report entitled Operation and Maintenance Planning for the Charbia Directorate was the end product of this study.

AID has reviewed the report and now wants to convey to the MOI some concerns and identify some issues which it is felt are fundamental to implementation but are not completely addressed in the report.

The first logical step in the process to strengthen C&M is the implementation of a plan to upgrade this function. As mentioned above, there are, a number of issues unanswered or unresolved which impact implementation. The purpose of this paper is to briefly review the background and present status of this activity and to provide suggestions for planning the implementation of an O&M program.

Background:

An underlying assumption of the SR and O&M components of the IMS project is that the level of maintenance for the irrigation infrastructure is inadequate to maintain the systems and sustain dependable water deliveries. The Project Paper sets the stage for initiations of the O&M segment of the project. It does so by providing historical background and describing the O&M problem now facing the MOI and defining the project made to address this problem. This assumption is supported by the Project Paper.

A second but more subtle assumption is that as water becomes more scarce the operation of the system must be refined and upgraded to more efficiently distribute and use the available water. To be able to meet the increased demands for Nile Water the IMS designers proposed the following:

1. A program to reduce the SR backlog by replacing the large number of structures that are deteriorated or otherwise obsolete.
2. Development and implementation of a Comprehensive Model Implementation Plan for operation and maintenance in the Gharbia Directorate. Once the plan is implemented and tested this Directorate is to serve as the model and example for the remainder of Egypt. Three steps to achieve these objectives which are to receive funding from USAID are:
  - a. Technical assistance from an expatriate expert to assist with development of the plan.
  - b. Development of an in house capability to perform routine maintenance by establishment and/or equipping of workshops.
  - c. Installation of a radio communications systems.
3. Increased MOI funding for O&M.
4. Upgrading of O&M activities in other directorates following the example of Gharbia. The project paper recognizes the possible need for additional funding from USAID to accomplish a country wide upgrading to O&M.

Project Paper (PP)

The PP refers to items to be funded by USAID in some detail. These include development of the O&M plan for Gharbia and funds for the procurement of workshop and communications equipment. The Paper recognizes but does not address in detail a number of issues and implications the MOI will face in operating an upgraded O&M program. The objective of achieving a "show case" O&M operation in the Gharbia Directorate is clear.

PP (page 29) does identify specific items that should be addressed to develop a model O&M plan. These are as follows with interpretation of objective for each item.

1. Budget - Procedures to identify O&M cost, translate cost to budget proposals, and establish operating budget. Develop initial budget.

2. Fund release and control - Administrative procedures to assure that budget is expended effectively without neglect to critical elements.
3. Structure and Canal Maintenance - Routine Maintenance policy and procedures. Basic elements of a preventative maintenance program.
4. Inspection - Development of policies and procedures to routinely inspect and detect maintenance needs in a timely manner.
5. Work Scheduling - Develop policies and procedures for identification of routine maintenance needs, prioritization of needed maintenance, and scheduling of maintenance, repair and rehabilitation.
6. Contracting - Policies and guidelines to determine types of work to be contracted. Contracting procedures.
7. Design - Policies and procedures for design of remedial work. Responsibilities for differing levels of design.
8. Construction Inspection and Quality Control - policies and procedures for a quality control program.
9. Survey - This item could encompass policies and procedures for a variety of data collection activities.
10. Staffing and Administration - Staffing necessary for the C&M program along with administrative procedures.
11. Communications and Complaints - Procedures to receive and promptly respond to complaints from water users.
12. Control and Management - Policies needed for management and control of C&M organization.
13. Work Accomplishment Reporting Procedures - Procedures used to record accomplishment of task and to report to responsible officials.

The PP stipulated that a plan be developed by the MOI with support from an advisory engineer/planner. The level of planning is not specifically stated but it is strongly implied that this plan was to be at a level ready for implementation.

GRANT AGREEMENT

The Grant Agreement is the official contracting document linking GOE and USAID. It contains a number of references to the O&M component. These are summarized as follows:

1. Section 5.6 requires that the MOI provide sufficient budget to implement the new O&M system.
2. Annex I Project Description obligates USAID to support the MOI toward meeting the Project objectives over a five year period.
3. Annex I Project Components item 2.c makes provisions for technical assistance leading to a model O&M component in the Gharbia Directorate. Item 3 contains provisions for technical assistance for equipment procurement. The last paragraph reaffirms to an objective of creating ".... a system to plan for operation and maintenance...."
4. Annex I GOE Responsibilities makes GOE responsible for:
  - a. Detailed planning for each of the Project Elements
  - b. Taking actions necessary for implementation
  - c. Providing budget and staffing as needed

The provisions contained within the Grant Agreement are compatible with the PP objectives.

O&M Plan for Gharbia Directorate:

In early 1983, a Harza Engineer L.E. Swarner was assigned to the Gharbia Directorate. Appendix A of the Harza/MOI contract refers to the scope of work and responsibilities for the O&M planning for Gharbia Directorate. In February 1984 a report entitled "Final Report, Operation Maintenance and Planning for Gharbia Directorate" was presented to the MOI by Mr. Swarner. This report contains numerous recommendations and much useful data. The report is organized by Chapters as follows:

- |            |                             |
|------------|-----------------------------|
| Chapter I  | Introduction                |
| Chapter II | Organization and Management |

|              |   |
|--------------|---|
| Chapter III  | District Operation Maps & Physical Inventory Data                       |
| Chapter IV   | Establishing & Equipping Workshops                                      |
| Chapter V    | Maintenance of Facilities   |
| Chapter VI   | Training of Personnel   |
| Chapter VII  | Water Control and Measurement   |
| Chapter VIII | Budgeting for Operation and Maintenance                                 |
| Chapter IX   | Manpower of Small Channels or Meskas                                    |
| Chapter X    | Utilization of Water on Farms   |
| Chapter XI   | Conjunction use of Water  |
| Chapter XII  | Establishment of Technical Libraries                                    |
| Chapter XIII | Cost and Benefits of Upgrading and improving Operation and Maintenance. |

Unfortunately the report prepared By Mr. Swarner, in USAID's opinion does not fully satisfy the intent of the PP for an implementation plan. The more fundamental reasons are:

1. The report does not include an assessment or provide a complete description of existing operating conditions and policy procedures.
2. Much of the report is too general sufficient and does not outline enough detail for implementation.
3. The problems are not identified categorically, for example lack of adequate transportation, staff, etc.
4. The report is written as a series of recommendations to the MOI and does not describe an implementation plan. No decisions have been made by the MOI on any of these recommendations.
5. Irrigation efficiencies which are useful as baseline data for evaluation of O&M activities appear to be unreasonably high. Their use as baseline data is questionable.

Conclusion and Recommendation:

Again the PP intent was to develop one Directorate to the point where its O&M program becomes a model for the remainder of the country. This Directorate could become the example to Egypt that the Salt River project is to the US.

USAID feels that this particular project component is at an extremely critical point. If a concerted effort by all concerned is not made then the goal of implementing an upgraded O&M program will not be achieved. There are several elements critical to the success of meeting the objectives. These are:

1. A clear understanding within the MOI both to Cairo and Tanta and USAID of the proposed O&M objectives and the mechanics of obtaining the objectives.
2. Firm commitment to the objectives by the MOI in personnel and funding.
3. Well conceived framework plan and detailed implementation plan.
4. Assignment of a sufficient staff to complete the project implementation plan and to supervise its implementation. It is recommended that a Project Director be appointed. For the immediate future someone in the MOI will have to devote a major part of his work time to moving the project forward.

Your suggestions to have a meeting or meetings with MOI personnel at Tanta to clarify issues and plan the next steps to be taken should be done as soon as possible. These meetings will help clarify the intent of the project, and identify problems areas and layout the plan of work which needs to be done.

As the coordinator develops and implements the O&M plan the following points might be considered.

1. To supplement a shortfall in qualified MOI staff needed during this peak work load period, contract with an Egyptian consulting firm or use short term TDY specialist to assist in the planning and early implementation.
2. A logical sequence of events after a coordinator has been appointed is:

- a. Identify major constraints to the O&M program
  - b. Develop framework plan
  - c. Develop detailed elements of parts of plan necessary to begin implementation
  - d. Prepare budget and obtain funding for startup
  - e. Begin implementation
  - f. Continue detailed development of elements of framework plan
3. Consideration be given to ways to establish meaningful baseline data.

APPENDIX H

CHARACTERISTICS OF TRAINEES

Engineers

- A. Total trained  
(June 1, 1982 - August 15, 1985) = 490
- B. Male 444  
Female 46
- C. Number of courses taken  
one course 418  
two courses 68  
three courses 4
- D. Age:  
under 25 years 4  
25 - 35 221  
35 - 45 153  
45 - 112
- E. Years in MOI  
- less than 20 years  
(engineers and assistant directors of work) 335  
- 20 years to 30 years  
(directors of work, deputy inspectors  
& inspectors) 111  
- over 30 years  
(General directors and Undersecretaries) 44

F. By Dept.

|                               |     |
|-------------------------------|-----|
| Irrigation Dept.              | 219 |
| Irrigation Projects Dept.     | 112 |
| Drainage Dept.                | 81  |
| Dams and Grand Barrages Dept. | 10  |
| Water Research Centre         | 45  |
| Technical Design Sector       | 19  |
| MOI Administration            | 4   |

G. Overseas Training

|          | Total     | 1982     | 1983     | 1984     | 1985     |
|----------|-----------|----------|----------|----------|----------|
| 4 weeks  | 48        | 28       | 16       | 4        |          |
| 5 weeks  | 78        |          | 27       | 31       | 20       |
| 8 weeks  | 12        | 4        | 6        | 2        |          |
| 13 weeks | 1         | 1        |          |          |          |
| 29 weeks | 3         | 3        |          |          |          |
|          | <hr/> 142 | <hr/> 36 | <hr/> 49 | <hr/> 37 | <hr/> 20 |

## Appendix I

## Common and Specific Courses By Year, Times Offered &amp; Number of Trainees

## ENGINEERS

| SUBJECT OF COURSE                                   | 1982<br>Jun. 1 - Dec 31    |                 | 1983           |                 | 1984           |                 | 1985<br>Jan. 1 - Aug 15 |                 | Total<br>June 1, 1982<br>Aug. 15, 1985 |                 |
|---|----------------------------|-----------------|----------------|-----------------|----------------|-----------------|-------------------------|-----------------|--|-----------------|
|   | No. of courses             | No. of trainees | No. of courses | No. of trainees | No. of courses | No. of trainees | No. of courses          | No. of trainees | No. of courses                         | No. of trainees |
|   | <b>COMMON COURSES: (A)</b> |                 |                |                 |                |                 |                         |                 |  |                 |
| Operation & Maintenance                             | 1                          | 19              | 1              | 18              | 1              | 12              | 1                       | 18              | 4                                      | 77              |
| Design of Irrigation Structures                     | 1                          | 18              | 1              | 25              | 1              | 22              | 1                       | 18              | 4                                      | 66              |
| Construction Management & Quality Control           | 1                          | 20              | 1              | 20              | 3              | 56              | 1                       | 10              | 5                                      | 88              |
| On Farm Water Management                            | 1                          | 20              | 1              | 27              | 1              | 19              | 1                       | 20              | 3                                      | 66              |
| Administration & Planning                           | 1                          | 20              | 1              | 20              | 1              | 18              | 1                       | 0               | 3                                      | 58              |
|   | Total of A                 |                 | 3              | 57              | 5              | 110             | 7                       | 133             | 3                                      | 349             |
| <b>SPECIFIC COURSES (B)</b>                         |                            |                 |                |                 |                |                 |                         |                 |  |                 |
| Modern Irrigation Systems                           |                            |                 |                | 21              |                |                 |                         |                 | 1                                      | 21              |
| Open & Tilt Drainage, Design & Construction         |                            |                 |                |                 | 1              | 20              |                         |                 | 1                                      | 21              |
| Using Pipes in Irrigation Projects                  |                            |                 |                |                 | 1              | 20              |                         |                 | 1                                      | 21              |
| Structural Replacement Project                      |                            |                 |                |                 | 1              | 15              |                         |                 | 1                                      | 15              |
| Irrigation Improvement Project                      |                            |                 |                |                 |                |                 | 1                       | 19              | 1                                      | 19              |
| Modern Theories in Design of Bridges                |                            |                 |                |                 |                |                 | 1                       | 38              | 1                                      | 39              |
| Modern Equipment to Control Water Level & Discharge |                            |                 |                |                 |                |                 | 1                       | 5               | 1                                      | 6               |
|   | Total of B                 |                 |                | 21              | 3              | 55              | 3                       | 66              | 7                                      | 141             |
|   | Grand Total                |                 | 3              | 57              | 6              | 131             | 10                      | 188             | 25                                     | 490             |

Appendix J,

THE ON-FARM WATER MANAGEMENT TRAINING COURSE SCHEDULE  
 June 29 to Aug. 15, 1985

Week Number (1)

| Date    | Day  | Time                 | Activity  | Place | Trainer<br>In Charge |
|---------|------|----------------------|---|-------|----------------------|
| June 29 | Sat. | noon                 | Arrival at K.E.S.<br>Settlement<br>Lunch<br>Greeting Party                        |       | ALL                  |
| June 30 | Sun. | 0700-0730            | Organization/ Review<br>of Day  | TC    | Fahim                |
|         |      | 0800-1200            | Opening Session,<br>Ceremony, Trainee<br>Responsibility and<br>Trainee Evaluation | TC    | Fahim                |
|         |      | 1200-1300            | On-Farm Water Manage-<br>ment   |       | Semaika              |
|         |      | 1300-1400            | Lunch   |       |                      |
|         |      | 1400-1500<br>Evening | <u>Lecture:</u> The CFWM<br>Training Course<br><u>Lectures:</u>                   | TC    | Naguib               |
| July 1  | Mon. | 0700-0730            | Organization/Review<br>of Day   | TC    | Fahim                |
|         |      | 0730-0930            | Discipline Diagnostic<br>Exams  | TC    | All                  |
|         |      | 1000-1100            | Interdisciplinary<br>Diagnostic Exams   | TC    | All                  |
|         |      | 1100-1200            | Lunch   |       |                      |
|         |      | 1200-1330            | <u>Lecture:</u> The Research<br>Development Process                               | TC    | Metawie              |
|         |      | 1400-1500            | <u>Lecture:</u> Interdiscip-<br>linery Work                                       | TC    | Lotfy                |

Week Number (1) (Cont.)

| Date   | Day    | Time       | Activity  | Place | Trainer In Charge |
|--------|--------|------------|---|-------|-------------------|
| July 2 | Tues.  | 0700-0730  | Organization/Review of Day                                | TC    | Fahim             |
|        |        | 0730-0900  | Agronomy Introductory Lecture                             | TC    | Semaika           |
|        |        | 0915-1015  | Sociology Introductory Lecture                            | TC    | Naguib            |
|        |        | 1045-1145  | Lunch   |       |                   |
|        |        | 1145-11315 | Engineering Introductory Lecture                          | TC    | Metawie           |
|        |        | 1330-1500  | Economics Introductory Lecture                            | TC    | Lotfy             |
| July 3 | Wed.   | 0700-0730  | Organization/Review of Day                                | TC    | Fahim             |
|        |        | 0730-0930  | <u>Lecture</u> : Introduction to Phase I: The Base Survey | TC    | Semaika           |
|        |        | 0930-1030  | Team Assignment   | TC    | Fahim             |
|        |        | 1030-1330  | Field Visit   | Field | All               |
|        |        | 1330-1400  | <u>Lecture</u> : Team Work                                | TC    | Fahim             |
|        |        | 1400-1500  | <u>Lecture</u> : Meeting Format                           | TC    | Lotfy             |
| July 4 | Thurs. | 0700-0730  | Organization/Review of Day                                | TC    | Fahim             |
|        |        | 0730-0900  | Agronomy Base Survey Lecture                              | TC    | Semaika           |
|        |        | 0915-1045  | Engineering Base Survey Lecture                           | TC    | Metawie           |
|        |        | 1045-1145  | Lunch   |       |                   |
|        |        | 1145-1315  | Sociology Base Survey lecture                             | TC    | Naguib            |
|        |        | 1400-1500  | Economic Base Survey Lecture                              | TC    | Lotfy             |

Week Number (2)

| Date    | Day    | Time      | Activity  | Place | Trainer In Charge |
|---------|--------|-----------|---|-------|-------------------|
| July 7  | Sun.   | 0700-0730 | Organization/ Review of Day   | TC    | Fahim.            |
|         |        | 0730-0830 | <u>Lecture</u> : Problem Identification: Completing the Base Survey | TC    | Semaika           |
|         |        | 0930-1100 | Discipline Phase I Sessions   | TC    | All               |
|         |        | 1100-1200 | Lunch   |       |                   |
|         |        | 1200-1500 | Discipline Phase I Sessions   | TC    | All               |
| July 8  | Mon.   | 0700-0730 | Organization/Review of Day  | TC    | Fahim             |
|         |        | 0730-0830 | <u>Lecture</u> : Project Evaluation                                 | TC    | Lotfy             |
|         |        | 0900-1000 | <u>Lecture</u> : Working with Farmers                               | TC    | Naguib            |
|         |        | 1015-1115 | <u>Lecture</u> : System/ Farmer Interaction                         | TC    | Metawie           |
|         |        | 1115-1215 | Lunch   |       |                   |
|         |        | 1215-1500 | Team Planning/ Scheduling Phase I                                   | TC    | All               |
|         |        | Evening   | <u>Lecture</u> :  | TC    |                   |
| July 9  | Tues   | 0700-0730 | Organization/Review of Day  | TC    | Fahim             |
|         |        | 0730-1500 | Phase I: Field Work   | Field | All               |
| July 10 | Wed.   | 0700-0730 | Organization/Review of Day  | TC    | Fahim             |
|         |        | 0730-1500 | Phase I Field Work  | Field | All               |
| July 11 | Thurs. | 0700-0730 | Organization/Review of Day  | TC    | Fahim             |
|         |        | 0730-1500 | Phase I Field Work  | Field | All               |

Week Number (3)

| Date    | Day    | Time      | Activity  | Place    | Trainer In Charge |
|---------|--------|-----------|---|----------|-------------------|
| July 14 | Sun.   | 0700-0730 | Organization/ Review of Day                           | TC       | Fahim             |
|         |        | 0730-1500 | Phase I Field Work                                    | Field    | All               |
| July 15 | Mon.   | 0700-0730 | Organization/Review of Day                            | TC       | Fahim             |
|         |        | 0730-1030 | Discipline Phase I Sessions                           | TC       | All               |
|         |        | 1100-1200 | Lecture: How to Write a Report                        | TC       | Semaika           |
|         |        | 1200-1300 | Lunch   | -        | -                 |
|         |        | 1300-1500 | Problem Identification Slides & Films                 | TC       | All               |
|         |        | Evening   | Lecture:  | TC       |                   |
| July 16 | Tues.  | 0700-0730 | Organization/Review of Day                            | TC       | Fahim             |
|         |        | 0730-1500 | Team Report Writing                                   | TC       | All               |
| July 17 | Wed.   | 0700-0730 | Organization/Review of Day                            | TC       | Fahim             |
|         |        | 0730-0930 | Team Report Writing                                   | TC       | All               |
|         |        | 0930-1100 | Team Presentation                                     | TC       | Lotfy             |
|         |        | 1100-1145 | Lunch   | -        | -                 |
|         |        | 1145-1315 | Team Presentation                                     | TC       | Lotfy             |
|         |        | 1330-1500 | Team Presentation                                     | TC       | Lotfy             |
| July 18 | Thurs. | 0700-0730 | Organization/ Review of Day                           | TC       | Fahim             |
|         |        | 0730-0830 | Lecture: Introduction To Phase II: Possible Solutions | TC       | Naguib            |
|         |        | 0900-1000 | Lecture: Hypothesis Development and Testing           | TC       | Lotfy             |
|         |        | 1000-1100 | Lecture: Teamwork in Phase II                         | TC       | Metawie           |
|         |        | 1100-1200 | Lunch   | -        | -                 |
|         |        | 1200-1500 | Discipline Phase II Sessions                          | TC/Field | All               |

Week Number (4)

| Date    | Day    | Time                   | Activity   | Place              | Trainer In Charge |
|---------|--------|------------------------|--|--------------------|-------------------|
| July 21 | Sun.   | 0700-0730              | Organization/Review of Day   | TC                 | Fahim             |
|         |        | 0730-1500              | Discipline Phase II Sessions                                       | TC/<br>Field       | All               |
| July 22 | Mon.   | 0700-0730              | Organization/Review of Day   | TC                 | Fahim             |
|         |        | 0730-1500<br>Evening   | Discipline Phase II Sessions<br><u>Lecture:</u>                    | TC/<br>Field<br>TC | All               |
| July 23 | Tues.  | 0700-0730              | Organization/Review of Day   | TC                 | Fahim             |
|         |        | 0730-0900              | <u>Lecture:</u> Irrigation Scheduling                              | TC                 | Metaawie          |
|         |        | 0930-1200              | Introduction to the Lab  | TC                 | Saied             |
|         |        | 1200-1300<br>1300-1500 | Lunch<br>Team Hypotheses Development                               | TC                 | All               |
| July 24 | Wed.   | 0700-0730              | Organization/Review of Day   | TC                 | Fahim             |
|         |        | 0730-1200              | Team Hypotheses Development  | TC                 | All               |
|         |        | 1200-1300<br>1300-1500 | Lunch<br>Team Hypotheses Development                               | TC                 | All               |
| July 25 | Thurs. | 0700-0730              | Organization/ Review of Day  | TC                 | Fahim             |
|         |        | 0730-0830              | Team Planning/Sche-  |                    |                   |
|         |        | 0730-1500              | duling for Phase II<br>Phase II Field Work/<br>Discipline Sessions | TC/<br>Field       | All               |

Week Number (5)

| Date    | Day    | Time      | Activity                                  | Place        | Trainer In Charge |
|---------|--------|-----------|---|--------------|-------------------|
| July 28 | Sun.   | 0700-0730 | Organization/Review of Day                | TC           | Fahim             |
|         |        | 0730-1500 | Phase II, Field Work/ Discipline Sessions | TC/<br>Field | All               |
| July 29 | Mon.   | 0700-0730 | Organization/Review of Day                | TC           | Fahim             |
|         |        | 0730-1500 | Phase II Field Work/ Discipline Sessions  | TC/<br>Field | All               |
|         |        | Evening   | <u>Lecture:</u>                           | TC           |                   |
| July 30 | Tues.  | 0700-0730 | Organization/Review of Day                | TC           | Fahim             |
|         |        | 0730-1500 | Phase II Field Work/ Discipline Sessions  | TC/<br>Field | All               |
| July 31 | Wed.   | 0700-0730 | Organization/Review of Day                | TC           | Fahim             |
|         |        | 0730-1500 | Phase II Field Work/ Discipline Sessions  | TC/<br>Field | All               |
| Aug. 1  | Thurs. | 0700-0730 | Organization/ Review of Day               | TC           | Fahim             |
|         |        | 0730-1500 | Phase II Field Work/ Discipline Sessions  | TC/<br>Field | All               |

Week Number (6)

| Date   | Day    | Time      | Activity   | Place       | Trainer In Charge |
|--------|--------|-----------|--|-------------|-------------------|
| Aug. 4 | Sun.   | 0700-0730 | Organization/Review of Day   | TC          | Fahim             |
|        |        | 0800-1500 | Team Report Writing  | TC          | All               |
| Aug. 5 | Mon.   | 0700-0730 | Organization/Review of Day   | TC          | Fahim.            |
|        |        | 0800-1500 | Team Report Writing  | TC          | All               |
|        |        | Evening   | <u>Lecture:</u>  | TC          |                   |
| Aug. 6 | Tues.  | 0700-0730 | Organization/Review of Day   | TC          | Fahim             |
|        |        | 0730-0930 | Team Presentation  | TC          | All               |
|        |        | 0930-1100 | Team Presentation  |             |                   |
|        |        | 1100-1200 | Lunch  |             |                   |
|        |        | 1200-1500 | Team Presentation  | TC          | All               |
| Aug. 7 | Wed.   | 0700-0730 | Organization/Review of Day   | TC          | Fahim             |
|        |        | 0730-0930 | <u>Lecture:</u> Introduction to Phase III & Implementation Process   | TC          | Lotfi             |
|        |        | 0930-1030 | <u>Lecture:</u> Planning Principles & Project Planning               | TC          | Naguib            |
|        |        | 1100-1500 | Land Leveling Presentation   | TC<br>Field | Metawie           |
| Aug. 8 | Thurs. | 0700-0730 | Organization/Review of Day   | TC          | Fahim             |
|        |        | 0730-0830 | <u>Lecture:</u> How to Present the Recommended Solutions             | TC          | Naguib            |
|        |        | 0830-1500 | Presentation of Recommended Solutions to the farmers/local officials | Field       | All               |

Week Number (7)

| Date    | Day    | Time                 | Activity  | Place | Trainer In Charge |
|---------|--------|----------------------|---|-------|-------------------|
| Aug. 11 | Sun.   | 0700-0730            | Organization/Review of Day (Phase III report)             | TC    | Fahim             |
|         |        | 0730-1500            | Team Report Writing                                       | TC    | All               |
| Aug. 12 | Mon.   | 0700-0730            | Organization/ Review of Day                               | TC    | Fahim             |
|         |        | 0730-0930            | Discipline Final Exam                                     | TC    | All               |
|         |        | 1000-1100            | Interdisciplinary Final Exam                              | TC    | All               |
|         |        | 1100-1200            | Lunch   |       |                   |
|         |        | 1200-1500<br>Evening | Team Report Writing<br>Lecture                            | TC    | All               |
| Aug. 13 | Tues.  | 0700-0730            | Organization/Review of Day                                | TC    | Fahim             |
|         |        | 0300-1500            | Slides Show & Video Films (Implementation in the Project) | TC    | All               |
| Aug. 14 | Wed.   | 0700-0730            | Organization/Review of Day                                | TC    | Fahim             |
|         |        | 0730-0900            | Team Report Writing                                       | TC    | All               |
|         |        | 9300-1100            | Team Presentation   | TC    |                   |
|         |        | 1100-1200            | Lunch   |       |                   |
|         |        | 1200-1300            | Team Presentation   | TC    | Metawie           |
|         |        | 1330-1500            | Team Presentation   | TC    | Metawie           |
| Aug. 15 | Thurs. |                      | Graduation Exercises<br>Clean-Up                          | TC    | All               |



Appendix K

TRAINING COURSE NO. 22  
MANAGEMENT SKILLS SEMINAR  
TRAINEES' EVALUATION FORM

Aiming to get use of your view about this course, in order to raise our performance in coming courses, we are interested to look at your evaluation of this course:

Please fill in black the circle representing your view with extreme frank and honesty

Length of the course:

Limiting the course in two weeks was:

- suitable and sufficient.
- Better shortened to one week.
- better increased to three weeks.
- I have another proposal: \_\_\_\_\_

(2) Daily Program and Duration:

(2-1.) Regarding daily program composed of three sessions was:

- suitable and sufficient.
- better shortened to two sessions.
- better increased utilizing afternoon period.
- I have another proposal: \_\_\_\_\_

(2-2.) Dividing the program among lectures, discussions, and field trips was:

- suitable.
- lectures' periods to be increased.
- discussions' periods to be increased
- field trips to be increased.
- I have another proposal: \_\_\_\_\_

(3) Subjects of Course:

(3-1.) Handling the subjects of the course in general was:

suitable at a percentage of:

10 20 30 40 50 60 70 80 90 100

theoretical and far from practical application.

(3-2.) I suggest giving more importance to the following subjects:

- 1- \_\_\_\_\_
- 2- \_\_\_\_\_
- 3- \_\_\_\_\_
- 4- \_\_\_\_\_
- 5- \_\_\_\_\_

(3-2.) I suggest giving less importance to the following subjects:

- 1- \_\_\_\_\_
- 2- \_\_\_\_\_
- 3- \_\_\_\_\_
- 4- \_\_\_\_\_
- 5- \_\_\_\_\_

(3-4.) I suggest eliminating the following subjects:

- 1- \_\_\_\_\_
- 2- \_\_\_\_\_
- 3- \_\_\_\_\_
- 4- \_\_\_\_\_
- 5- \_\_\_\_\_

(3-5.) I suggest adding the following subjects:

- 1- \_\_\_\_\_
- 2- \_\_\_\_\_
- 3- \_\_\_\_\_
- 4- \_\_\_\_\_
- 5- \_\_\_\_\_

(3-6.) Delivery of lectures in English Was:

No problem or obstacle to me

Presented a problem or obstacle, the reason was

\_\_\_\_\_  
\_\_\_\_\_

(4) Printed Matter:

- Printed matter distributed was:
- (4-1.) good and comprises beneficial information  
 yes  no
- (4-2.) too much to assimilate all of it  
 yes  no
- (4-3.) few and needs augmentation and abundance  
 yes  no
- (4-4.) comprises information not needed  
 yes  no
- (4-5.) The response

I have done the following \_\_\_\_\_

- read all the printed matter  
 read a remarkable part of it  
 only perused it  
 read nothing

(5) Benefits Gained: (mark the percentage)

- (5-1.) from lectures:  
10 20 30 40 50 60 70 80 90 100
- (5-2.) from discussions:  
10 20 30 40 50 60 70 80 90 100
- (5-3.) from field trips:  
10 20 30 40 50 60 70 80 90 100
- (5-4.) from the course as a whole

- high benefit  
 moderate benefit  
 limited benefit  
 negligible benefit

(6) What was your previous imagination and expectations about this course before you attend it, what was fulfilled and what wasn't?

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(7) Did you face any problems or disturbances in any field, if any what are they?

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(8) Any other suggestions or proposals.

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THANKYOU,



Started to Collect June '81

Appendix I

STATISTICS FORM FOR MOI ENGINEERS

Form Dating

Signature

(1) NAME: First Name Middle Name Surname (Family Name)

(2) SEX:  Male

Female

(3) BIRTHDATE: Month Day Year

(4) PLACE OF BIRTH: Governorate

(5) UNIVERSITY:

(6) FACULTY:

(7) SPECIALIZATION:

(8) GRADUATION DATE: Year Term

(9) GRADUATION DEGREE:  Accepted  Good  Very Good  Excellent

(10) HIGHER DIPLOMAS:  Yes  No if yes:

| Year  | University | Branch |
|-------|------------|--------|
| ----- | -----      | -----  |
| ----- | -----      | -----  |
| ----- | -----      | -----  |

(11) MASTER DEGREE:  Yes  No if yes:

| Year  | University | Subject |
|-------|------------|---------|
| ----- | -----      | -----   |
| ----- | -----      | -----   |
| ----- | -----      | -----   |

(12) Ph. D. DEGREE:     Yes     No    if yes:

| Year  | Univesity | Subject |
|-------|-----------|---------|
| ----- | -----     | -----   |
| ----- | -----     | -----   |

(13) DATE OF APPOINTMENT TO MOI: Month    Day    Year

- (14) PRESENT EMPLOYMENT LEVEL (higher technical cadre)
- Engineer
  - Director of Works
  - First Deputy Inspector
  - General Director
  - First Under Secretary
  - Assistant Director of Works
  - Deputy Inspector
  - Inspector
  - Under Secretary
  - Vice Minister

(15) PRESENT LEVEL OCCURRENCE DATE: Month    Day    Year

- (16) PRESENT EMPLOYMENT LEVEL (University cadre)
- Assistant Researcher (Demonstrator)
  - Researcher (Assistant Lecturer)
  - First Researcher
  - Researches Leader (Assistant Professor)
  - Chief of Researchers (Professor)
  - Deputy Director, Research Institute
  - Director, Research Institute
  - Chairman, Research Center

(17) PRESENT LEVEL OCCURRENCE DATE: Month    Day    Year

(18) PRESENT FINANCIAL LEVEL:

- Six                       Five                       Four                       Three
- Two                       One                       General Director
- Higher                       Distinguished                       Vice Minister

(19) PRESENT POST OF WORK:

(20) PRESENT POST OCCUPYING DATE: Month \_\_\_\_\_ Day \_\_\_\_\_ Year \_\_\_\_\_

(21) WORK ABODE ADDRESS

Town \_\_\_\_\_ Governorate \_\_\_\_\_

(22) GENERAL DIRECTORATE (or RESEARCH INSTITUTE) SUBORDINATED TO:

(23) ITS ADDRESS:

Town \_\_\_\_\_ Governorate \_\_\_\_\_

(24) SECTOR:

- MOI Administration - Minister's Office
- MOI Administration - Irrigation Sectors
- MOI Administration - Planning and Followup
- Irrigation Department - Irrigation Sector
- Irrigation Department - Projects Sector
- Irrigation Department - Dams and Grand Barrages
- Drainage Projects Authority
- Shore Protection Authority
- High Dam Authority
- Water Research Center

(25) PROFICIENCY IN ENGLISH LANGUAGE:

- | <i>Speaking</i>                 | <i>Reading</i>                  | <i>Writing</i>                  |
|---------------------------------|---------------------------------|---------------------------------|
| <input type="radio"/> Excellent | <input type="radio"/> Excellent | <input type="radio"/> Excellent |
| <input type="radio"/> Good      | <input type="radio"/> Good      | <input type="radio"/> Good      |
| <input type="radio"/> Fair      | <input type="radio"/> Fair      | <input type="radio"/> Fair      |

(26) ENGLISH LANGUAGE EXAMINATION AT AUC. (ALIGU)

- Yes       No      if yes:

Date \_\_\_\_\_ Results: Usage ---- Listening ---- Average ----

(27) PROFICIENCY IN OTHER FOREIGN LANGUAGES:

- |                      |                                 |                            |                            |
|----------------------|---------------------------------|----------------------------|----------------------------|
| <i>French</i>        | <input type="radio"/> Excellent | <input type="radio"/> Good | <input type="radio"/> Fair |
| <i>German</i>        | <input type="radio"/> Excellent | <input type="radio"/> Good | <input type="radio"/> Fair |
| <i>Other (-----)</i> | <input type="radio"/> Excellent | <input type="radio"/> Good | <input type="radio"/> Fair |

(28) COMPILED BOOKS or PUBLISHED PAPERS:

(29) TRAINING COURSES ATTENDED IN EGYPT OR ABOARD

| No | Country | Town | Date |    | Trainer | Subject |
|----|---------|------|------|----|---------|---------|
|    |         |      | from | to |         |         |
|    |         |      |      |    |         |         |
|    |         |      |      |    |         |         |
|    |         |      |      |    |         |         |

(30) CONFERENCE, SEMINARS, WORKSHOPS, etc. ATTENDED IN EGYPT OR ABOARD

| No | Country | Town | Date |    | Arranged by | Subject |
|----|---------|------|------|----|-------------|---------|
|    |         |      | From | to |             |         |
|    |         |      |      |    |             |         |
|    |         |      |      |    |             |         |
|    |         |      |      |    |             |         |



### 30th TRAINING COURSE FOR ENGINEERS

#### 1985 BRIDGE ENGINEERING SEMINAR AND WORKSHOP

April 17 - May 16, 1985

#### COURSE SCHEDULE

##### Wednesday 4.17.1985

|               |                                       |             |
|---------------|---------------------------------------|-------------|
| 9.00 - 10.00  | General Introduction                  |             |
| 10.00 - 10.30 | Break                                 |             |
| 10.30 - 11.00 | Course Review & Introduction .....    | Eng. Augade |
| 11.00 - 1.30  | Open Panel Review Workshop .....      | Eng. Augade |
| 1.30 - 3.00   | Questionnaire & Pre-Examination ..... | Eng. Augade |

##### Thursday 4.18.1985

|               |                                   |                  |
|---------------|-----------------------------------|------------------|
| 8.30 - 9.00   | Open Panel Area Review .....      | Eng. Augade      |
| 9.00 - 11.00  | Project Planning .....            | Prof. Dr. Wafail |
| 11.00 - 12.00 | Project Planning Examples ] ..... | Prof. Dr. Wafail |
| 12.00 - 2.30  | Open Discussion Workshop ] .....  | Eng. Augade      |

##### Sunday 4.21.1985

|              |   |                              |
|--------------|---|------------------------------|
| 8.30 - 10.30 | Engineering Discussions .....   | Eng. Augade                  |
| 10.30 - 2.30 | Field Trip to Delta Barrage<br>(Site Investigation & Soil Lab.) ] ..... | Eng. A. Fahim<br>Eng. Augade |

##### Monday 4.22.1985

|             |   |                        |
|-------------|---|------------------------|
| 8.30 - 2.30 | Soil Studies<br>Slope Stability<br>Bearing Capacities<br>Settlement ...etc. ] ..... | Dr. Adel Abd El-Meguid |
|-------------|---|------------------------|

##### Tuesday 4.23.1985

|              |                                    |                          |
|--------------|------------------------------------|--------------------------|
| 8.30 - 10.00 | Foundation Modelling ] .....       | Eng. Augade & Eng. Fahim |
| 10.00 - 2.30 | Workshop - Design Concepts ] ..... | Eng. Augade & Eng. Fahim |

Wednesday 4.24.1985

|              |                                |  |
|--------------|--------------------------------|--|
| 8.30 - 10.30 | Hydraulic Design               | ] Prof. Dr. Wafail<br>Prof. Dr. Talaat |
|              | Open channel Section...etc.    |  |
| 10.30 - 1.00 | Constrictions in Open Channels | Prof. Dr. Abd-El-Kawi                  |
| 1.00 - 2.30  | Workshop .....                 | + Eng. Augade                          |

Saturday 4.27.1985

FREE DAY

Sunday 4.28.1985

|             |   |                                   |
|-------------|---|-----------------------------------|
| 8.30 - 2.30 | Prestressed Design,<br>Computer Facilities,<br>Workshop | ] ..... Eng. Augade & Eng. Fonken |
|-------------|---|-----------------------------------|

Monday 4.29.1985

|             |                           |                                      |
|-------------|---------------------------|--------------------------------------|
| 8.30 - 1.30 | Prestressed Design        | ] ..... Eng. Augade                  |
|             | Precast Concrete Concepts |                                      |
| 1.30 - 2.30 | Standardization Concepts  | ..... Prof. Dr. Wafail & Eng. Augade |

Tuesday 4.30.1985

Field Trip to Medical Products  
Factory at Abu-Saltan

Thursday 5.2.1985

|              |                        |                |
|--------------|------------------------|----------------|
| 8.30 - 12.30 | Project Planning ..... | Dr. Ali Talaat |
| 12.30 - 2.30 | Workshop               |                |

Sunday 5.5.1985

|              |   |  |
|--------------|---|--|
| 8.30 - 12.30 | Hydraulic Structures                      | ] ..... Prof. Dr. Abd-El-Kawi<br>Prof Dr. Talaat |
|              | Syphons,<br>Concrete Box Sections,...etc. |  |
| 12.30 - 2.30 | Workshop, Detail Small Structures         | + Eng. Augade                                    |

Monday 5.6.1985

8.30 - 12.30 Materials:  
Concrete, Aggregates, Soils,...etc .  
(Irrigation and Hydraulic Department,  
Faculty of Engineering,  
Ein Shams University . . . . .)

Tuesday 5.7.1985

8.30 - 10.30

Local Compared to Others ]

10.30 - 2.30

Mid-Course Panel Discussion ]

..... Eng. Augade, Eng. Jean  
Dr. Abd El-Kawi, Eng. Fahim

Wednesday 5.8.1985

8.30 - 12.30

Design of Bridges (R.C.)

..... Prof. Dr. Mohr I. Soliman

12.30 - 2.30

Workshop

Eng. Augade

Thursday 5.9.1985

8.30 - 2.30

Contracting Procedures

..... Eng. Augade & Eng. Helmy

Sunday 5.12.1985

8.30 - 2.30

Quality Control

Present Systems,

Workshop.

..... Eng. Evan Krith & Eng. Augade

Monday 5.13.1985

8.30 - 2.30

Quality Control-

New Concepts

Workshop

..... Eng. Evan Krith & Eng. Augade

Tuesday 5.14.1985

8.30 - 2.30

Special Panel Discussion

Invitation to Eng. Ali

Eng. Ali Abd El-Rahman

Under Secretary of State for  
Governorate Affairs & Projects Affairs

Wednesday 5.15.1985

8.30 - 2.30

Course Review,

Conclusions,

Engineering Philosophy

..... All Lecturers

Thursday 5.15.1985

CLOSING SESSION

CERTIFICATES DELIVERY