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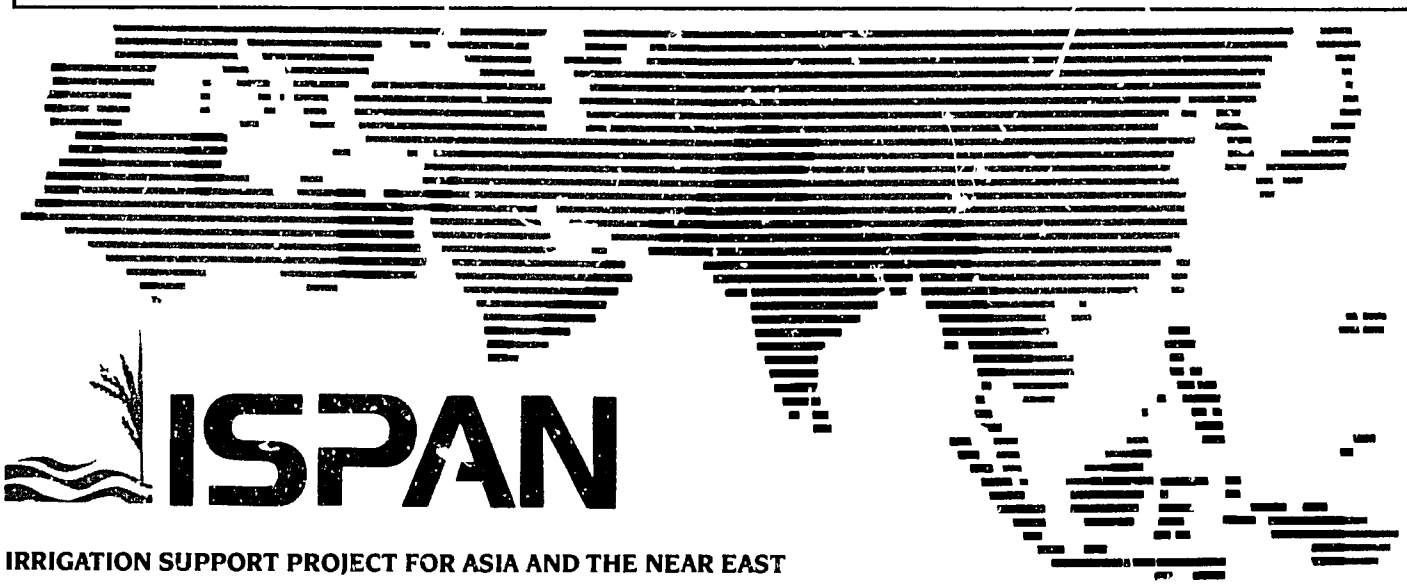
MAIN SYSTEMS MANAGEMENT COMPONENT OF THE EGYPTIAN IRRIGATION MANAGEMENT SYSTEMS PROJECT: START-UP WORKSHOP REPORT

ALEXANDRIA, EGYPT

November 15-19, 1989

ISPAN Activity No. 658B

ISPAN Report No. 24



IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST

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Training Resources Group
The University of Arizona

ISPAN Report No. 24

START-UP WORKSHOP FOR THE MAIN SYSTEMS MANAGEMENT COMPONENT OF THE EGYPTIAN IRRIGATION MANAGEMENT SYSTEMS PROJECT

ALEXANDRIA, EGYPT

November 15-19, 1989

Prepared for the USAID Mission to Cairo
under ISPAN Activity No. 658B

by

Al Rollins
and
Lee Jennings

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The workshop participants deserve special recognition for their willingness to spend long hours collaboratively working to achieve the workshop results. We would also like to express our appreciation for the excellent administrative, logistical, and secretarial support provided by Reda Kandiel, Amani Ismail, Inas Farid, and Sahar Fouad. Finally, we thank Kathy Alison, Human Resources Development Officer of ISPAN, for the opportunity to work with such a committed group of development workers in Egypt.

ACRONYMS

APC	Agricultural Production and Credit
AWP	Annual Work Plan
CC	Coordinating Committee
EOP	End-of-Project
FAO	Food and Agricultural Organization (UN)
GOE	Government of Egypt
IIP	Irrigation Improvement Project
ILD	Irrigation and Land Development Office (USAID)
IMS	Irrigation Management Systems
ISPAN	Irrigation Support Project for Asia and the Near East
LOP	Life-of-Project
MFS	Monitoring, Forecasting and Simulation
MIS	Management Information System
MO	Monitoring Office
MPWWR	Ministry of Public Works and Water Resources
MSM	Main Systems Management
NITI	National Irrigation Training Institute
NRIDCS	Nile River Irrigation Data Collection System
O&M	Operations and Maintenance
PD	Project Director
PDP	Professional Development Project
PIL	Project Implementation Letter
PIO/PT	Project Implementation Order/Participant Training
PIR	Project Inception Report
PM	Preventive Maintenance
PPD	Project Preparation Department
PSM	Planning, Studies and Models
S&M	Survey and Mapping
SR	Structural Replacement
TA	Technical Assistance

TDY	Temporary Duty
TL	Team Leader
TMD	Training and Manpower Development
UN	United Nations
USAID	U.S. Agency for International Development
WRC	Water Research Center

EXECUTIVE SUMMARY

The Main System Management (MSM) Project in Egypt is being carried out with the Ministry of Public Works and Water Resources (MPWWR). A project start-up workshop for MSM was held 15-19 November 1989 in Alexandria, Egypt. This was the seventh start-up workshop conducted by ISPAN this year for project components of the Irrigation Management Systems (IMS) Project and its Coordinating Committee (CC), which manages and coordinates the activities of the seven project components of this large, complex umbrella enterprise in Egypt.

MSM is a key component of IMS. Its primary purpose is to provide real-time flow data that can be used to improve management of irrigation water in the Nile River water distribution system, and thereby reduce waste and irrigation shortages. This project was initially begun in July 1985, but the original contract activities were unsuccessful and terminated by the Government of Egypt (GOE) in June 1987. The present MSM contract, which was awarded to the Harza Engineering Company (Harza) on 19 February 1989, includes some objectives not included in the initial contract scope. Specifically, the present MSM Project includes the following objectives:

1. Install a real-time flow data collection system using telemetry.

2. Provide a data management system to allow decision makers and other IMS components easy access to the data in a format that will be usable for their respective purposes.

3. Install a voice communication system that can be used throughout the Ministry's twenty directorates.

4. Establish improved water measurement capabilities within the ministry, including equipment, procedures, and trained manpower.

5. Establish an operations and maintenance (O&M) organization within the ministry that is equipped and trained to operate and maintain the various systems provided under this component.

6. Implement a canal automation scheme within one pilot canal command.

7. Provide staff training that encompasses all of the above activities.

The Office of Irrigation and Land Development (ILD) of USAID/Cairo, with the concurrence of the MSM project director, asked the Irrigation Support Project for Asia and the Near East (ISPAN) to conduct a project start-up workshop. The workshop was designed and facilitated by Lee Jennings, a management consultant with Training Resources Group, and Al Rollins, an independent consultant/trainer, under contract with the Irrigation Support Project for Asia and the Near East (ISPAN), a centrally-funded USAID project.

There were eight workshop goals:

- Exchange current information about the project that is essential to start-up.
- Achieve agreement on project goals and activities, and commitment to them.
- Provide an opportunity for the project team to become better acquainted.
- Agree on the management roles and responsibilities of the contractor, USAID, and host country agency.
- Agree on project-management procedures.
- Improve the ability to work together as a team.
- Discuss and develop strategies for the most important issues that will affect MSM.
- Develop work plans for the first six to twelve months of MSM.

Prior to the workshop, the facilitators conducted confidential interviews with thirty-two persons, all of whom were workshop participants. Ten participants were not interviewed because of late invitations and time constraints. Seven major issue categories were identified from the interviews and discussed during the workshop.

1. **Roles/Responsibilities/Authorities**
2. **Communication/Coordination**
3. **Training**
4. **Staffing/Personnel Issues**
5. **Contract/Procurement Issues**
6. **Ministry of Communications (ARENTO)/Frequencies**
7. **Site Selection Issues**

Forty-two persons participated in the workshop: 10 from the MPWWR, 17 from the MSM Project staff, 8 from Harza, 4 from the U.S. Agency for International Development (USAID), 1 from the IMS component for Planning Studies and Models (PSM), and 2 from the Ministry of Communications (ARENTO).

A major outcome of the workshop was increased knowledge about, understanding of, and commitment to the goals of IMS and MSM. Participants gained a better understanding and appreciation of the interrelationship of MSM, other project components, and concerned organizations and agencies.

Another major outcome took the form of clarified roles, responsibilities, and authorities of major actors in this very complex enterprise. Communication channels were established and clarified for future coordination and problem-solving. The major expectations for project management from MPWWR, MSM project staff, Harza, and USAID for each of the other groups were identified, published, and discussed.

Twenty-six major agreements on key project issues were reached during the workshop (See Chapter 3.2.2 for more specifics and details). There were important agreements on elements in each of the seven major issues identified during the interviews.

The session on work plans provided an opportunity for four groups of MSM project staff and Harza consultants to discuss, refine, and report on the following:

1. the consolidated Life of Project (LOP) work plan

2. the Telemetry System work plan (Component 1)

3. the Data Management work plan (Component 5)

4. the Training work plan (Component 7)

Following the presentation and discussion of these draft work plans, a number of agreements were reached or reaffirmed. (See Chapter 3.2.3 for specific agreements.)

Before the end of the workshop, participants evaluated the workshop's effectiveness. In written evaluations, participants responded very positively to the accomplishment of each of the workshop's eight major goals (see Appendix D for a complete summary).

Some unresolved issues remain that should be dealt with in follow-up activities:

- Telecommunication (ARENTO) issues--specific frequencies for Component 2, participation in and collaboration with MSM project implementation

- Delegation of responsibilities by Project Director without delegation of commensurate authority

- Completion of TA and MSM staffing requirements, with clear roles and responsibilities

- Choice of stations

- Linkage and cooperation between MSM staff and other Irrigation Directorate staff

The agreements and recommendations reached by participants represent many hours of open discussion and involved participation. All agreed that timely implementation of activities honoring these agreements will materially further the effective implementation of the MSM Project and the IMS enterprise. They were also clear that commitment to follow-up and monitoring of these activities is essential on the part of all involved and responsible parties (see Chapter 5 for specific recommendations and conclusions), and that a follow-up workshop should be held in six to nine months to share new information and review agreements, lessons learned, and future issues and work plans.

In conclusion, the facilitators are convinced that this project can have a successful start-up phase. Building on the team spirit that was demonstrated in Alexandria, the MSM team can be quite effective. However, the team will have to make serious efforts to continue their collaborative work planning and to resolve their differences in creative and productive ways. They will also need to focus soon on the development of an MSM Project Management Information System (MIS) that takes into consideration the information needs of all parties concerned with MSM implementation. All these efforts will be greatly aided by the dedication and competence evidenced by workshop participants.

Chapter 1

INTRODUCTION

1.1 Background

The Main System Management (MSM) component of the Irrigation Management Systems (IMS) Project in Egypt is being carried out with the Ministry of Public Works and Water Resources (MPWWR) through a bilateral agreement with the Government of Egypt (GOE) and supportive funding from the U.S. Agency for International Development (USAID). The IMS Project was originally authorized in 1981 with an intended ten years project life.

MSM was initially begun in July 1985 when the GOE awarded a $3,289,780 fixed-price contract to the RET Corporation to design, supply, and install the Nile River Irrigation Data Collection System (NRIDCS). At the end of the contract term, June 1987, a portion of the required equipment had been delivered, and a very small amount had been installed, but the MPWWR accepted none of this work and the contract was terminated. The present MSM contract, which was awarded to Harza on 19 February 1989, includes the NRICDS component plus an additional six components that were added in further agreements between USAID and the GOE/MPWWR. Although the contract was signed in early 1989, there have been numerous delays in actual implementation, due at least in part to residual effects of the earlier contract failure.

The primary purpose of the MSM component is to provide real-time flow data that can be used to improve the management of irrigation water in the Nile River water distribution system, and thereby reduce waste and irrigation shortages. These are MSM's objectives:

1. Install a real-time flow data collection system using telemetry techniques.

2. Provide a data management system to allow decision makers and other IMS components easy access to the data in a format that will be usable for their respective purposes.

3. Install a voice communication system that can be used throughout the ministry's twenty directorates.

4. Establish improved water measurement capabilities within the ministry, including equipment, procedures, and trained manpower.

5. Establish an operations and maintenance (O&M) organization within the ministry that is equipped and trained to operate and maintain the various systems provided under this component.

6. Implement a canal automation scheme within one pilot canal command.

7. Provide staff training that encompasses all of the above activities.

Total USAID contribution to this component will be $42 million, including approximately 200 person months of technical assistance (TA), 60 person months of nondegree training, degree training for 10 persons, and commodities.

MSM has begun somewhat slowly in relation to the outputs expected at this point in the project schedule. This delay has occurred due to a number of factors beyond the control of the MPWWR, Harza, and USAID. It is anticipated that this start-up workshop will help facilitate and resolve some of the issues that have contributed to the delays in implementation.

1.2 Terms of Reference

ISPAN was asked to provide two senior facilitators skilled in workshop design, implementation, and consultation. They were to do the following:

- Participate in a team planning meeting (TPM).
- Meet with key team members (project staff from MPWWR, USAID personnel, Harza team leader and team) to help prepare for the workshop.
- Review background information and interview participants to identify key issues and constraints to successful project implementation.
- Analyze interview data, using results to design the specific elements particular to the MSM start-up workshop.
- Oversee the workshop planning and organization and the timely and proper management and completion of all logistical arrangements.
- Manage and facilitate the workshop implementation, emphasizing team building and problem solving approaches.
- Conduct a debriefing on the results of the workshop and possible next steps with key MPWWR/USAID/Harza staff.
- Prepare a brief report of issues identified, agreements reached, final problem-solving approaches recommended for effective project management and improved project implementation, and training methodologies employed.

1.3 Interviews

Thirty-one interviews were conducted to establish the workshop agenda. The interviewees included 17 Egyptians on the project staff, 3 people from USAID, 7 from the Harza consultant staff, 4 senior staff from MPWWR, and the Planning Studies and Models (PS&M) project director.

Interviewees were asked to describe the major goals of the IMS project and the MSM component. They were also asked to describe their roles and responsibilities within the project, and their expectations and concerns for the workshop. Finally, individuals were asked to identify the major issues facing the implementation of MSM. Although the facilitators were unable to interview five senior MPWWR officials and two senior engineers from the Ministry of Communications (ARENTO), these individuals were able to identify their issues and concerns during the workshop and had major inputs into the discussions and agreements reached.

The facilitators analyzed the interview data and used the results to develop issue statements that were discussed in the workshop. The issues selected were those mentioned most often during the interviews.

The proposed workshop agenda, schedule, and list of issues were discussed with the workshop steering committee (Soliman Abou Zeid, MSM project director; Andy Tczap, Harza team leader; and John Anania, USAID project officer) prior to the workshop.

1.4 Interview Findings and Issues Identified

Most participants interviewed were enthusiastic about the workshop, although some expressed concern that discussions and agreements reached during the workshop might not be followed up with appropriate actions and implementation.

Almost half of those interviewed knew very little about the goals of the overall IMS project, the MSM component, and other project components.

Many were unclear about the roles of USAID, the MPWWR monitoring office, and the technical assistance team. Most had never been to this type of participatory workshop before, so they were very curious about the agenda and their roles in the workshop.

The interview data reflected two general areas of concern. The first was a lack of knowledge about the overall IMS Project and its components, including the role and function of the IMS Coordinating Committee and how it affects MSM. The second broad area of concern centered around the effective implementation of MSM. These concerns fell into seven categories and are listed below. (Appendix E contains a more detailed description of these categories. Additional issues were identified during the workshop and are added as number 8 in Appendix E.)

These were the project implementation issues:

1. **Roles/Responsibilities/Authorities**

2. **Communication/Coordination**

3. **Training**

4. Staffing/Personnel Issues

5. Contract/Procurement Issues

6. Ministry of Communications (ARENTO)/Frequencies

7. Site Selection Issues

Chapter 2

THE START-UP WORKSHOP DESIGN

2.1 Workshop Background and Overview

The purpose of a Project Start-up Workshop is to shorten the time a project needs to begin running smoothly and effectively. When a project's major players gather together in a residential setting, they are often able to systematically address major issues, identified in confidential pre-workshop interviews, that affect the project's effective implementation. The workshop participants also can obtain current project information, discuss management expectations, and develop work plans for the coming year. For MSM, which is very complex (seven components) and is closely interrelated and interdependent with other IMS components, such a process is critical.

The Office of Irrigation and Land Development (ILD) of USAID/Cairo, with the concurrence of the MSM project director, Soliman Abou Zeid, asked the Irrigation Support Project for Asia and the Near East (ISPAN) to conduct a project start-up workshop.

The workshop, held 15-19 November 1989 in Alexandria, Egypt, was the seventh for IMS components in Egypt. Because of project delays, this workshop was in many respects an important "new" start-up for key MSM players.

Forty-two persons attended the MSM start-up workshop. (See Appendix A for a participant list.) Ahmed Ali Mazen, head of the Irrigation Department and chairman of the IMS Project Coordinating Committee, attended for two days.

Al Rollins, an independent consultant/trainer, and Lee Jennings, a management consultant with Training Resources Group, facilitated the workshop under contract with ISPAN.

Four major groups were involved:

<u>Project Staff</u> — The MSM project director, 15 Egyptian engineers (some very new to this project), and a telecommunication consultant from the University of Cairo.

<u>Harza Staff</u> — The team leader, the Harza project sponsor, the home office coordinator, the specifications and procurement officer, and four technical assistance consultants for MSM components 1, 2, 5, and 7.

<u>USAID Staff</u> — The ILD office director, the MSM project officer, and the senior irrigation specialist. The associate director for Agriculture joined for the presentation of agreements and work to senior officials.

MPWWR Staff The head of the Irrigation Department and chairman of the IMS Coordinating Committee (CC), the First Undersecretary of State and head of the Irrigation sector, Undersecretaries of Governates for Upper and Lower Egypt, Undersecretaries for Planning and Water Distribution, the head of the IMS monitoring office (MO), the project directors for the Planning Studies & Models component (IMS), and the Gharbia Operations and Maintenance Project plus two senior engineers from ARENTO.

The workshop design provided opportunities for individual work on information gathering and background reading; small-group and plenary discussions; presentations on history and background of both the IMS umbrella project and MSM, and also on the more-technical information regarding advanced methodologies to be used in the project; plus team-building and problem-solving activities in both heterogenous and intact work groups. Perhaps of equal importance were the breaks, scheduled activities outside of formal sessions, and meals and free time as vehicles for making new relationships and working on important interface and coordination agendas. As recommendations and agreements were reached during the workshop, they were recorded and typed for the total group to review and ratify. Participants received copies of all workshop agreements prior to the final presentation to senior officials (Appendix F, Management Expectations, and Appendix G, Results/Agreements of Discussions on Project Issues).

The ISPAN consultants facilitated the workshop process, guiding group assignments and encouraging full participation of all members, facilitating plenary discussions/decision-making, and recording/reviewing agreements reached and recommendations made.

2.2 Workshop Goals

The workshop was designed to accomplish the following goals:

- Exchange project information that is essential to start-up.
- Achieve agreement on project goals and activities, and commitment to them.
- Provide an opportunity for the project team to become better acquainted.
- Agree on the management roles and responsibilities of the contractor, USAID, and host country agency.
- Agree on project-management procedures.
- Improve the ability to work together as a team.
- Discuss and develop strategies for the most important issues that will affect the MSM.

- Develop work plans for the first six to twelve months of MSM.

2.3 Workshop Schedule

The workshop lasted three and one-half days, from 6 P.M. on Wednesday, 15 November to noon on Sunday, 19 November 1989.

WEDNESDAY, NOVEMBER 15

6:00 P.M. Opening Session

Welcome and workshop expectations by Mohamed Nadar, first undersecretary of state and head of the irrigation sector; Soliman Abou Zeid, MSM project director; and William Carmack, USAID/IRD office director.

Presentation of the Workshop Objectives, Schedule, Expected Outcomes and Workshop Assumptions (Norms)

8:00 P.M. Session 2: Getting Acquainted--Reception

THURSDAY, NOVEMBER 16

8:30 A.M. Session 3: Sharing Project Information

Overview of IMS and results of September 1989 IMS Coordinating Committee management workshop agreements by Eng. Nadar and Mr. Carmack

Role of the IMS monitoring office by Eng. Taha

Overview of MSM project by Eng. Abou Zeid

Questions and answers

2:00 p.m. Overview of MSM project implementation by Mr. Tczap

Questions and answers

Presentation of communication technology by Eng. Abou Zeid

Questions and answers

Session 4: Overview of Facilitators' Findings

Session 5: Expectations of Project Management

6:00 P.M. Close of day one

FRIDAY, NOVEMBER 17

8:30 A.M. Session 5: (continued) Agreements on Project Management Expectations

11:30 A.M. Break for prayers and lunch

1:00 P.M. Session 6: Discussion of Key Project Issues

3:00 P.M. Break for Egypt and Algeria football, World Cup regional finals

5:00 P.M. Session 6: (continued)

7:00 P.M. Close of day two

8:00 P.M. B.B.Q. banquet

SATURDAY, NOVEMBER 18

8:30 A.M. Session 6: (continued)

2:00 P.M. Session 7: Developing a Project Work Plan

4:15 P.M. Presentation of MSM work plans

1. Project Management
2. Component 1: Telemetry System
3. Component 5: Data Management
4. Component 7: Training

6:00 P.M. Close of day three

SUNDAY, NOVEMBER 19

8:30 A.M. Session 8: Presentation of work plans to senior officials (with final corrections and ratification)

10:30 A.M. Session 9: Workshop Evaluation

12:00 Noon Close of workshop

2.4 Session Descriptions

This section contains a brief description of each session. The results of the issues discussed and the agreements and decisions reached appear in Chapter 3.

Session 1: Workshop Opening

The participants were welcomed and given a brief introduction to the workshop expectations by Mohamed Nadar, Soliman Abou Zeid, and William Carmack. The facilitators added their own welcomes and reviewed the workshop objectives, expected outcomes, schedule, and norms for working together effectively.

Session 2: Getting Acquainted

The participants, in heterogeneous groups of six, introduced themselves to each other by name, by project-related work, and by favorite leisure-time activity. One person at each table presented each person to the total group. This exercise provided some good start-up energy and helped set an informal, participatory climate for the workshop. Following this exercise, everyone attended the opening reception.

Session 3: Sharing Project Information

Eng. Nadar and Mr. Carmack presented an overview of IMS goals and some of the actions taken in the IMS Project Management Workshop held 3-8 September 1989 in Alexandria, Egypt. Participants then queried the two presenters for additional information or clarification.

Because a majority of participants had indicated little knowledge of the monitoring office role, Taha Abou El Dahab described the roles and responsibilities of that office as defined in the September IMS Project Management Workshop. Questions and answers followed this brief overview.

Soliman Abou Zeid, MSM project director, followed with a review of the project history, and provided an overview of the present status of the new MSM component, with a more detailed and technical presentation of the communications technology, especially the meteor burst equipment and system. Table groups were asked to identify no more than five questions for which they needed further information or additional clarification. Answers from Eng. Abou Zeid and ensuing discussions by the total group were lively and engaging, and some of the issues raised were discussed more fully later in the workshop.

Andy Tczap, Harza TA team leader, next presented his overview of the present implementation status of MSM components. This presentation was also followed by a lively and active period of questions and answers.

Session 4: Overview of Facilitators' Findings

The facilitators then presented results of the pre-workshop interviews, which were reviewed for accuracy, completeness, and acceptance by the total group.

Session 5: Expectations of Project Management

Facilitators closed with an overview of the management expectations session, a brief lecturette on the management aspects of MSM, and indications of the process and agenda for the following day.

Because many of the issues identified resulted from a lack of information on decisions and actions already taken by the IMS/CC in the September Management Workshop and in subsequent meetings, Mr. Carmack presented a more detailed and specific description of those actions. Eng. Mazen, chairman of the committee, attended this session to provide official confirmations and details in response to the questions raised by this presentation.

Following this initial information sharing, the participants divided into four groups: MPWWR project staff, Harza TA team, USAID staff, and senior officials of MPWWR and ARENTO. Their task was to develop a list of expectations of project management that the other groups should meet. Each was to record these expectations and then present and clarify them with the other groups. Each group was to review the other groups' expectations, then discuss reactions and reach agreements where possible in the total community.

In developing their lists, the organizational groups considered the following questions:

- How do you expect the other groups to share project information with you?
- What do you expect the working relationships to be with the other groups involved in implementing MSM?
- What kinds of written reports do you expect to receive from the other groups? What kinds of reports do you expect to prepare for the other groups?
- How much do you expect to be involved in the decisions that are made by the other groups connected to MSM?
- How do you expect to monitor individual and overall project performance?
- To what extent do you want to be involved in planning MSM activities with the other groups?

This was an important session, which touched directly on many of the issues identified in the interviews. The results appear in Chapter 3 of this report.

Session 6: Discussion of Key Project Issues

Following a break for prayers and lunch, the seven key issue categories were again presented at scattered locations around the room. Participants each selected one issue for which they had the most interest and the most resources to offer. Given the large number of participants in this workshop, this self-selection allowed small groups of interested persons to work on each of the seven issue categories in the first round. They worked on their chosen issues for two hours.

The first report-out session, featuring discussions and agreements in the large group, lasted approximately two and one-half hours. Reports-outs and large group discussions and agreements continued through the morning of the third workshop day. Agreements and recommendations resulting from this session are described in Sections 3.2.1 and 3.2.2 of the following chapter.

Session 7: Developing a Project Work Plan

Four groups involved in MSM component planning, management, and implementation were tasked to develop and report on detailed work plans for the next six to nine months of the project. These groups, which included both MPWWR project staff and Harza TA consultants, addressed these areas:

- Management of MSM
- Component 1: Telemetry System
- Component 5: Data Management
- Component 7: Training

The remaining four components of the project are not yet fully staffed. Therefore, part of the project management's task was to develop and report on plans to complete the staffing requirements and give specific dates where possible.

All reports on these detailed work plans will be incorporated and expanded in the MSM Project Inception Report (PIR) to be submitted 1 December 1989 to USAID and the MPWWR. Draft reports of the MSM Life-of-Project Workplan (Appendix H) and the Training Component's First Year Schedule (Appendix I) are appended to this report.

Session 8: Presentation of Agreements and Work Plans to Senior Officials

This session consisted of a presentation of agreements on management expectations and key issues by Soliman Abou Zeid to Edwin Stains and the senior MPWWR officials present for final review, clarification, and ratification.

Session 9: Closing and Evaluation of the Workshop

Engineers Mazen, Nadar, and Abou Zeid closed the workshop with words of appreciation for all who had made this workshop possible and successful, with special thanks to the participants and facilitators. The facilitators added their appreciations, and passed out the workshop evaluation form, which the participants completed.

Chapter 3

OUTCOMES AND AGREEMENTS

3.1 Overview of Outcomes

- A common understanding developed about the MSM component and how it fits into the overall IMS project. Workshop activities brought about a clarification of the roles and responsibilities of the IMS Coordinating Committee, the IMS monitoring office, the MSM Steering Committee, and the MSM project director, TA team leader, and USAID project officer.

- Information was exchanged and agreements made on important project management and implementation issues.

- An important opportunity was provided for key individuals to step back from their busy schedules and meet together to exchange ideas, clarify expectations for working together, and discuss current and potential issues related to project implementation.

- Team building began in the form of increased understanding of how individuals will work together, and an increased appreciation for participant personalities and potential contributions to the project. Overall, commitment to MSM and its goals increased.

- Egyptian engineers assigned to work with MSM components had an opportunity to become better acquainted and to discuss component workplan assumptions with the TA consultant(s) assigned to their component.

- The draft MSM Life-of-Project(LOP) workplan was reviewed and important modifications and further details proposed for both the consolidated LOP workplan and the workplans of component 1, Telemetry System; component 5, Data Management; and component 7, Training.

- Participants concurred that the proposed workplan modifications and agreements reached during the workshop will be incorporated into the final MSM Project Inception Report that will be submitted to MPWWR and USAID by 1 December 1989.

3.2 Specific Recommendations and Agreements

This section summarizes the specific agreements and recommendations by session. For a full copy of each original workshop product, refer to Appendices F and G. Although, minor issues and some specific technical recommendations are omitted from this summary, all management agreements are presented in full.

3.2.1 Project Management Agreements

MSM staff agreed to meet the following expectations of the MPWWR group:

- Meet quarterly with the Directorates to discuss the status of MSM implementation constraints and outputs.
- Provide immediate reports about problems, obstacles, and constraints.
- Follow precisely the decisions and guidelines of the MSM Steering Committee and the IMS Coordinating Committee.
- Provide, through the IMS monitoring office, quarterly progress reports on the status of implementation, constraints, and outputs.
- Take immediate action to solve urgent problems.
- Follow ministerial decrees concerning the responsibilities of the project director.
- Cooperate with the IMS monitoring office in providing information that leads to establishing success factors and indicators for evaluating project performance.
- Give suggestions for MSM long-term plans to MPWWR and GOE decision makers.
- Give comments on MPWWR short-term and long-term plans that concern MSM before final approval.

USAID agreed to meet the following expectations of the MPWWR group:

- Provide up-to-date information, studies, and research reports about similar projects outside Egypt.
- Hold periodic meetings with top MPWWR officials to exchange information and ideas.
- Provide status reports or letters of explanation regarding the status of any problems directly concerning USAID that delay implementation of the project.

- Hold periodic meetings with MPWWR officials to discuss project work status. (MSM project officer)

- Provide evaluation reports furnished by external missions.

- Provide, through the IMS monitoring office, project financial reports.

- Exchange information and ideas while preparing long-term plans for projects.

The TA team (Harza) agreed to meet the following expectations of the MPWWR group:

- Exchange all information on project implementation and outputs only with the approval of the project director; however, if there are disagreements between the project director and the TA team leader, these should be taken to the MSM Steering Committee, or, if necessary, to the IMS Coordinating Committee for resolution.

- Encourage teamwork with counterparts and senior staff.

- Ensure that all written reports are in accordance with contracts and are exchanged only with the approval of the project director.

- Maintain contract regulations as the basis of any decision taken by the TA team.

- Before taking action, discuss all decisions concerning the project with the project director. If disagreements cannot be resolved at the level of the project director, project officer, and TA team leader, take them to the MSM Steering Committee, and, if necessary, to the IMS Coordinating Committee.

- Follow instructions from the IMS/MO and work closely with it in establishing indicators to measure project performance and success.

- Follow the contract precisely in providing progress reports about project performance.

- Work closely with the project in giving suggestions for short- and long-term project plans.

The TA team agreed to meet the following expectations of the MSM staff group:

- Inform them periodically about software and hardware technical information, as well as other new items.
- Transfer knowledge and experience.
- Work with MPWWR as a team, which includes TA consultants sharing offices with Egyptian engineers so they can explain what is going on.
- Prepare brief, clear technical reports as specified in the contract.
- Prepare technical reports related to project technology that can benefit MPWWR technical staff.
- Reach decisions through discussion.
- Develop project workplans collaboratively with MPWWR staff.
- Work in full cooperation with MPWWR staff and provide training to Egyptian engineers when required and approved.

USAID agreed to meet the following expectations of the MSM Project staff group:

- Give information about procurement regulations whenever the information changes.
- Meet often to discuss problems and resolve outstanding issues.
- Provide copies of USAID/Cairo activity reports.
- Review MSM workplans and give recommendations.
- Cooperate and seek approval of required documents in reasonable time.

USAID agreed to meet the following expectations of the TA team:

- Share information from other IMS projects.
- Provide a clearer definition of the information required in reports.
- Facilitate more active involvement of the project officer, while recognizing his work pressures with other projects and activities.

- Expedite the approval process and provide an interim response if a rapid response is not possible.

- Review and provide feedback on written reports.

- Clarify, as needed, AID policy and guidelines.

- Help negotiate/mediate disputes between MPWWR and the TA team.

- Assure consistency with AID policy and guidelines.

- Monitor the overall accomplishment of project goals and workplans.

- Review MSM workplans for consistency with overall IMS goals and USAID policy.

MPWWR and MSM staff agreed to the following expectations of the TA Team:

- Provide copies of the minutes of MSM Steering Committee and IMS Coordinating Committee meetings.

- Provide advanced information on local staffing plans.

- Disseminate MSM staff meeting information to other colleagues.

- Permit advance review of local procurement documents.

- Disseminate existing technical information.

- Assure adequate staff, both expatriate and local, once the workplans and component staffing patterns proposed in the 1 December 1989 MSM PIR have been approved by MPWWR and USAID.

- Prepare contract reports in collaboration with the MSM staff and obtain approval by the Project Director (Harza).

- Participate in preparing project workplans. (MSM staff)

- Provide guidance on broad project objectives and GOE policy matters. (MPWWR)

- Mediate and help resolve disputes within MSM staff. Note: the proper forums for this are the MSM Steering Committee, and, if necessary, the IMS Coordinating Committee. (MPWWR)

- Monitor, through the IMS MO, the performance of the TA team leader and the overall project team in relation to satisfactory accomplishment of contract requirements and workplans. (MPWWR)

- Assure an overall evaluation of budgets and schedules. (MPWWR)

- Assure an expanded role for the Directorates in planning and implementing project activities. (MPWWR)

- Become involved in all MSM planning activities. (TA team)

MPWWR and the MSM project director agreed to the following expectations of USAID:

- Share information through the IMS MO, meetings, seminars, telephone calls, visits, and mail box.

- Maintain working relationships that are collaborative, cordial, frank, open, and professional.

- Be responsible for submitting to USAID an LOP workplan, annual workplans, budget requests, and action memos in accordance with the terms of the GOE/USAID Grant and other contractual agreements. (MSM project director)

- Make decisions in accordance with GOE/USAID-approved project implementation plans and GOE/USAID requests.

- Develop MSM project workplans collaboratively. (MPWWR and TA staff)

- Provide quarterly reports to the IMS Monitoring Office and advise MPWWR and USAID immediately on project implementation problems. (MSM project director)

- Do annual reviews of MSM implementation. (IMS MO)

- Ensure that timely implementation decisions are made based on GOE/USAID-approved project workplans. (MSM project director and MPWWR)

- Keep MSM staff informed regarding project progress and problems. (MSM project director)

The TA team agreed to meet the following expectations of USAID:

- Share information through mail, meetings, telephone calls, and office visits. Note: It was later clarified that all formal contacts between the TA contractor and USAID should be through the MSM project director; however, occasional informal/informational/administrative contacts may be made directly.

- Maintain collaborative and professional working relationships.

- Collaboratively develop project workplans and progress reports.

- Provide sound judgment and technical advice on project implementation issues.

- Advise USAID through the project director on any TDY TA consultants, commodity procurement, and participant training requests.

- Provide strong leadership and ensure efficient management of contract inputs. Note: In later discussion it was recognized that this expectation will be met insofar as possible, considering the responsibilities of the TA team leader and the authority of the MSM project director.

Considerable discussion during the workshop led to clarification and agreement on these management expectations. It was noted that there needs to be continued discussion and negotiation between the MSM project director, TA team leader, and USAID MSM project officer to further clarify the roles, responsibilities, and authorities of the project director and TA team leader. It was agreed that if the project director and TA team leader cannot reach agreement, the issue will be taken to the MSM Steering Committee as soon as possible. If the issue cannot be resolved there, it will go to the IMS Coordinating Committee.

3.2.2 Recommendations on Project Issues

This section summarizes major recommendations agreed upon concerning the seven major categories of identified project issues.

Group 1: Roles/Responsibilities/Authorities

a. The priority issue in this category was defined by the group as "pressure to push ahead with the work in each MSM component versus reluctance to authorize work prematurely." The issue was seen less as the expenditure of money than as a difference of opinion between the MSM project director and the TA contractor concerning the advisability or necessity of moving ahead simultaneously on all work components.

   The recommendation that was suggested and approved is that when MPWWR and USAID approve the proposed project workplans--showing component start and end dates, staffing patterns, and financial schedules--project implementation and appropriate expenditure of funds should start accordingly.

   It was further noted that the proposed workplans, component staffing patterns, and financial schedules will be included in the 1 December 1989 MSM PIR. Once they have been approved, the progress of work and

corresponding expenditures will be monitored, tracked, and evaluated by the MO and submitted to the MSM Steering Committee, IMS Coordinating Committee, and USAID.

b. Relations between MPWWR and the Directorates after the MSM is operational:

- Planning should begin with the MSM PIR about how to continue project activities (i.e., assure O&M and renovation as needed) after the project ends. Note: It was recognized that the important issue of long-term sustainability will demand much more attention over the life-of-the-project.

- MPWWR should start budgeting gradually as needed with the progress of the project for the end-of-project (EOP) operation phase.

- Technology transfer with the appropriate ongoing training and extension of technical information should be the utmost concern and target of the project.

- Staff trained by the project should be maintained in their positions after the EOP in order to assure long-term O&M.

c. Roles, responsibilities, and authorities within MSM between the TA consultants and their Egyptian counterparts:

- Teamwork should be the norm and technology transfer the target.

- The TA team should be fully responsible for technical aspects and guidance, with the MSM staff sharing responsibility with the team for project implementation.

- The TA team should provide regular lectures, as needed, to enhance technology transfer.

- All MSM staff, local and TA consultants, should be kept informed through regular meetings within project components and contacts with MSM project managers.

- An MSM personnel supervision system should be developed to judge performance and the improvement of technical skills. The system should include provision for both positive and negative incentives plus the possibility of the project director recommending awards, certificates, promotions, etc.

Group 2: Communication/Coordination

a. Between MSM, PS&M, and MPWWR's Irrigation sector: A computerized analysis unit should be established in the Irrigation sector to analyze the data that will come from MSM (water levels), PS&M (flow models), and the Irrigation sector (discharges, sections, and crop patterns).

b. Between the MSM and Irrigation Improvement Project (IIP) components: An IIP improved canal command area should be selected for the pilot canal automation that is to be done by MSM.

c. Between the MSM and Professional Development (PD) components: Coordinated planning should be done so that PD facilities and resources can be utilized properly for MSM in-country training.

d. Within subcomponents of MSM:

- Weekly staff meetings should be held with the project director, TA team, and subcomponent heads to share information, coordinate activities, and monitor progress.

- Subcomponent heads should transfer information to their staffs.

- Copies of workplans and progress reports should be provided to all staff.

e. Between MSM and Directorate staffs:

- MSM should organize five regional seminars of general directors, inspectors, and chief engineers for each water district as soon as possible.

- Training programs should be planned for district engineers and other Directorate staff who are directly responsible for implementing or maintaining MSM activities.

- Regular meetings should be held with key Directorate staff to solve field implementation problems.

f. Between MSM staff and Steering Committee: The MSM staff agreed to provide the Steering Committee with a list of all Directorate staff needs by 1 January 1990. This list will include an explanation of their job tasks. In the meantime, it is recommended that each Directorate select one part-time civil engineer and one electrical engineer to work with MSM staff. Both should have English language capability.

Group 3: **Training**

a. The Project Inception Report due 1 December 1989 will specify staffing needs for the training component, and may include a request for both a full-time TA training consultant and a local training coordinator. The final recommendation will be submitted to the Steering Committee for approval as soon as MPWWR and USAID approve the PIR.

b. English courses should be arranged for every Egyptian engineer on the project, including those who pass the pre-TOEFL.

c. Contract personnel should be considered for both in-country and off-shore training if requested by the project director and approved by the Steering Committee.

d. Training for MSM staff and designated Directorate staff who will work with MSM staff should be arranged as soon as possible and continue though the LOP. Everyone who needs and is qualified for off-shore training should receive it.

e. To counteract rotation practices that may block or delay the project, it is recommended that the MSM staffing be completed and that, as a matter of policy, this staff be maintained after the LOP in order to assure long-term O&M.

Group 4: **Staffing/Personnel**

a. MSM staffing should be completed. If there is any problem doing this after the approval of the PIR, the problem should be taken to the Steering Committee, or, if necessary, to the IMS Coordinating Committee for resolution.

b. In order to attract and keep experienced Egyptian staff, it is recommended that the MSM Training Plan assure training opportunities and that the MPWWR and MSM provide opportunities for advancement.

c. When setting salaries for MSM contract staff, salary levels recommended by the IMS Coordinating Committee must be respected, or the committee must approve any exceptions.

d. The responsibility for staff supervision and performance ratings must be determined by the project director and the TA team leader. This policy must then be clarified to all MSM staff.

e. MPWWR announced that the IMS Coordinating Committee has agreed upon increased per diem rates for Egyptian staff working with IMS projects.

Group 5: Contracts/Procurement

a. USAID Handbook 11 regulations should be used for all MSM procurement.

b. For information purposes, it was noted that the MSM Vehicle Procurement Plan is completed, the Project Procurement Plan will be part of the Inception Report, and work is underway to identify the best way to maintain computers.

Group 6: ARENTO/Frequencies

a. ARENTO and the MSM Project Director agreed to meet 21 November 1989 to agree on VHF frequencies and to schedule future meetings to work out Backbone arrangements and questions of ownership and responsibility for long-term maintenance of the system. The ultimate agreement should be similar to other agreements between ARENTO and other ministries or projects.

b. A full- or part-time ARENTO engineer should be designated at the 21 November meeting to work with MSM staff during the design and implementation of the system.

c. The MSM Training Plan should include plans to train appropriate MSM staff at the ARENTO Telecommunications Institute in Nasser City.

Group 7: Site Selection

a. Phase 1 of the telemetry system should be implemented as planned and, at the same time, Phase 1 expansion should be planned so that it can be implemented when desired.

b. MSM and IIP project directors should meet within two months to provide recommendations to a top-level commission of MPWWR charged with selecting a suitable site for the pilot canal automation. It is recommended that one of the eleven IIP sites in old lands be selected.

3.2.3 Workplan Agreements

The workplan session provided an opportunity for four groups to discuss and refine their current ideas on these items:

- Consolidated LOP workplan
- Telemetry system workplan (component 1)
- Data management workplan (component 5)
- Training workplan (component 7)

After presenting and discussing these draft workplans, the participants reached or reaffirmed the following agreements:

- Comments and suggestions on the draft workplans will be taken into consideration as the workplans are finalized and included in the MSM Project Inception Report submitted to MPWWR and USAID on 1 December 1989.

- Adequate MSM office space will be assured by making the entire fifth floor of the Giza building available to MSM until the new building, which will house all IMS components currently in the Giza building, is ready (three to four months from now). The MSM project director will reconfirm MSM space needs with the resident engineer of the new building as soon as possible.

- The MSM Training Plan included in the PIR will include staffing projections for staffing that will assure long-term O&M--numbers, types, and projected time for their training.

- MPWWR will assign two or three additional electronic engineers to MSM by February 1990.

Chapter 4

PARTICIPANT EVALUATION RESULTS

Twenty-eight of the participants completed the written evaluation. (See Appendix D for a complete evaluation report.) All the workshop goals were considered to have been met, and there was a high level of participant satisfaction with all aspects of the workshop. On a scale of 1 (low, goal not achieved) to 5 (high, goal achieved very well), participants rated the overall achievement of workshop goals at 4.14. The highest goal achievements were rated 4.32 (to provide an opportunity for the project team to become acquainted and to discuss and develop strategies for the most important issues that will affect the project). These were followed by--

- to exchange project information that is essential to beginning the project (4.29)
- to gain agreement on and commitment to project goals and activities (4.25)
- to agree on the roles and responsibilities of the technical assistance team, USAID, and the project sponsoring agency (4.12)
- to clarify expectations for working together (4.07)
- to agree on procedures for managing the project (3.93)
- to develop workplans for the first six to twelve months of the project (3.82)

When asked what was the most important benefit of the workshop, participants mentioned the following areas most frequently:

- understanding project objectives and benefits as well as the relationship between MSM, ISM, and other concerned organizations
- team building, getting acquainted, and developing friendships and collaborative working relationships between the different groups
- clarifying issues and problems
- agreeing on implementation and management issues

When asked what could be done to improve the workshop, most participants responded that the workshop was well run. Three participants felt that there could be improvements in the procedure for the workplan session and in the presentation of the training component workplan. One participant suggested a need for an English-Arabic interpreter and for the numbering of all printed papers. Another felt that issues should be screened into two groups, one for discussion and the other for information only. Other comments included "rearrange groups after initial discussions, i.e., from AID/MSM/MPWWR/TA to AID/MSM/MPWWR" and "use a new, easier questionnaire."

When asked what areas were left unresolved or needed special attention for follow-up, several of the group mentioned ongoing negotiations with ARENTO to secure agreements for using VHF frequencies and ARENTO training facilities as well as the assignment of an ARENTO engineer to work with MSM staff on the design and construction of the communication system and on the important long-term issues of ownership and system O&M. These were other unresolved issues:

- delegation of responsibilities by the project director without delegation of commensurate authority
- incomplete staffing of MSM (both TA and local)
- relationship between and responsibilities of TA consultants and local staff
- choice of sites for the telemetry stations and for the pilot canal automation
- linkage and cooperation between MSM staff and Irrigation Directorate staff

The participants rated the facilitators positively and, for the most part, responded favorably concerning the quality of workshop arrangements and accommodations.

Chapter 5

RECOMMENDATIONS AND CONCLUSIONS

The detailed agreements and recommendations generated by the participants represent long hours of work and tremendous effort. To ensure that this work will not be wasted, the participants must be committed to honoring these agreements and to considering the recommendations made. It is important to follow up on these actions to make sure they are accomplished.

- The MSM project director, TA team leader, and USAID project director should continue their discussions and negotiations regarding the important issue of delegating responsibility without commensurate authority. This should happen concurrently with their agreeing upon the final workplan and staffing proposals that will be included in the 1 December 1989 PIR. If all parties cannot agree on issues that one considers important for project implementation, the issue should be taken as soon as possible to the MSM Steering Committee, and, if necessary, to the IMS Coordinating Committee for resolution.

- The agreements reached during this workshop should be monitored at the weekly MSM staff meetings and also at the monthly steering committee meetings. They should also be followed by the IMS monitoring office.

- MPWWR should continue to provide the MSM project director with full high-level support and guidance as he continues his negotiations with ARENTO to work out the most appropriate agreements for all concerned parties.

- As soon as the PIR is accepted and approved by MPWWR and USAID, the agreed-upon timing for completing the staffing (both local and TA) of all components should be closely monitored by the steering committee and the IMS monitoring office.

- One- or two-day seminar/workshops should be organized early in 1989 to inform key Directorate staff about the approved MSM Inception Report and to agree on the roles and responsibilities of Directorate staff in MSM implementation activities.

- A follow-up workshop should be planned with ISPAN to be held in six to nine months. The purpose of the workshop would be to review how well agreements were honored, review current workplans and lessons learned, and agree on future issues and plans.

The facilitators are convinced that this project can have a successful start-up phase. Building on the team spirit that was demonstrated in Alexandria, the MSM team can be quite effective. However, the team will have to make serious efforts to continue their collaborative work planning and to resolve their differences in creative and productive ways. They will also need to focus soon on developing an MSM Project Management Information System (MIS) that takes into consideration the information needs of all parties concerned with MSM implementation. All these efforts will be greatly aided by the dedication and competence evidenced by workshop participants.

APPENDIX A

Participant List

LIST OF PARTICIPANTS
MSM PROJECT START-UP WORKSHOP, ALEXANDRIA, EGYPT
NOVEMBER 15 - 19,1989

MINISTRY OF PUBLIC WORKS AND WATER RESOURCES

1. Eng. Ahmed Ali Mazen, Head of Irrigation Department and Chairman, IMS Project Coordinating Committee
2. Eng. Mohamed Nadar, First Undersecretary of State, Head of Irrigation Sector
3. Eng. Ali Rafie, First Undersecretary , Upper Egypt
4. Eng. Abdel Monem El Zeftaoui, Undersecretary, Gharbia Governorate
5. Eng. Khalil Omar, Undersecretry for Water Distribution
6. Eng. Mohamed El Malkh, Undersecretary for Planning
7. Eng. Mohamed abdel Hamid, Undersecretary for Alexandria Governorate
8. Eng. Yahia Abd El Aziz, General Technical Director Irrigation Department
9. Eng. Taha Abou El Dahab, Head, IMS Monitoring Office
10. Eng. Fathi El Shaer, General Director, General Directorate for Water Distribution, Lower Egypt, and Project Director, Gharbia Operations and Maintenance Project (IMS).

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

1. Mr. Edwin D. Stains, Associate Director for Agriculture
2. Mr. William J. Carmack, Office Director, Irrigation and Land Development
3. Mr. John Anania, Project Officer MSM
4. Eng. Ali Mohamed Khalifa, Senior Irrigation Specialist

MAIN SYSTEMS MANAGEMENT PROJECT

1. Eng. Soliman Abou Zeid, Project Director, MSM
2. DR. Mohamed Mahmoud Elgohnemy, Electrical Telecommunications Consultant
3. Eng. Alaa Abbas, Civil Engineer, Component 5
4. Eng. Omar El Badawi, Civil Engineer, Component 1
5. Eng. Fayek Afify, Electrical Engineer, Component 1
6. Eng. Salah Zaki, Telecommunications Engineer, Component 2
7. Eng. Amr Hafez, Civil Engineer, Component 1
8. Eng. Mona Fares, Electrical Telecommunications Engineer, Component 2
9. Eng. Hala Shaker, Civil Engineer, Component 5 and Technical Secretary
10. Eng. Ahmed Taha, Mechanical Engineer, Component 5
11. Eng. Ahmed Abou El Seoud, Civil Engineer, Component 5

13. Eng. Sherief Tharwat, Civil Engineer, Component 1
14. Eng. Ahmed Anwar, Electronics Engineer, Component 1
15. Eng. Hesham Yousef, Civil Engineer, Component 1
16. Eng. Amal Rifaat, Electrical Engineer, Component 1
17. Eng. Osama El Meselhi Amin, Electrical Engineer, Component 1

PLANNING STUDIES AND MODELS PROJECT

Dr. Bayomi Attia, Project Director

MINISTRY OF COMMUNICATIONS

1. Eng. Tharwat Kamel, General Manager of Transmission, ARENTO
2. Eng. Rokia Rahiea, Director of Frequency Coordination, ARENTO

HARZA ENGINEERING COMPANY AND UTAH STATE UNIVERSITY

1. Mr. Glenn Tarbox, Harza Project Sponsor
2. Mr. Jack Quinn, Home Office Coordinator
3. Mr. Wayne Kennel, Specifications and Procurement Officer
4. Mr. Andrew Tczap, Team Leader, Harza MSM Team
5. Mr. Dale Vance, Electronics Engineer, Component 1
6. Mr. Ruben Dal Monte, Communication Systems Manager, Component 2
7. Mr. Ron Canfield, Software Engineer, Component 5
8. Mr. Earl Israelsen, Training Specialist, Component 7

IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST

1. Mr. Al Rollins, Facilitator
2. Mr. Lee Jennings, Facilitator

MSM PROJECT SUPPORT STAFF

1. Mrs. Amani Ismail, Secretary
2. Miss. Inas Farid, Secretary
3. Mr. Reda Kandiel, Administrative Assistant
4. Miss. Sahar Fouad, Accountant

APPENDIX B

Description of Project From Project Paper

APPENDIX B

Description of Project from Project Paper

2. Main System Management (Telemetry)

a. Background

The telemetry concept to measure water levels at key locations was originally tested in the small Menufia Telemetering System which was designed in 1977, became operational in 1980, and was extended to a few additional stations in 1982 and 1983. The present telemetry system is a component of the Nile River Water Master Plan developed by MOI/UNDP.

In 1984 USAID agreed to finance the first stage of a nation-wide telemetry data collection system. Tests of a meteor burst communications link between Aswan Dam and Cairo, plus validation of an Flow Distribution computer model, were successfully completed in the spring of 1985 along with the initiation of a contract between MOI and the RET Corporation to design, install, and make operational a telemetry system known as the Nile River Irrigation Data Collection System (NRIDCS). Implementation of the system includes approximately 255 data collection and transmission platforms, computer facilities at Cairo and Aswan, data receiving equipment at all 19 field directorate offices, and a comprehensive training program for all staff levels. The implementation is on schedule and is expected to meet its target date of July 1987. The computer equipment has arrived and is operational, model development and training have started, and the installation of the data collection platforms at the field sites started in August 1986.The year following the installation of NRIDCS (July 1987-July 1988) will serve as a system testing period for the Ministry, providing experience in operating and maintaining the system, evaluating its performance, and providing on-the-job training for personnel.

b. Objectives

The objective of this component is to increase the MOI control over the timely distribution of water through the irrigation system. This will be accomplished through the NRIDCS computerized data collection and analysis system. Computerized data collection and meteor burst transmission to central computers in both Cairo and Aswan will provide the MOI with the potential to automate the operation of water regulating structures in the distribution system at key locations and provide instructions and monitor results of water regulation throughout the system. The main objective for proceeding with automation is to reduce water losses and raise the efficiency and effectiveness of operating the irrigation delivery system.

c. Proposed Activities

The future program for Main Systems Management includes (1) expansion and improvement of the Telemetry system currently being installed, and (2) automatic operation of key segments of the irrigation system. The program for expanding and improving the telemetry system includes expanding the number of data collection platforms (DCPs), adding voice communications, incorporating acoustic flow meters, developing a maintenance program, and improving or expanding the system's software.

(1) Telemetry System Expansion

The program for telemetry system expansion and improvement consists of five activities.

(a) Communications Enhancement:

A system for transmitting messages in simple form to be understood by local operating staff is necessary. There are two possibilities for this type of enhancement that are under study. The contractor for the Telemetry system

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will be making a proposal soon for incorporating this capability in NRIDCS. This would allow operating orders to be relayed to all DCP sites very efficiently. If this program is feasible and selected, it could be accomplished before July 1987 by the contractor. Alternatively, the VHF radio system, to be installed to assist the maintenance staff of the Directorates, could be expanded to be used as a voice system for operating the irrigation system in conjunction with NRIDCS. This possibility is also under study by the MOI under the IMS project. Another possibility is the installation of a trunk line communication system for the use of the Ministry of Irrigation throughout the irrigated areas. It is planned to carry out a detailed feasibility analysis to ascertain the desirability and cost effectiveness of such a system. The most cost effective and efficient system will be selected and implemented. It is expected that the total cost of installation will be approximately $10 million. This amount is shown in the attached budget tables but will only be used, if the system is found feasible and given priority by USAID and the MOI.

(b) Flow meters

Presently, discharges at key locations in the irrigation system are calculated by curve or formula using measured water levels. Mean velocity and cross sectional area are data inputs which are obtained annually by conventional calibration methods using current meters to obtain velocity and the sounding method to obtain cross sectional area. These formulas or curves will be entered into NRIDCS software and, when water level data is received at the Master Station, discharge will be calculated automatically.

More accurate and reliable discharge calculations are necessary to improve system operation and can be obtained through the use of acoustic flow meters. Acoustic flow meters provide continuous, very accurate velocity data. Using these data, plus the cross sectional area, would provide accurate discharge data every two hours (the time when water level data is received at the NRIDCS Master Station). The Ministry has identified about 85 key sites for flow meters, but wants to test a few flow meters first before proceeding with all 85 sites. The test would examine installation procedures, maintenance, operation, and accuracy. This test would include six flow meters: four open channel sites (river site, lined canal site, unlined canal site and a drain channel or outflow where flow may be in both directions); and two sites at the Aswan Low Dam to measure discharges from Aswan I and Aswan II power plants. Installation of the six flow meters is estimated to take about one year and the test period would be about one year. The test is estimated to cost $150,000, and if it is decided to proceed with all 85 sites the estimated cost is around $2,000,000.

(c) Maintenance

The NRIDCS is to be completed and turned over to MOI for operation in July 1987. There is a one year warranty period after July 1987 during which the RET corporation will advise on maintenance. Because this is a new technology, the Ministry may not be able to maintain a sufficiently trained maintenance staff to keep the system running. The Ministry proposes to contract for maintenance with a reliable company for a period of five years, during which time, Ministry staff would gain maintenance experience and training or a decision made to leave the maintenance responsibility in the private sector. The estimated cost of a contract maintenance program is $150,000 per year.

(d) Software Enhancement

After the NRIDCS is installed and operating, and the system begins to produce results, adequate operation and management procedures will be established by Ministry personnel. It is likely that Telemetry software will require modification in order to meet changes that arise. Consultant costs of $50,000 are estimated for a one year period following the warranty period. Costs of enlarging or changing the mathematical models that will be in the NRIDCS computer system have been included separately in the Ministry's "Planning Studies and Model Development" program.

(e) Expansion

After NRIDCS is operating and experience in its use is gained by Ministry staff, it is planned that the system will be expanded to include second order sites in the irrigation system and perhaps nine key Upper Nile River Basin sites. Expansion to second order irrigation sites would permit decentralized control and management of the irrigation system. This will assist the Directors in operating their Directorate systems more efficiently. Because NRIDCS is a meteor burst system and can transmit data over long distances (2000 Km) it will permit collection of important runoff data from the nine key stations in the Upper Nile Basin used for inflow forecasts to Lake Nasser and operating the High Dam. The expansion program is estimated to be about 300 additional data collection platforms at a cost of $4,000,000.

(2) Automation

The automation program consists of three activities: (1) the implementation of automation on the pilot demonstration canal command from which data and operating and maintenance experience will be obtained; (2) reconnaisance and feasibility studies to set priorities on canal commands to be automated depending on their feasibility and in coordination with the SR and RIIP programs, and (3) implementation of feasible canal automation.

(a) Pilot Automation Project

The Ministry has selected the Salheya canal as a pilot project. Construction of this "new lands" project is nearing completion. The project consists of a main canal and two branch canals, 57 Km long and concrete lined. The Salheya canal takes water from the Ismailia Canal. The system includes the intake, two check structures and a pumping plant. The service area is 196,000 feddans and a turnout is provided for each 3000 feddans (20 feddans per farm). Each turnout is an outlet to a concrete well box upon which the water users are expected to put a pumping plant to serve the 3000 feddans. Sprinkler and drip irrigation methods are expected. The Ministry's present water delivery criteria calls for 18 hours water delivery every day with six hours off.

The Ministry is making a feasibility study under the IMS project for operating this canal automatically in association with NRIDCS. Three or four alternatives have been preliminarily evaluated. The 18 hour on--six hour off irrigation schedule requires adding new structures to the canal systems, such as small ponds for storage, eleven additional check structures, and perhaps raising the canal lining. If a 24 hour per day delivery schedule is adopted, only minor changes in the existing structures would be required for automation. This study is to be completed by the end of August 1986. After the selection of an alternative from the feasibility study, a definite plan, design, and tender documents must be prepared. Construction would follow. The estimated time for completing construction is three years. A preliminary cost estimate of two alternatives is included in Appendix A: (1) 24 hour per day water delivery ($1.9 million), (2) 18 hour per day water delivery ($14.3 million).

Assuming both alternatives yield the same order of magnitude of benefits, further feasibility analysis is wasted effort since the 24 hour system costs only 13 percent of the 18 hour system. Therefore only the 24 hour alternative has been included in the USAID funding levels.

(b) Automation Studies

Two types of studies are to be undertaken. The first study will be a reconnaisance level study which would inventory each canal in the irrigation system, prepare maps, drawings and other pertinent data regarding the canal; prepare inflow-outflow analysis, and identify problems; define an overall strategy for automation and prepare a priority list of canals for automation after taking into account the "Structure Replacement" and Regional Irrigation Improvement" programs; and develop a set of criteria to be applied to feasibility studies to decide whether to automate (See Appendix B for details). This study is expected to take about two years at a cost of $1.5 million. Costs would be for consultants, data collection, and equipment.

Based on the reconnaissance studies, feasibility studies would start for selected canal commands. Three or four canal commands would be studied to feasibility level simultaneously. Each year three or four studies would commence. Each study would be about two years in length. The first five or six studies would be done by consultants who would at the same time train Project Preparation Department staff to conduct these studies (see Appendix C for details). These initial studies would cost about $400,000 each, primarily for consultants. Assuming six initial studies by consultants, this cost would be $2,400,000. Future studies of the remaining 44 canal commands may need part time consultants' assistance in the field of electronics and communications equipment and software. These future studies would be outside the realm of this IMS project.

(c) Automation Implementation

As feasibility studies and tender documents are completed, an average of four per year, project advertisement, contractor selection, and installation can begin. This would be a continuous process over about sixteen years until the entire system is automated.

A preliminary cost estimate for automating all 50 canal commands and the main river structures is $50,000,000. This is based on an average cost per gate of $84,500 times half of the 1,235 gates in the system.

A maintenance program will of course be required. It will be similar to NRIDCS for the communications and electronic equipment. Additionally, maintenance will be required for the mechanical equipment installed to drive the gates. With the assistance on maintenance for the NRIDCS, the Ministry should be able to transfer that experience and training to maintain the automation features that are installed.

d. USAID Support

The schedule in Table F4 summarizes the costs of the various activities and puts them in a rough time frame for implementation. USAID will finance those items for the Telemetry system as listed. Funding of telemetry expansion will be based on an evaluation during late 1988. In addition, USAID is prepared to assist a reasonable pilot automation project effort in one or two canal commands such as the 24 hour pilot automation system as indicated in Table F4.

USAID will finance the reconnaisance study and the first six feasibility studies to be contracted out. A decision can be taken near the PACD regarding USAID financing of feasibility studies beyond the initial ones. Similarly, a decision regarding AID financing of implementation of automation ($50 million) can be taken near the PACD.

Tables F5 and F6 provide the detailed budgets for USAID and GOE. In total, USAID will finance 220 person months of resident and 65 TDY assistance and provide 60 person months of nondegree specialized training.

Table F4

Schedule - Main Systems Management (Telemetry Phase II)
(Additional Activities and Costs)

Year	1987	1988	1989	1990	1991
TELEMETRY					
NRIDCS	Comp. present contract	Warranty			
Communications	Install $380,000				
Flow Meters	Pilot Proj. Install $150,000	Test	Expansion $2,000,000		
Maintenance		5 years program $750,000			
Software		Develop $50,000			
Expansion			Installation $4,000,000		
AUTOMATION					
Pilot Project Salheya	Specs, Bids Award $300,000	Installation $2,000,000		Test	
Studies		Reconnaisance $1,500,000		Initial Feasibility (6) $2,400,000	
Total (Thousands)	$830	$1,950	$4,900	$4,350	$1,350

Appendix A

Preliminary Cost Estimate - Salheya Canal Automation

Item	24 hour Service	18 hour Service
Definite Plan Development	25,000	40,000
Preparation of Designs and Tender Documents	30,000	100,000
Specification Management	50,000	80,000
Equipment and Structure Modification		
Civil and Mechanical	800,000	10,000,000
Electrical and DCP Components	600,000	1,100,000
Software Modification		
Directorate	5,000	10,000
Master Stations	5,000	10,000
Gate Position and Flow	20,000	100,000
Subtotal	1,535,000	11,440,000
Contingencies (25%)	385,000	2,860,000
Total	1,920,000	14,300,000

APPENDIX B

The reconnaisance study will consist of the following actions:

a. Inventory the irrigation system, especially first order structures, prepare maps or update existing maps of the system, prepare or assemble drawings and descriptions of the structures and canal systems defining their physical characteristics, their age and date of replacement (past or future).

b. Document present operating procedures and strategy.

c. Prepare inflow - outflow analysis for each canal command to determine efficiencies and losses.

d. Define operating problems by canal command.

e. Define an overall system automation strategy, i.e. what parts of the system would be operated by Directorate offices. Perhaps only the main river system structures would be operated from Cairo and the canal commands from Directorate control centers.

f. Examine the "Structure Replacement Program" and the "Regional Irrigation Improvement Program", in relationship to those canal commands with the greatest potential for improvement through automation, and prepare a priority list for conducting feasibility studies.

g. Monitor operation of the Salheya Pilot Project and collect data concerning its operation, losses, maintenance, cost of O and M and performance of equipment and software.

APPENDIX C

The feasibility studies will consist of the following activities:

a. Determine the extent of automation needed, i.e.. number of structures to be included, mode of operation, complete automation or semi-automation.

b. Determine civil works and mechanical equipment needs, i.e. structural modifications and number and location of gates at each structure to be automatically controlled.

c. Determine type of automation system, communication system, controls, central or local control.

d. Determine how the system is to be integrated into NRIDCS.

e. Determine and quantify the benefits to be achieved.

f. Determine costs, capital, and operation and maintenance.

g. Estimate staff requirements and training needed.

h. Prepare final designs if feasibility proved.

i. Prepare specification and tender documents.

MAIN SYSTEM MANAGEMENT

Projected Expenditures and Obligations - USAID Funds(000's)

Table F 5

	Category	Through FY 86 $ FX	Through FY 86 $ L/C	FY 87 $ FX	FY 87 $ L/C	FY 88 $ FX	FY 88 $ L/C	FY 89 $ FX	FY 89 $ L/C	FY 90 $ FX	FY 90 $ L/C	FY 91 $ FX	FY 91 $ L/C	Totals $ FX	Totals $ L/C	Grand Total $
1	Consulting Services															
	Resident(Long term)	70				802		700		1200		1300	0	4072	0	4072
	Non Resident	9	0	121	0	235	0	247	0	250	0	272	0	1134	0	1134
	Communications			50		140		150		80				420		420
	Sub Total	79	0	171	0	1177	0	1097	0	1530	0	1572	0	5626	0	5626
2	Training															
	Non Degree			30		150		170		50		50		450	0	450
	Degree(MS,PhD,etc)													0	0	0
	Local Training													0	0	0
	Sub Total	0	0	30	0	150	0	170	0	50	0	50	0	450	0	450
3	Construction															
	Salheya	0	0	0	0	0	1369	0	1602					0	2971	2971
														0	0	0
														0	0	0
	Sub Total	0	0	0	0	0	1369	0	1602	0	0	0	0	0	2971	2971
4	Commodities															
	Vehicles	110				110								220	0	220
	Data Processing			50										50	0	50
	Communications					1000		8000		1000				10000	0	10000
	Flow Meters	0	0	0	0	159	0	2316	0	0	0	0	0	2474	0	2474
	DCP'S	2500	0	580	0	350	0	2316	0	2432	0	581	0	8759	0	8759
														0	0	0
														0	0	0
	Sub Total	2610	0	630	0	1618	0	12632	0	3432	0	581	0	21503	0	21503
5	Local Services															
	Administration		50		50		120		170		180		190	0	760	760
	Local Experts													0	0	0
	Maint. Contract	0	0	0	0	165	0	174	0	182	0	191	0	712	0	712
	Sub Total	0	50	0	50	165	120	174	170	182	180	191	190	712	760	1472
6	Other															
	Invitational Travel			30		40		50		60		70		250	0	250
														0	0	0
	Sub Total	0	0	30	0	40	0	50	0	60	0	70	0	250	0	250
	Combined Annual Totals	2689	50	861	50	3150	1489	14123	1772	5254	180	2464	190	28541	3731	32272
	Cumulative Totals	2689	50	3550	100	6700	1589	20823	3361	26077	3541	28541	3731			

	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
Project Obligation $	4264	12000	12000	4008	0	0	32272

TABLE F6

MAIN SYSTEM MANAGEMENT

Projected Expenditures - GOE Funds (000's)

Table F 6

	Category	Thru FYB61 $ L/C	FY 87 $ L/C	FY 88 $ L/C	FY 89 $ L/C	FY 90 $ L/C	FY 91 $ L/C	Total $ L/C
1	Consulting Services							
	- Resident (Long term)							0
	Non Resident							0
	Sub Total	0	0	0	0	0	0	0
2	Training							
	Non Degree							0
	Degree (MS, PhD, etc)							0
	Local Training							0
	Sub Total	0	0	0	0	0	0	0
3	Construction							
	Main Office	50	100	100	0	0	0	250
								0
	Sub Total	50	100	100	0	0	0	250
4	Commodities							
								0
								0
								0
								0
								0
								0
	Sub Total	0	0	0	0	0	0	0
5	Personnel							
	Salaries		60	70	82	96	112	420
	Incentives		30	35	41	48	56	210
	Travel & Misc.		10	12	14	16	19	71
	Sub Total	0	100	117	137	160	187	701
6	Other							
	Operations		50	58	68	80	94	
	Sub Total	0	50	58	68	80	94	0
	Combined Annual Totals	50	250	275	205	240	281	951
	Cumulative Totals	50	300	575	780	1020	1301	

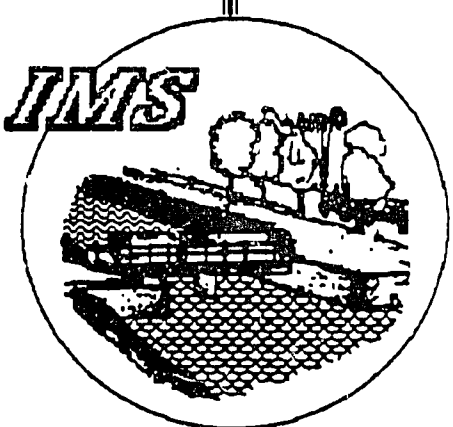
APPENDIX C

IMS Project Overview

AGRICULTURAL BRIEFING PAPER

NARP

IMS



APC

USAID

Cairo - Egypt

Revised May 1989

AGRICULTURAL BRIEFING PAPER

This paper gives an overview of the agricultural sector in Egypt, defines the major constraints to agricultural production, and outlines USAID's projects and plans to assist the Government of Egypt (GOE) to improve its overall agricultural output so as to reduce the current gap between supply and demand.

Attached are Annexes A thru D. Annexes A through C define the elements of each of the three USAID ongoing projects in more detail. Annex D outlines the water resources available to Egypt and its limitations.

The reader may contact the Agricultural Resources Directorate, USAID/Cairo, for more details on the various programs and projects described herein.

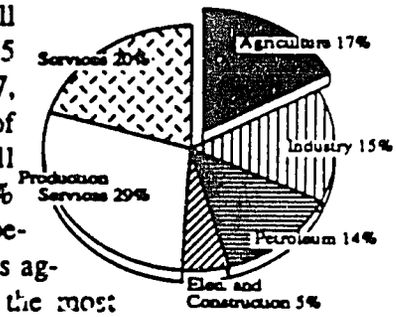
SETTING

Egypt has one of the richest endowments of agricultural resources in the world. It has a year-round favorable climate with three cropping seasons, fertile soils, and a dependable, although finite, high-quality supply of fresh water for crop irrigation. The agricultural areas of Egypt, most of which produce two crops a year, can be compared to one large controlled environment or greenhouse where: temperatures seldom, if ever, fall to the freezing or frost level; there is almost continuous sunlight; photoperiods are sufficiently variable that almost all high value and staple crop varieties can be grown; and where practically 100 percent of the crop land is irrigated. During the summer, the main crops are cotton, rice, maize, tomatoes, and sorghum. During the winter, wheat, clover, beans, barley and vegetables are grown. Sugarcane, oranges and grapes are the major perennial crops.

The Nile Delta with its associated Nile River Valley is one of the world's oldest agricultural areas, having been under continuous cultivation for at least 5,000 years. Except for a few oases and some arable land in the Sinai, most of Egypt's seven million cultivated feddans are confined to this river area. Historically, agriculture has been the dominant sector in the Egyptian economy, providing the bulk of employment and output crucial to foreign exchange earnings, and received substantial budgetary support. Two millennia ago Egypt was the Mediterranean breadbasket, providing much of the wheat needed to feed the cities of the Roman Empire.

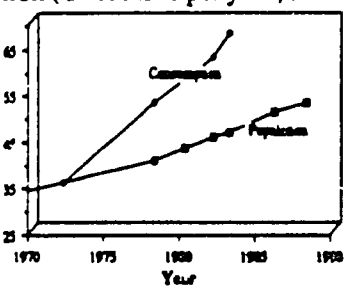
More recently, growth of the Egyptian economy in the late 1950's and early 1960's was based upon expansion of the industrial sector. Agriculture's share of the GDP fell from 34.4% in 1955 to 17% in 1987, while its share of employment fell from 56% to 30% over the same period. Nevertheless agriculture remains the most important sector of the economy.

GROSS DOMESTIC PRODUCT



Egypt was self-sufficient agriculturally, and agricultural production grew at over three percent annually during the 1960's—an exceptional performance, given the already very high initial yields. In the 1970's and the early 1980's, the pace of growth declined to around two percent. Several factors contributed to the slow down in agricultural growth. First, year-round irrigation led to a rising water table, drainage problems, and declining yields for several crops; second, agricultural labor costs rose as alternative employment opportunity in urban areas and abroad rose dramatically; and third, a system of controls over production and marketing of cotton, rice, and other major crops

had an adverse impact on incentives for farm production. Farms have become steadily smaller — an average of less than 2.5 acres each — making it impossible for the farmers to provide adequately for their families, if they devote the land to grains. Fortunately, to meet demands from a more prosperous population of urban consumers, farmers were able to shift much of their lands to vegetables, fruits or even flowers to increase income from their small plots of land. With a rapidly rising population (Over 2.5% per year, doubling from 26 million in 1960 to 52 million in 1988), a dramatic increase in per capita consumption, a very limited agricultural land area (about the size of New Hampshire), and the shift toward horticultural crops, Egypt has had to import a greater share of its basic grain needs. Agricultural imports have now reached approximately four billion dollars per year, $800 million of which is from the United States. Egypt is currently importing over two-thirds of its wheat and vegetable oil and about one-third of its feedcorn requirement. Such an evolution of trade is appropriate but requires that Egypt earn foreign exchange to finance these imports, either from export of higher value agricultural crops or from the export of industrial goods.



Finally, Egypt's agriculture sector is unique in that over 95 percent of its agricultural production is derived from irrigated agricultural land and its irrigation waters originate outside of its borders. The prolonged, 1976-87 drought in Africa resulted in low water levels in the High Aswan Dam and administered cut backs of water available for rice farming in 1988. Major problems were averted by heavy rains in the Nile watershed during June-August, 1988, but the experience of the drought has left the GOE more aware of the necessity to conserve water. Additional details on the water resource trends and the current situation may be found in Annex D.

CONSTRAINTS

There are four broad categories of constraints impeding agricultural development in Egypt. These include policies, institutions and organizations, resources (water and non-water), and technology.

Policies: A conglomeration of policies and controls over the agricultural sector have sent economically inefficient production signals to farmers and acted to seriously constrain the growth of Egyptian agriculture. For cotton, whose marketing is monopolized by the state, farmers receive less than a third of the export-value of their crop. For poultry and red meat, controls over imports and private marketing drive up prices for similar, locally produced items. Results include scarce and costly land being allocated to the production of long season berseem (clover) to provide fodder for the protected meat industry and highly subsidized fertilizer being applied in excessive quantities, resulting in inefficient allocation of scarce resources. These policies cause too much land to be put into low value crops such as wheat, barley, maize and berseem. Too little land is given over for the production of crops which would produce higher returns for the nation, such as cotton, vegetables and fruits.

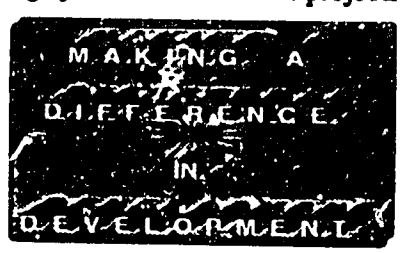
Institutional: Reflecting the prevalence of state intervention that once characterized Egyptian agriculture, there are a number of ministries with key and overlapping responsibilities. Over-regulation, institutional territorial disputes and conflicting policies have resulted in slow development. In addition, planning and managerial limitations of these ministries do not permit the development of needed information and incentive structures. These limitations include not giving full consideration of the farmers' needs during the planning and design of the agricultural program and irrigation system. Moreover, many regulations restrict private sector competition and lower overall efficiency.

Resources: The amount of fertile arable land and quantity of irrigation water are key constraints to increased agricultural production in Egypt. The fertile land base (old lands) is being reduced by water logging, salinity, uneconomical farm operations, and urbanization. Droughts, such as that experienced over the past decade, have highlighted the limited water supplies available to Egypt. Conveyance water losses in on-farm channels are often high because of poor design and low flow rates. Poor land-leveling causes uneven water distribution and water applications that greatly exceed annual crop needs, especially on desert soils. These imperfections result in reduced yields and restrict efforts that could be made to intensify cropping via more timely seedbed preparation, transplanting, etc. Inadequate on-farm drainage often results from the lack of drains or from the poor maintenance of field drains and/or main drains.

Labor shortages at the farm level occur seasonally, but are in some measure artificially induced by the inadequate prices paid for certain crops — especially cotton which, in Egypt, is highly labor-intensive.

Technology: Highly productive agriculture depends on a reliable stream of improved technology. Because of the relatively high levels of productivity already achieved in Egypt, the technological constraints on Egyptian agriculture are greater and more sophisticated than those operating on other countries in the region. While much improved technology is already available, it is also likely that other technologies developed elsewhere and not yet evaluated in Egypt could be adapted to Egyptian conditions.

The quality and quantity of produce available for consumption and export are seriously constrained by weaknesses in the marketing systems. Inadequate attention to the marketing system as the production has shifted to more perishable crops such as vegetables, fruit and livestock products has resulted in a marketing infrastructure that has not had a commensurate investment and development.



USAID AGRICULTURAL PROGRAM

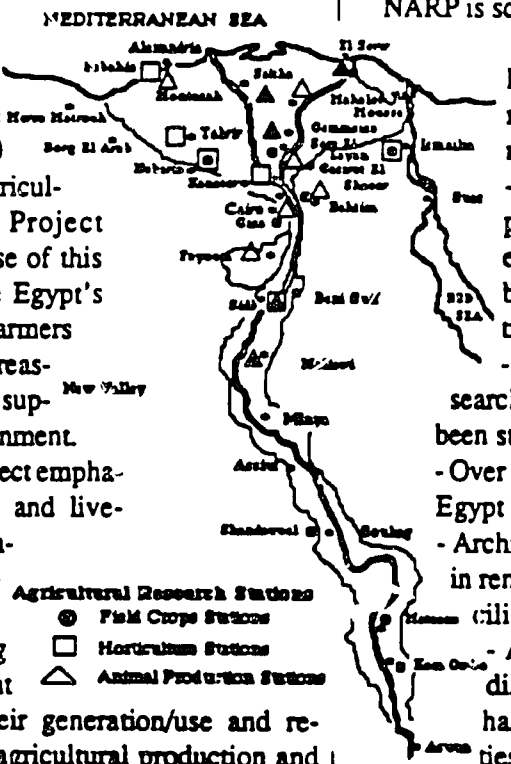
USAID has made a long-term commitment to assist the GOE in developing and improving its agricultural sector USAID funding authorized for the agriculture sector, since USAID returned to Egypt in the mid 1970's, has been more than $990 million. Agricultural and credit programs are with the Ministry of Agriculture and Land Reclamation (MOA) and irrigation with the Ministry of Public Works and Water Resources (PWWR).

The first agricultural USAID portfolio, developed in the late 1970's, contained fourteen projects with a total USAID contribution of $230 million. These projects were primarily targeted at the promotion of productivity gains, and included emphasis in such areas as poultry, cereal grains, farm and agricultural machinery, horticulture, aquaculture, water management, small farmer credit programs, and data collection and analysis programs. Several hundred Egyptians received graduate degrees under these projects, and literally thousands received non-academic and in-country training. Seven major research and experiment centers were built, and a host of Egyptian government facilities were renovated. More than $20 million of agricultural equipment was procured and more than a dozen laboratories were equipped. The research carried out under these "first generation projects," which were phased out by 1987, have benefitted roughly 1.4 million farmers who are now using high-yielding crops.

Based on the relationships developed and the lessons learned from the first generation projects, the current portfolio of three major projects has been developed with a total USAID contribution of $763 million. The major objective underlying these three projects is the development of the basic sustainable agricultural system which would enable farmers to generate the highest possible return from their very small farms. The three projects are summarized on the following pages:

National Agricultural Research Project

The Office of Agriculture within the USAID Agriculture Resources Directorate is monitoring the $300 million National Agricultural Research Project (NARP). The purpose of this project is to improve Egypt's capability to provide farmers with productivity increasing technologies in a supportive policy environment. The design of this project emphasizes increasing crop and livestock yields by the creation and transfer of appropriate technologies, and by facilitating a policy environment which encourages their generation/use and removes constraints to agricultural production and marketing.



The project's strategy calls for enhancing the effectiveness and extent of a broad range of public and private institutions involved in Egypt's agricultural development. The NARP has been supporting agricultural research since 1985 (Key Stations shown on map) and was amended in September 1988 to expand its scope to include five areas of concern. The project's five components focus on: (1) agricultural research; (2) agricultural policy analysis; (3) seed technology; (4) technology transfer; and (5) project management/new initiatives. Annex A provides a more comprehensive description of the NARP program. The Consortium for International Development (CID), the NARP's primary technical assistance contractor, has a 14 person resident team providing guidance and advice for improving management systems and research practices.

In addition, there are contracts with San Diego State, International Rice Research Institute, International Science and Technology, and USDA to provide the necessary support to implement the project. Additional contracts are planned. The NARP is scheduled to be completed in 1994.

To date approximately $14 million has been expended, mainly on the research activities. Accomplishments thus far include:

- Commodity contracts, which will procure $7 million in laboratory equipment, farm machinery, and library materials have been advertised.
- The first phase of $9 million of research grants to Egyptian universities has been started.
- Over 900 researchers have been trained in Egypt in on-farm research methodology.
- Architectural design work for $8 million in renovations to research and library facilities has commenced.
- A new rice variety which is "blast" disease resistant, high yielding and has desirable cooking and eating qualities has been released.

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Agricultural Production & Credit Project

The Office of Agriculture and Economics is monitoring the $123 million Agricultural Production and Credit (APC) Project. This is a unique complementary approach to the NARP activities concentrating on policy evolution and strengthen-

ing of farmer credit systems. The project has two elements and grows out of the lessons learned under the USAID supported Small Farmer Production Project (SFPP). The first is a capital transfer component in which cash transfers are made to provide capital for the Principal Bank for Development and Agricultural Credit (PBDAC). These credit transfers are phased and releases are tied to successful implementation of previously negotiated relaxations of state intervention in the agriculture sector. Through 1988, two releases totaling $73 million had been made following GOE implementation of agreed policy changes. As a result of these negotiations, Egyptian farmers now receive world market level prices for several key crops, most crop-delivery quotas have been relaxed or eliminated, and wasteful subsidies for imported annual feed have been phased out. This activity is considered very successful by both the GOE and USAID and is expected to be extended to other policy areas in the agriculture sector.

The second element of the project is a technical assistance component designed to assist the PBDAC enhance its ability to provide credit for Egypt's farmers and agro-businesses. An initial five year contract has been signed with Chemonics International to provide a team of eleven experts in banking to work with PBDAC in restructuring its lending and management processes. This technical assistance will enhance the financial viability and effectiveness of PBDAC for supplying the credit needs of the rural sector. As part of the project the US Center for Privatization is working with counterparts from the PBDAC to develop a plan for the gradual phasing-in of private sector participation in the supply of agricultural inputs which are currently supplied by PBDAC.

The APC project was approved on November 20, 1986 and is scheduled to be completed on September 30, 1993. Due to the excellent progress to date, consideration is being given to expanding and extending the APC project to 1995. Annex B provides a full description of the APC project. Accomplishments to date under the APC project and its predecessor include:

- $18.4 million contract with Chemonics International signed and the resident team in place.
- Major policy changes have been made by the GOE, freeing up many constraints to increase production (see Annex B for details).
- Small farmer loan concepts and procedures developed under SFPP have been extended into a total of 12 Governorates and 311 villages of the 350 targeted under the project. Over 150,000 small farmers have utilized the new credit facilities;
- 4,559 individuals were trained in 588 different training courses (loan management, accounting, computer operations, etc.).
- A draft APC Project Credit Manual and a draft/proposed General Ledger System and Computerized Accounting System were prepared.

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IMS Irrigation Management Systems Project

The Office of Irrigation and Land Development is monitoring the Irrigation Management Systems (IMS) Project. The IMS project is a complex umbrella project authorized for $340 million and is scheduled for completion in September, 1991. The project is comprised of ten components administered by eight PWWR Project Directors. The project has activities in all 19 Irrigation Directorates and focuses on the six million feddans of irrigated old lands in Egypt. Major consultancy contracts have been concluded with Harza Engineering Company (two contracts), Consortium for International Development, Sheladia Associates, Morrison-Knudsen (two contracts) and the U.S. Bureau of Reclamation. An additional contract will shortly be awarded, all of which will support the implementation of the IMS Project (Refer to Annex C for more details regarding the IMS Project and its components).

To date, the project has accomplished the following:

- $159 million in consultancy and procurement contracts have been put in place and are operational. Another $27 million in consultancy and procurment contracts should be in place by January 1989.
- 9,000 concrete structures have been replaced under the Structural Replacement component which provide benefits to 1.1 million farmers.
- More than 4,000 PWWR employees have been trained in twenty-five major disciplines.
- Eleven initial studies for rehabilitating approximately 400,000 acres of irrigation systems have been conducted under the Regional Irrigation Improvement component.
- A model Irrigation Advisory Service has been created in Minya where 100% of the farmers in an area have been contacted by the outreach team and have been consulted on irrigation delivery problems.
- The Project Preparation Department has developed and analyzed a number of studies for potential funding.

OTHER AID AGRICULTURAL PROJECTS

In addition to the three major projects described above, USAID has several activities outside of the Agricultural Resources Directorate that have a positive affect on the Egyptian agricultural sector.

Commodity Import Program:

The USAID Commodity Import Program is investing $200 million in Egypt's public and private sector annually. Recipients of this program apply for loans which are used toward the purchase of U.S. commodities.

Since 1975, $221 million have been invested in the agricultural public sector for such items as well digging machinery, pumps, canal lining machines, feed grains, and irrigation equipment. The agricultural private sector has also received $17 million worth of commodities since the program began.

Farmer-to-Farmer Program:

This activity, being funded by AID Washington, brings American farmers to Egypt where they work with Egyptian farmers. Thirty U.S. farmers have traveled to Egypt so far, and have worked in the areas of veterinary services, potato production, tomato improvement, grape processing, citrus production, and dairy activities.

TRI-National Program:

A tri-national U.S., Israel, Egypt program funded by AID/W provides a variety of technical and research based projects in both Egypt and Israel. Totaling $20 million, this activity supports arid lands research, technology exchange and cooperation, epidemiology and control of vector-borne diseases, and scholarships.

OTHER DONORS

There are numerous donors that are providing assistance to Egypt in the agriculture sector. With the exception of the World Bank, all have relatively small programs in relation to USAID. All the other donor activities are important to the overall development of the agriculture sector, and the individual donor projects are coordinated with the larger USAID activities.

The World Bank is heavily involved in Egypt's agricultural sector. It's projects include a $246 million large field drainage project covering most of the irrigated area (4.4 million acres) of the country and a small integrated agricultural development project in the Minya governorate. Currently the World Bank is designing a reclamation project covering over 150,000 acres and a $40 million fertilizer storage project.

The United Nations Development Program (UNDP) and the World Bank have also assisted the PWWR in developing a Water Master Plan Project. UNDP has also supported strengthening the cotton arbitration and testing capability of the government, supported agricultural development and

settlements in West Nubarya, assisted with coastal protection activities, provided technical assistance to plan the rehabilitation and improvement of water delivery systems in old lands, carried out remote sensing, supplied technical assistance for maintenance and management of irrigation pumping stations, and supported the Water Research Center.

Other donors in the water management and irrigation areas include FAO (the Fayoum project), Canada (the Dakahliya project, aimed at remedying salinity and water logging problems), the Netherlands (water management and drainage), the African Development Bank (helping with construction of the Esna barrage), the Ford Foundation (ground water utilization), and the European Investment Bank(assisting the government in developing sprinkle and drip irrigation of 30,000 hectares in the Nubarya area).

The Japanese are funding two irrigation and land reclamation projects. The Katara project is reclaiming 15,000 feddans. Sprinkler and drip irrigation methods are being used. In the Adleya land reclamation project, 6,000 feddans of desert will be reclaimed. In addition, they have imported small-scale farm equipment and supported a rice research and production project in the Delta.

Holland has supported an integrated rural development project (credit, extension, on-farm water management, horticulture and mechanization) in Fayoum governorate; the Finnish Government is funding a milk collection and cooling project with the Misr Food and Milk Company, and West Germany (GTZ) has provided long-term support to Egypt's agricultural sector in the areas of rodent control, agricultural research, and mechanization.

FUTURE USAID ACTIVITIES

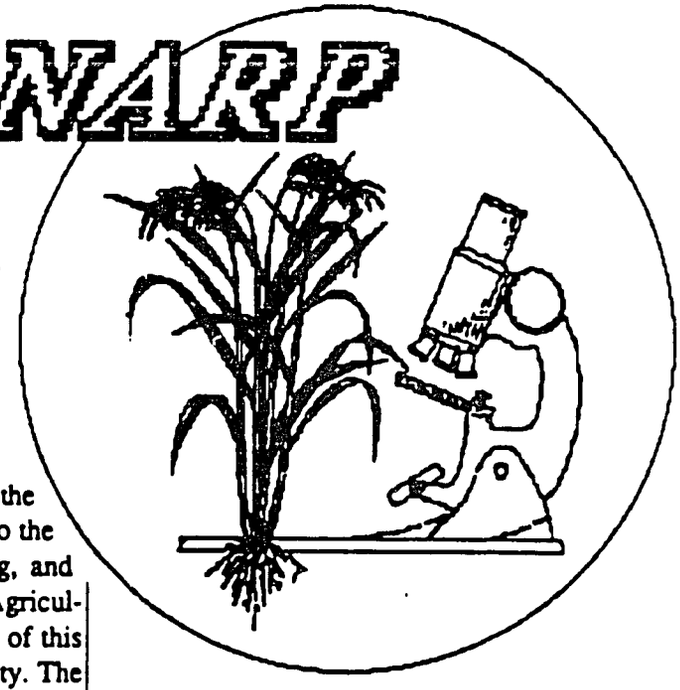
In addition to implementing the current portfolio activities, USAID will be considering expanding the APC project to encourage the GOE to make further policy changes in the agriculture sector and to privatize the input responsibilities of PBDAC.

Depending on the financial and human resources available, USAID may also consider ways to assist the GOE in its reassessment of ***export/import*** policies and its policies regarding development of the ***New Lands***. There are approximately 1.3 million feddans of new lands that have been developed using Nile River waters. Some additional new lands will be developed over the next 20 years utilizing water made available from improved overall irrigation and water use efficiencies. Studies have shown that the effectiveness of past development of new lands has been marginal in most cases. USAID is considering supporting studies of the new lands to determine how to improve the new lands already developed and to help define the strategy for future development of new lands. At the same time the role and benefits of more private sector involvement in new lands development could be explored for providing a mechanism to improve production. USAID could also play an important role in development of ***groundwater*** resources in the New Valley and Sinai.

USAID has been approached unofficially by the government and requested to consider funding ***drainage*** activities in coordination with the World Bank. This could complement Regional Irrigation Improvement activities.

Other projects or programs that may be undertaken by USAID would be assisting the MOA to increase ***private sector*** participation in marketing of both agricultural inputs and outputs; increased involvement in the animal and dairy science areas; investigation of means to develop multi-channel agricultural input distribution and assistance in developing ***computer linkages*** between the MOA and PWWR.

NATIONAL AGRICULTURAL RESEARCH PROJECT



Project Number: 263-0152
Start Date: Sept. 12, 1985
Completion Date: Sept. 30, 1994
Authorized Amount: $300 million
Implementing Agency: Ministry of Agriculture and Land Reclamation (MOA)

Project Summary

Nearly all of the time and energy of the staff of the Agriculture Office is applied to the development, implementation, monitoring, and evaluation of the $300 million National Agricultural Research Project (NARP). The goal of this project is to increase agricultural productivity. The purpose of this project is to improve Egypt's capability to provide farmers with productivity-increasing technologies in a supportive policy environment. The design of this project emphasizes increasing crop and livestock yields by the creation and transfer of appropriate technologies, and by facilitating a policy environment which encourages their generation/use and removes constraints to agricultural production and marketing.

The project's strategy calls for enhancing the effectiveness and extent of a broad range of public and private institutions involved in Egypt's agricultural development. The project's five components focus on: (1) agricultural research; (2) agricultural policy analysis; (3) seed technology; (4) technology transfer; (5) management/new initiatives. The following summarizes these components.

Agricultural Research

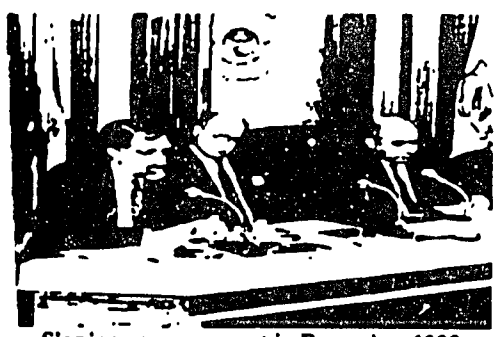
This $174 million component is intended to significantly improve and expand agricultural research in Egypt. It focuses primarily on strengthening the Agricultural Research Center (ARC), Egypt's most important research institution. The two major thrusts are the institutional strengthening of ARC's research management capability and the expansion of an agricultural research orientation to increase the production of relevant, practical technologies.

The institutional improvement of ARC involves a comprehensive program of human resources development, management improvements, and upgrading of physical facilities. A technical assistance contractor (CID) with a 14 person interdisciplinary team is providing guidance and assistance to ARC for improving management systems and research practices. A separate contract is in place with IRRI which is providing technical assistance for rice research.

An extensive training program in support of both management improvements and research methodologies has been designed in response to a training needs assessment. It provides for 276 graduate and post-doctoral participants, observational and invitational travel, and in-country train-

ing for over 40,000 participants in 164 different types of programs. Facilities' improvements include a renovation program for existing buildings, a maintenance program, and land improvements. Commodities include lab equipment, farm machinery, library books and periodicals, office equipment and vehicles.

The research component also provides financial support for agricultural research activities. A Research Support Program provides $12.6 million to fund in-house ARC research to provide a continuous flow of improved technology to farmers and to develop farmer feedback mechanisms. A Research Grant Program will provide $15.8 million to support university research and strengthen linkages with the university community. An International Collaborative Research Program will provide $16 million in funding for research in Egypt in collaboration with international experts. This will facilitate access to worldwide technology and its adaptation to local circumstances. All three research support programs will focus on national development priorities and assure relevant, problem oriented research.



Signing an agreement in December 1988 to add $40 million to NARP

Agricultural Policy Analysis

This $22 million component is designed to strengthen the policy analysis capability of the MOA's Undersecretariat of Agricultural Economics and Statistics (U/AES). It is intended to result in an enhanced U/AES ability to monitor the agriculture sector and analyze the impact of policy decisions. This will facilitate more effective policy reform, liberalization of agriculture, and increased productivity.

This project component will provide $9.5 million for 5 long-term technical advisors and 240 person months of short-term experts. It will provide $3.1 million for training, including U.S. long-term training for 16 high level technicians and managers, U.S. short-term for 67 other staff, and in-country training for 573 persons. Commodities include $2.7 million for office equipment and vehicles. Support services will include $2.7 million for technical studies and minor renovation of office space.

The technical assistance and training will be supplied to the U/AES to improve its ability to conduct and manage priority analyses, interpret and utilize results of these analyses, and address economic policy issues. The technical assistance contractor will assist in improving management practices and research methodologies, developing a quick response capability for urgent research topics, and establishing feedback mechanisms. The training program will provide the staff with advanced analytical and subject area expertise. Policy workshops and seminars will be utilized to strengthen linkages with outside public, private, university, producer, and other groups.

The statistical analysis and data processing capability of the U/AES will be upgraded with emphasis on improving the quality, scope, and accessibility of information. Technical assistance will be provided to systematize reporting formats and develop a data base information system for policy and statistical analysis. A total of 76 personal computers will be provided for the U/AES and its 38 field offices. Internal training programs will instruct staff in the use of PC and mainframe computers.

An Information Center will be established to support the policy analysis operations of the U/AES. Technical assistance will be provided for planning and developing this center. Long-term U.S. training for 3 staff and short-term U.S. technical training for 6 persons will be included. Equipment for archive management, printing, microfiche, and office equipment also will be provided.

Seed Technology

This $42 million component emphasizes improvement of the ARC Central Authority for Seeds (CAS), a public sector organization which concentrates on seed research and processing of the many varieties of seeds which are currently unattractive to the private sector. This component provides $1.6 million for one seed technology advisor and 7 person months of short-term experts. It includes $2.5 million for U.S. long-term training of 66 persons and 17 persons short-term. It provides $27.1 million in commodities for research equipment and testing and genetic lab equipment. It also includes $4.1 million in services for renovation of 8 seed processing plants, a Genetic Resources lab, and a cotton research lab.

The technical advisor is currently in place under the CID contract. He will assist the Director of the CAS to plan training, select equipment, develop research programs, supervise the installation of equipment, and plan maintenance procedures. Training has been planned in response to a training needs assessment to improve staff capabilities for seed research, processing, operations, maintenance, and training. Commodities will include lab equipment to upgrade research and testing facilities, quality control equipment for standardization of seeds, equipment for a genetic lab, modern seed processing equipment to upgrade 8 plants to a total capacity of 40,000 tons per year, and spare parts for 5 plants financed under a previous AID project.

Technology Transfer

This $51 million technology transfer component is designed to improve communication between research organizations and the farmer. This includes the diffusion of new technologies to the field and feedback on the conditions and needs of farmers. Linkages between farmer and scientists must be improved so research can be oriented toward solving practical problems by generating relevant technology. Coordination of extension services must be achieved in order to package the technology properly and deliver it when and where appropriate.

The component includes $4.8 million in technical assistance under the CID contract for 2 long-term technical advisors and 182 person months of short-term experts. In addition $23.8 million is provided for a major training effort and for commodities, including office equipment, vehicles, and media processing equipment. The component also includes $12.4 million in support services for extension demonstrations, office renovations, and technology transfer grants.

The project component will provide support for the strengthening of the planning and management capabilities of the ARC Extension Affairs Division (EAD) which is responsible for monitoring and guiding the planning and operations of the 20 governorate extension services. EAD senior staff will receive short-term training in planning and management. The staff of EAD's applications-oriented centers and institutes will be upgraded with U.S. long-term training for a total of 14 technicians, trainers and communications experts.

The component will encourage decentralization of technology transfer institutions by strengthening governorate level extension services and improving coordination between the national and governorate levels. Technical assistance will be provided to assist local government councils to develop, review and approve yearly extension plans. Technical assistance and U.S. short-term training will be provided for up to 10 senior extension officials in each governorate to improve their administrative skills. Approximately 350 extension workers in each governorate will receive in-country training to improve their communications skills for working with farmers. Funding is provided for renovation, office equipment, and communications. Transportation equipment will be provided to improve service delivery. The funding also supports the development of technology packages tailored for each governorate, and the costs of technology delivery, such as media, demonstration plots, and farmer training.

This component will provide support for non-public extension service agencies in the form of a $3.5 million grant fund. Organizations and activities will be supported which are problem oriented,

cater to farmer needs, involve farmer participants, and increase agricultural productivity. Examples include indigenous PVO's, private sector companies, farmer groups and cooperative, and agricultural faculties at Egyptian universities.

The component will also strengthen the research community's technology transfer capability at the governorate level. It provides for the training of subject matter specialists from a wide variety of public and private institutions and provides funds for the preparation of technology packages identified in governorate extension plans or requested by non-public extension groups. It also provides for the conversion of 10 ARC experimental stations into Research and Extension Centers in order to improve outreach to farmers in their service area.

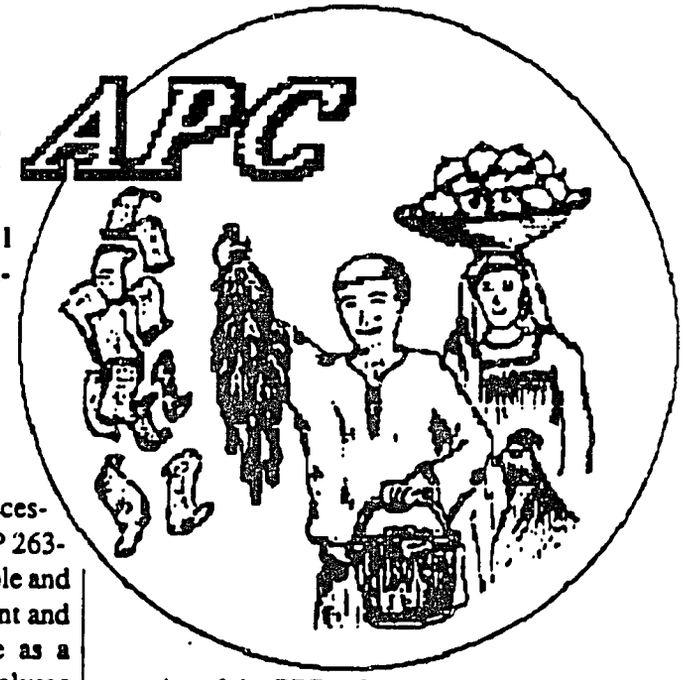
Project Management/New Initiatives

This $11 million component provides technical assistance and support to the NARP's Executive Office which monitors the project. This will include the installation of management monitoring and financial control systems and the development of project support services, such as implementation planning, monitoring and evaluation, procurement, maintenance, and communications. The Executive Office will also be provided with technical and financial resources to deal quickly with emerging agricultural development problems and detect new opportunities by preparing studies and developing new projects or other initiatives. The component includes $4.5 million for two long-term management specialists and 74 person-months of short-term experts. It provides $0.7 million for 192 months of training. It also includes $3.9 million in support for administration, studies, evaluation, and audits.

The NARP's summary cost estimate and financial plan by component and expenditure category are as follows:

	AID		GOE	Total
By Component	$FX	$LC	$LC	$
Research	86,474	56,819	34,220	177,513
Technology Transfer	16,202	24,754	7,425	48,381
Policy Analysis	12,604	4,951	3,745	21,300
Seed Technology	32,958	2,367	7,607	42,932
New Initiatives	6,675	2,660	3,714	13,049
Contingencies	7,466	4,276	2,683	14,425
Inflation	22,139	19,655	15,606	57,400
Total	184,518	115,482	75,000	375,000
Project Total	**$300,000**		**$75,000**	**$375,000**
By Expenditure Category				
Technical Assistance	33,036	5,232	720	38,988
Training	22,104	18,225	2,321	42,650
Commodities	67,204	4,108	3,250	74,562
Services	32,569	63,986	50,420	146,975
Contingencies	7,466	4,276	2,683	14,425
Inflation	22,139	19,655	15,606	57,400
Total	184,518	115,482	75,000	375,000
Project Total	**$300,000**		**$75,000**	**$375,000**

AGRICULTURAL PRODUCTION AND CREDIT PROJECT



Project Number: 263-0202
Start Date: Sept. 30, 1986
Completion Date: Sept. 30, 1993
Authorized Amount: $123 million
Implementing Agency: Principal Bank for Development and Agricultural Credit (PBDAC)

Background

The Project evolved from (1) the predecessor, Small Farmer Production Project (SFPP 263-0079); (2) a series of studies analyzing the role and needs of the Principal Bank for Development and Agricultural Credit (PBDAC) and its role as a provider of agricultural inputs; (3) several analyses and high level dialogue regarding the policy reforms required to increase agricultural production; and (4) the 1985 PBDAC decision to expand the SFPP concept from 3 into 8 additional governorates.

Goal and Purpose

The project is financed by a grant to the Government of Egypt (GOE). The goal of the project is to support reforms in the agricultural sector and strengthen market-based incentives, thus encouraging investment in agriculture and increasing overall productivity and farm income. This major USAID and GOE effort will entail significant reforms in sectoral policies.

The purpose of the project is to provide farmers with new technology, improved financial services and a competitive, expanded input supply system. The project will achieve this purpose by increasing the capitalization of the PBDAC to enable it to meet the demand for increased credit, resulting from the policy reforms; by strengthening the institutional capacity of the PBDAC to obtain adequate funds, provide access to credit, and provide financial services; by opening the input supply market to the private sector; and by improving technology diffusion systems.

The bulk of USAID Project funds are dollar denominated performance payments to support the GOE measures to reform the agricultural sector and will be transferred in tranches based on implementation of planned changes. The Grantee will make funds available to expand the capital base of the PBDAC. The amount of performance funds released will be determined by the Bank's need for additional capital to meet the demand for credit resulting from policy reform. Prior to or simultaneously with each performance disbursement, the GOE shall increase the capitalization of PBDAC by at least an equivalent amount of Egyptian pounds. These funds will ensure that small farmers and entrepreneurs have necessary financing available to realize opportunities created by policy reform. The parties will monitor the lending activity attributable to the increased capitalization

of PBDAC. All interest on the capitalization funds shall belong to PBDAC. At a minimum the amount of loans to small farmers at the highest allowable interest rate will be equal to or exceed the amount of the performance disbursements. For these purposes, a small farmer loan shall be the Egyptian pound equivalent of $5,000 or less. This expanded credit activity and technical assistance to modernize banking activities in over 300 of the PBDAC's 750 village banks, will re-orient the Bank as a primarily financial institution and allow it to diminish its role in controlling input supply and marketing.

While the GOE is developing its agricultural reform program, the project will begin to institutionalize PBDAC systems to transfer new technology and make credit accessible to small farmers and rural entrepreneurs providing farm related services. USAID funds are being used for technical assistance, services, training, and commodities to accomplish these project objectives.

The PBDAC assists the private sector by financing expansion of private services and infrastructure investments needed for agricultural development. The Bank is also improving its banking services to businesses supporting agriculture: improved analysis of loan and investment opportunities, techniques of evaluating client performance, and methods of loan management will enable the Bank to play a dynamic role in supporting the private sector. These private sector enterprises are expected to become major sources of information about new machinery, proper maintenance, new products and agricultural technologies.

To ensure the long run availability of these services, the financial viability and management capacity of the Bank is also being strengthened. At the end of the project, the PBDAC will have:

1. A sound capital structure and capital management system;
2. Effective management controls (budgeting, auditing, and financial analysis of Bank performance);
3. A dynamic personnel management and training program; and
4. A modern management information/accounting system.

Implementation

On the policy level, the key project implementation process is part of the AID overall policy dialogue and support to the GOE economic reform program. The details of the policy dialogue process and the capitalization of PBDAC have been the subject of GOE/USAID meetings. These detail include the establishment of policy benchmarks, determining the need of PBDAC for additional capitalization and progress by the GOE on its previously announced agenda of policy reforms.

The technical side of the project is being implemented by the PBDAC. The Bank will cooperate with others, i.e., the National Extension Service, private enterprises, and the MOA to ensure that the project meets its objectives.

The Chairman of the PBDAC is the Project Director. The day-to-day activities are managed by a Project Manager who reports to the Chairman and has responsibility for coordination with the extension service, preparation of reports to PBDAC and AID, management of administrative support, and leadership of the total project team with the assistance of the technical assistance contractor.

Project Technical Activities

Project activities are designed to enable farmers and private sector businesses to take advantage of policy reform to create a dynamic, expanding agricultural sector. The three primary technical activity outputs are:

1. Financial services which allow small farmers to take advantage of opportunities created by policy reform.
2. Development of private sector businesses in distribution and marketing.
3. Increased transfer of new technology to farmers by these private sector enterprises and the NES.

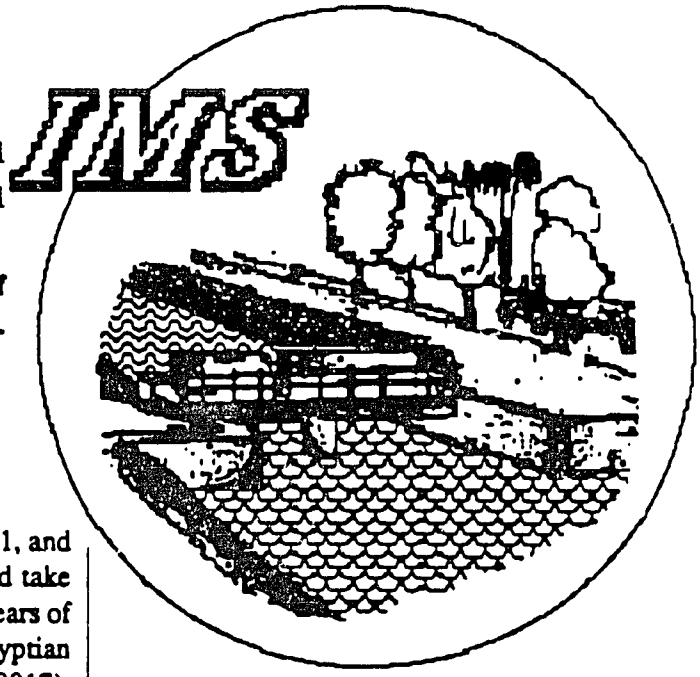
Illustrative Financial Plan

The following Table provides a summary cost estimate for the Project. The total AID contribution to the Project will be $123,000,000. The total GOE contribution will be LE 150,240,000, of which the GOE will contribute LE 42,000,000 to the first phase of the Project.

The GOE contribution of Egyptian pounds will fund Egyptian salaries, in-kind contributions, vehicles, office supplies, services, and will be used to capitalize village banks.

	$	LE $ Equiv.	Total $	$ Equiv. (D) @ LE	$1 = LE 1.35 $	USAID + GOE $ Equiv
	(A)	(B)	(A) + (B)	(C)	(D)	(A) + (B) + (D)
1. Technical Assistance						
Short Term	700	-	700	-	-	700
Long Term	7,200	-	7,200	-	-	7,200
Project Support	-	1,700	1,700	720	533	2,233
Subtotal	7,900	1,700	9,600	720	533	10,133
2. Training						
Non Local, Non Degree	800	-	800	-	-	800
Local	-	2,500	2,500	4,060	3,007	5,507
Subtotal	800	2,500	3,300	4,060	3,007	6,307
3. Commodities						
Computer, Preparation	3,000	1,000	4,000	-	-	4,000
Vehicles	800	-	800	1,700	1,259	2,059
Spare Parts	75	-	75	-	-	75
Office Equipment, Supplies	1,190	135	1,325	826	612	1,937
Subtotal	5,065	1,135	6,200	2,526	1,871	8,071
4. Services						
Maintenance	-	-	-	60	44	44
Refurbishing	-	-	-	230	170	170
Repair	-	-	-	2,604	1,929	1,929
Incentives	-	-	-	1,000	741	741
Evaluation and Audit	700	200	900	800	593	1,493
Subtotal	700	200	900	4,694	3,477	4,377
Project Subtotal	14,465	5,535	20,000	12,000	8,889	28,889
Inflation	-	-	1,000	2,040	1,511	2,511
Contingency	-	-	2,000	1,200	889	2,889
Project Total	-	-	23,000	15,240	11,289	34,289
5. Capitalization	-	-	-	135,000	100,000	100,000
6. Policy Performance	-	-	100,000	-	-	100 000
7. Grand Total	-	-	123,000	150,240	111,289	234,289

IRRIGATION MANAGEMENT SYSTEMS PROJECT

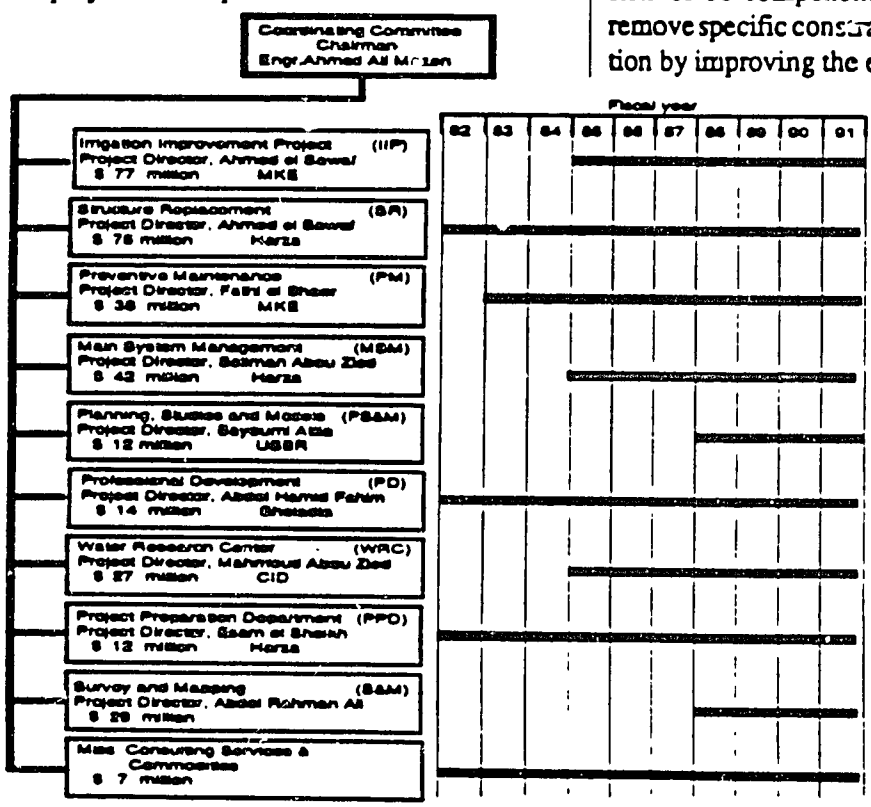


Project Number: 263-0132
Start Date: Sept. 22, 1981
Completion Date: Sept. 21, 1991
Authorized Amount: $340 million
Implementing Agency: Ministry of Public Works and Water Resources (PWWR)

Project Summary

The IMS Project was originated in 1981, and amended in 1984 to improve its impact and take advantage of the lessons learned from six years of research carried out under the USAID Egyptian Water Use and Management Project (263-0017). The project was expanded in 1987 and now consists of 10 components. Some are designed to remove specific constraints to agricultural production by improving the effectiveness of the current irrigation and drainage system. Others are to support the PWWR through continued research, training, and improved data base.

The Project consists of technical and capital assistance for the planning, design, construction (rehabilitation) and management of Egypt's irrigation system. The adjacent schematic shows the 10 project components, the PWWR Project Director, USAID funding level, current contractor, and duration of activity.



Project Rationale and Description

Project Rationale

1. Goal

Considering the problems specific to the irrigation sub-sector and the overall agricultural sector problem of inadequate agricultural production on the old lands, the goal of this project has been specified as:

"Effective control of Nile waters for all uses and particularly for their optimal allocation to and within agriculture as a means of helping increase agricultural production and productivity."

Control over water and its proper management for agricultural and other purposes are required at all levels in the irrigation system so that water can be efficiently delivered to the crop root zone without waste, when required, and in the quantities needed. Therefore, a sub-goal has also been specified:

"To improve the operating efficiency of the water distribution system for agricultural irrigation and for other water uses."

2. Purpose

The purpose is to strengthen the capability and capacity of the PWWR to plan, design, operate, and maintain the water distribution system.

To achieve this purpose the project is in the process of:

a. Planning, designing, and constructing an improved operationally efficient irrigation system in selected canal commands throughout the country, including establishment of formal organizations of farmers to liaison with representatives of the PWWR and Ministry of Agriculture and Land Reclamation (MOA), and involvement of the PWWR and MOA in on-farm water management.

b. Strengthening PWWR maintenance capability through the following activities: (1) completion of the SR component which is correcting past faulty maintenance; (2) the implementation of a Preventive Maintenance Program in six of the nineteen Irrigation Directorates; and (3) support of an IBRD/PWWR project on earthen channel maintenance, with particular emphasis on mesqa maintenance and the use of private contractors.

c. Further developing and adding to the set of computer models and computer programs that are designed for planning, operation, management of the irrigation system, and bringing the Project Preparation Department to a state of preparedness where it can analyze the feasibility to most PWWR developmental options with minimal expatriate assistance.

d. Developing and implementing the computer models designed for operation of the irrigation system and further development of the telemetry data collection and analysis system, including pilot investigations of system automation.

The above activities are being supported by: extensive research operations that cover all aspects of irrigation development and management; a PWWR wide training program developing a new National Irrigation Training Institute; the preparation of contour maps utilizing aerial photography; and the provision of essential miscellaneous technical and commodity assistance.

Setting

The Overall Irrigation and Drainage System

The irrigation delivery system with its single source of supply (Nile River) running the full length of the country appears deceptively simple. However, with its two dams at Aswan, 31,000 Km of public canals (some discharge up to 1,000 m3 sec), approximately 80,000 Km of mesqas1/ and farm drains, 560 large public pumping stations, over 17,000 Km of public drains, 450,000 saqias,2/ small pumps, and over 22,000 water control structures, the system is extremely complex. It provides water for over 6 million feddans3/, approximately 5.0 million of which are the alluvial lands along the Nile Valley and in the Delta (old lands) and 0.8 million are recently (1952-80) irrigated desert lands (old new lands).

1/ A mesqa is a private ditch serving from 10 to 300 feddans and 10 to 200 farmers.

2/ A saqia is a water wheel to lift water.

3/ One feddan equals 1.038 acres or 0.420 hectares.

The main characteristics of the irrigation system are: (1)operation and control of the water is based on the elevation of the water upstream or downstream of the off-take structures; (2)water is supplied to farmers on a rotation system that alternates on-off periods that vary by season and cropping pattern; and (3) most farmers have to lift water onto their fields rather than having it delivered by gravity flow.

The drainage system for removing excess water from cultivated lands consists of open drains, tile drains and pump stations. The open drain system, built mostly between early 1900's-1965, serves almost 5.5 million feddans (mostly old lands). Since the late 1960's, the GOE, with the assistance of the World Bank, has initiated a series of tile drainage projects to relieve Egypt's water logging and salinity problems. Currently, some three million feddans have been provided with subsurface drainage and improved open drain systems.

The PWWR is responsible for all aspects of the irrigation and drainage systems--planning, design, construction, operation, maintenance, and management. The Ministry has four Departments (Irrigation, Finance, Planning and Mechanical), four Authorities (Drainage, High Dam, Coastal Protection and Survey), six public companies, and the Water Research Center. To administer the irrigation system the Irrigation Department has 19 Directorates (essentially the same area coverage as Governorates), 48 Inspectorates and 167 Districts.

The PWWR regulates water supplies to and within each of the 50 canal commands, normally based on monthly water needs prepared jointly by the regional offices of PWWR and MOA. In general, since the High Dam was completed in 1968, the supply of water has been sufficient to enable the farmers to achieve close to 190 percent cropping intensities.

On-Farm Irrigation and Delivery System

Farm sizes in the 5.0 million feddans of old lands are small, 95 percent of the farms being of 5 feddans or less and approximately 70 percent being one feddan or less. The traditional method of irrigation is for the farmer to divide the land into small basins of a size not greater than 10 m x10 m. These basins enable the farmer to control the on-farm irrigation systems, and permit a fairly uniform application of water even on unleveled fields. The farmer is required to lift water from 50 to 75 cm because Government policy favors lift irrigation on the assumption that gravity flow results in excess water application. However, some areas in Upper Egypt and in Fayoum have gravity systems.

Water delivered to the farmer is not based on precise plant needs but on rotation with on and off periods. These periods depend on the type of soil, the cropping pattern and the season. There are two-turn and three-turn rotations. For example, a two-turn rotation could be 4 days on and 4 days off (rice), while a three-turn system would be 4 days on and 8 days off (general crops in the summer). Under rotation, farmers at the upper end of a mesqa often irrigate twice in a turn and the farmer at the lower end might not get a turn.

Project Components: Brief Description

Irrigation Improvement Project (IIP)

The IIP is planning, designing, and implementing a rehabilitation/ modernization program in selected canal commands covering an area of more than 300,000 feddans during the life of the project.

The IIP is being carried out in the following four phases within each area to be improved: (1) constraints to improved agricultural production are identified; (2) a feasibility study of potential solutions is carried out; (3) the appropriate alternatives (which must be technically sound, economically viable, and socially acceptable) are designed and implemented; and (4) the implemented solutions are then monitored and evaluated to improve the effectiveness of future improvements. Several feasibility studies have already been prepared by the Ministry and are currently being reviewed by AID.

USAID is helping finance improvements such as water control structures, monitoring systems, canal lining, canal crossings, canal excavation and/or realignment, land leveling, farmer organizational efforts, a grass-roots irrigation advisory service, commodities, training, and technical assistance.

The total AID contribution to IIP will be $77 million including approximately 500 person months of technical assistance, 300 person months of non-degree training, and two persons receiving degree training, commodities, and construction. Consultant services are currently being provided by Morrison - Knudsen Engineers.

Structural Replacement

The SR component is aimed at improving or replacing over 9,500 of the initial 1981 baseline of 20,500 small to medium structures in the irrigation system. These 9,500 structures had deteriorated or were no longer functionally appropriate. These structures include intake regulators, head regulators, weirs, tail escapes, spillways, bridges, and crossing structures. It is also aimed at: improving quality of construction; assuring that they are built to PWWR specifications, and reducing the backlog of structures that are unrepairable to enable the PWWR to have a manageable amount of structures that can be maintained.

The total USAID contribution to the SR component will be $75 million, including approximately 80 person months of technical assistance, 25 person months of non-degree training, commodities, and 80 percent of the cost of the structures. A full time advisor is being provided through Harza Engineering Company.

Preventive Maintenance

The Preventive Maintenance component will provide six directorates with the equipment and staff training necessary to perform routine first echelon maintenance. It is also installing the procedures to plan for, manage, and control higher levels of maintenance, including replacements that are contracted out. PWWR has committed to reorganize staff and provide funds needed to assure proper and reliable maintenance of the system. The product of this effort will be a preventive maintenance program, tested, accepted, functional, and fully staffed in six Directorates.

The initial phase of the preventive maintenance component is progressing with the establishment of a preventive maintenance organization in the Gharbia Directorate.

Associated with this program is an IBRD assistance package to strengthen the channel maintenance work throughout the country. The main focus of the IBRD program is on improving the capabilities of the PWWR Public Excavation Companies which carry out most of the channel maintenance work on the larger channels.

Under this component USAID will provide $38 million including about 290 person months of technical assistance, 80 person months of non-degree training and commodities. Consultant sevices are being provided by Morrison - Knudsen Engineers.

Main Systems Management

Management decisions to increase or diminish water flows at key points throughout the irrigation delivery system will be improved by a telemetry data collection system. This system is being developed to provide real time data to the managers of the water distribution system in order to improve management, reduce waste and irrigation shortages.

The initial phase of the telemetry system is designed to provide detailed data on the hydrology and other characteristics at 60 key points in the irrigation system. After gaining experience during the initial phase, the system will be expanded to increase the kinds of data to include flow rates, water quality, communications, as well as the number of data collection points in the system.

This component will also assist PWWR in experimenting with automation of control gates in a pilot area of the irrigation system. The pilot effort should result in decreased operation losses and improved irrigation efficiencies. A communica-

tions network and canal feasibility studies for determining the economic extent of automation will also be financed.

The total USAID contribution to this component will be $42 million, including approximately 200 person months of technical assistance, 60 person months of non-degree training, 10 persons receiving degree training, and commodities. Consultant services are being provided by Harza Engineering Company.

Planning Studies and Models

Through the Water Planning Group (WPG), the Ministry has developed a number of computer models that are designed to increase the operating efficiency of the whole system. These models fall into two groups. One group concerns inflow simulation to predict flows into Lake Nasser from the area above the Lake, and the other group of models are concerned with the service area between the High Aswan Dam and the Mediterranean Sea. This set of models is used to analyze the impact of the water delivery system on agricultural policies and programs, plan the distribution of water through the system, and provide detailed operating parameters such as gate movement schedules, for operating of the system within a specified set of system operating constraints.

The development of these two groups of models has been assisted by UNDP, starting in 1977. During the past two years, IBRD and UNDP with USAID participation, have carried out a number of review missions and found the project as having a positive and beneficial impact on developing the models needed to properly plan and operate the irrigation and drainage system. Due to funding constraints, the UNDP assistance will be phasing down, and USAID is providing support to further refine the two groups of models and the addition of several new models to the two groups.

A program for improving Monitoring, Forecasting, and Simulation (MFS) of the precipatation and run off in the Nile Basin is being established. It is planned that a grant will be made to the FAO to execute Phase I of a MFS program.

The total USAID contribution to the component will be $12 million including approximately 130 person months of technical assistance, 70 person months of non-degree training, and commodities are being provided by the U.S. Bureau of Reclamation.

Professional Development

Through this unit, the Ministry is providing structured in-service training programs for the five to seven thousand professional and 70 to 80 thousand nonprofessional staff of PWWR, plus some from the MALR. Training is being expanded to more than 60 subject matter areas. The component goal is to develop a National Irrigation Training Institute having the capability to provide high quality training to 2,500 students per year focusing mainly on the professional staff. This unit is currently offering courses in 25 subject areas and has trained 4,000 Ministry staff.

USAID will provide a total of $14 million including approximately 230 person months of technical assistance, 150 person months of non-degree, 5 persons receiving degree training, and commodities. Consultant services are being provided by a minority owned firm (Sheladia Associates).

Water Research Center

The scope and complexity of PWWR responsibilities for the irrigation system involve a wide range of scientific disciplines and widely varying subject matter areas. The Water Research Center was created in 1975 by PWWR to do the basic research and be the reservoir of knowledge on all aspects of the irrigation system. To serve this purpose, 11 separate research institutes were created. The project is helping the institutes improve their research capabilities, information dissemination, use of local private contractors, universities, and other research organizations to carry out special research projects rather than increase core staffing.

The total USAID contribution to the WRC will be $27 million, including approximately 420 person months of technical assistance, strengthen the existing staff of all eleven institutes with a signifi-

cant amount of degree training (44 PhD and 62 MSC) and non-degree training (470 person months) and commodities. Consultant services are being provided by a university group (Consortium for International Development).

Project Preparation Department

The Project Preparation Department was created by PWWR under the IMS Project to provide international quality economic and technical feasibility analyses of investment options open to the PWWR and to prepare reports in English for submission to international financial agencies and foreign donors. The PPD also serves in a staff capacity for PWWR to provide economic and technical analysis of various developmental options as assigned by the Minister. These analysis help the PWWR determine which programs are viable and are worth pursuing.

The total USAID contribution to the PPD component will be $12 million, including approximately 400 person months of technical assistance and 25 person months of non-degree training, and commodities. Consultant services are being provided by Harza Engineering Company.

Survey and Mapping

Part of the normal planning/design apparatus for irrigation systems is high quality aerial photography and detailed topographic maps.

Most of the cadastral and topographic maps currently in use for planning and designing irrigation improvements were prepared between 1900 and 1945. The majority of these maps are not adequate for preparation of feasibility studies or detailed project planning. In addition, accurately scaled aerial photography is not available for the irrigated areas of Egypt.

This component will arrange for aerial photography, new cadastral maps for about five million feddans of the irrigated lands, and large scale contour maps of the agricultural land. It will also provide training and equipment to the Egyptian General Survey Authority to upgrade its capability to provide mapping services.

The total USAID contribution to the Survey and Mapping component will be $29 million, including approximately 400 person months of technical assistance, 50 person months of non-degree training and commodities. A contract for consultant services is currently being negotiated.

Miscellaneous Technical Assistance and Commodity Procurement

This component provides for a residual supply of technical, commodity, and training assistance to cope with problems not addressed by the other components.

To date, over one million dollars have been utilized for special studies carried out in conjunction with other donor agencies, non-degree training for PWWR officials outside the normal IMS components, establishment of a monitoring office, project evaluations, invitational travel, and miscellaneous procurement.

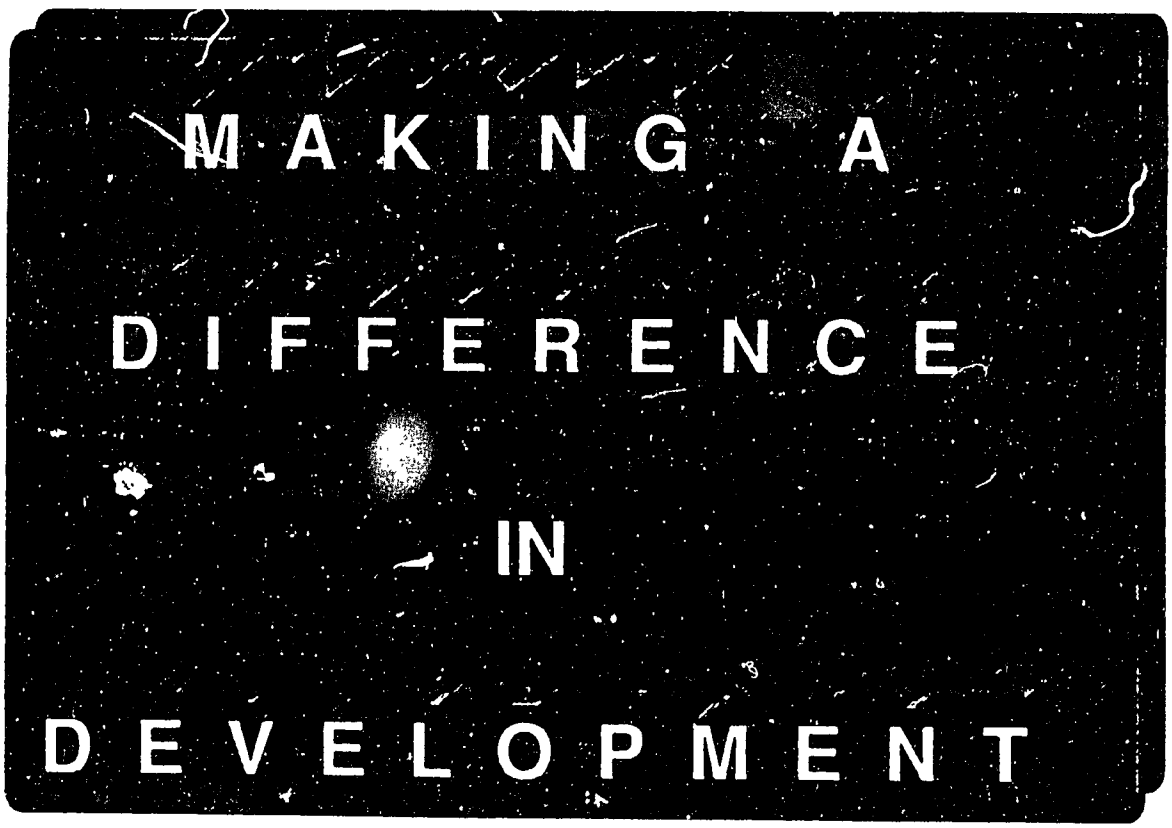
Accomplishments

To date, the IMS Project has accomplished the following:

- 9,000 concrete structures of the 22,000 small to medium structures in the system have been replaced under the Structural Replacement component which provide benefits to 1.1 million farmers.
- 4,000 PWWR employees have been trained in-country in 25 major subject matter categories.
- A model Irrigation Advisory Service has been created in the Minya area. While this activity is still in its infancy, 100% of the farmers in the project area have been contacted by the outreach team and have been consulted on irrigation delivery problems.
- A model Preventive Maintenance organization has been established in one Directorate.
- The Project Preparation Department has developed about 15 studies and related analysis for potential funding from other donors. This work has been a major factor in obtaining donor financing for the IBRD financed Drainage V Project, IBRD/AID financed Channel Maintenance Project, and bilateral financed ESNA Dam Project.

-$165 million in consultancy and procurement contracts have been put in place and are operational. Another $35 million in consultancy contracts and groups should be completed and in place by October 1989.

-Eleven initial studies for rehabilitating about 400,000 acres of irrigation systems have been conducted under the Regional Irrigation Improvement component.



EGYPT'S WATER RESOURCES

Introduction

The multi-year water regulatory capacity provided by the High Aswan Dam has given stability to Egypt's water resources by providing a reserve storage capacity during years in excess of requirements and providing supple-mental resources during lean years. The recent African drought from 1976-87, while being devastating to many parts of Africa has had limited impact on Egypt. The High Aswan Dam's water reserves were diminished, but the high inflows during 1988 have restored reserves to approximately the 1983/84 level. As a result Egypt is now focusing more effort on water management and forecasting to improve utilization of its water resource to meet future demands and to improve preparedness should drought threaten the availability of water resources in the future.

This Annex has been prepared to provide an overview for those interested in understanding Egypt's water resources and its importance in sustaining food and fiber production to meet the demand of a growing population. Water inflow and use trends and the future water requirements are discussed. The Annex also outlines water policy issues and the need for Egypt to complete plans and implement a long range program to better manage the limited water resources based on needs and conditions in the Nile watershed. This need stems from: (1) the significant draw down in water reserves behind the High Aswan Dam during the recent African drought and (2) estimates that show there will be insufficient water to sustain Egypt's projected requirements by the year 2000 unless improved conservation measures and management improvements are put into place during the next few years.

Water Resources

The renewable water resources available to Egypt are derived from the Nile River and its watershed. The Nile River, with a main channel 6,700 kilometers (km) long, is one of the longest rivers in the world and drains an area of 2,900,000 square kilometers. The river has two main branches (Blue and White) with headwaters in Ethiopia and Tanzania and drains parts of nine countries. Approximately 80 percent of the runoff into Egypt's Lake Nasser, which is formed behind the High Aswan Dam, is derived primarily from rain water runoff originating in the Ethiopian watershed. The other 20 percent is generated through the White Nile system which begins at Lake Victoria in Tanzania.

Over the years numerous agreements have been reached between the countries involved in the watershed with regard to sharing the water resources of the Nile basin. These agreements have culminated in an agreement that Egypt would be allocated a net of 55.5 billion cubic meters of water annually at the High Aswan Dam, based on an average annual runoff from the watershed of 84 billion cubic meters. The agreements specify procedures for sharing excesses during high runoff years and sharing deficits during low runoff years. In addition, Egypt and Sudan have agreed to share the cost of and the additional runoff generated by reducing evaporation losses in the swamps in southern Sudan via the construction of the Jonglei canal and other civil works. Realistically these improvements could increase Egypt's net share of the Nile River waters to approximately 58 billion cubic meters by the turn of the century and ultimately to approximately 65 billion cubic meters, if all the planned construction activities are undertaken. However, it must be noted that Ethiopia is not in full concurrence with the above mentioned agreement and the construction sites in Sudan are currently closed.

In addition to the surface water resources, usable groundwater is available in several areas within Egypt. However, the groundwater in the Nile Valley and the Delta of Egypt is not a resource in itself. It can only be looked upon as a storage

reservoir that is supplied by the Nile waters through the irrigation distribution system. It is currently estimated that 2.3 BCM are being extracted from the Nile Valley and Delta and that this amount could be increased to 5.0 BCM to balance the current recharge available from the irrigation system.

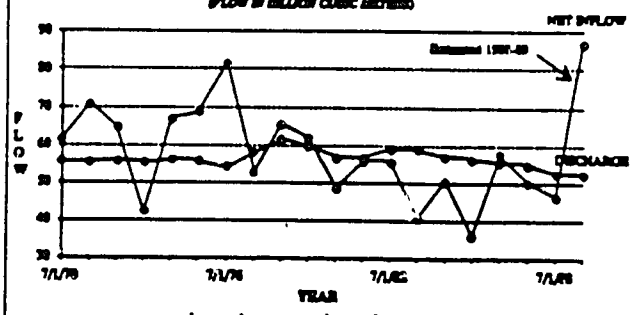
There are also two significant pockets of ancient nonrenewable groundwater under the Western Desert and the Sinai. The estimates of the amount under the Sinai have varied widely and have been as high as 25 billion cubic meters. The groundwater resources under the Western Desert have been studied in some detail. The studies indicate that the groundwater is 20,000 to 30,000 years old and is being recharged by water moving in from the southwest at the rate of 14 to 27 meters per year. There is no recharge to this area from the Nile River. Current developments are removing 460 million cubic meters (MCM) per year which is 145 MCM more than the annual recharge capabilities. Studies have indicated that it may be economical to increase development to irrigate an additional 100,000 feddans by increasing withdrawals to 730+ MCM per year. At this rate of withdrawal the water table would drop less than 100 meters in 50 years. Additional economic studies should be carried out before any further development proceeds.

The only other source of renewable water resources to Egypt is a very small amount of rainfall (10 to 20 cm. annually) along the north western coast. A small amount of marginal rainfed agriculture is supported by this limited precipitation.

Water Inflow and Use Trends

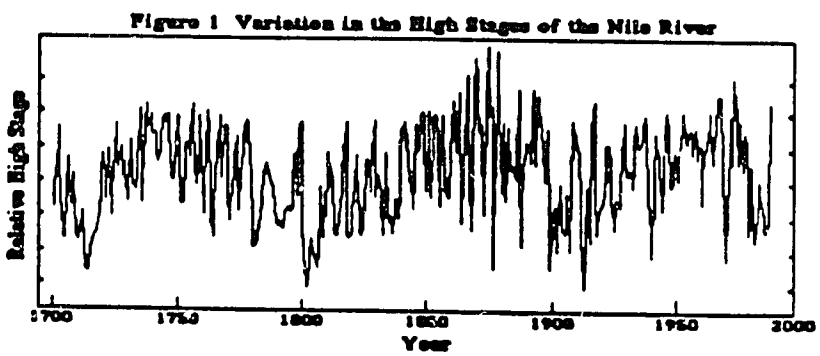
It appears, based on long-term stage (high water) records of the Nile river, that the runoff pattern has a hundred year cycle. Figure 1 indicates that there were low flow periods at the beginning of each century, high flow periods in the mid-century, and wide annual fluctuations. Based on this observation, it might be assumed that we are currently entering a low flow period for the next 15 or 20 years. However, the long-term weather patterns and water yields to Egypt could very well be changed because of man's influence through various development and use activities in the countries within the watershed. Figure 2 shows the net water inflows to Egypt at the High Aswan Dam during the past 18 years and shows that the inflows for the past few years, excluding the current year, have been significantly below the average of 55.5 billion cubic meters. The 1984-85 total inflow was less than 38 billion cubic

Figure 2
NET INFLOW AND DISCHARGE AT ASWAN DAM
(FLOW IN BILLION CUBIC METERS)



meters surpassing the previously record low of 42 billion cubic meters in 1913-14. Although 1985-86 inflows were back to normal, 1986-87 and 1987-88 were below average. However, 1988-89 demonstrates the possibility of wide fluctuations as this will be the record high-inflow year since construction of the High Aswan Dam. As shown by the constant or slightly decreased discharge rate from the High Aswan Dam (Figure 2), Egypt was not adversely affected by the recent African drought and with this year's inflows, the storage reserve has returned to approximately water year 1983/84 levels. Still, the African drought has had an impact by reducing reserves and several more

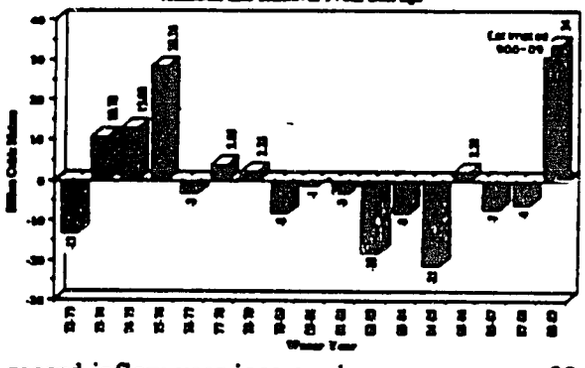
Figure 1 Variation in the High Stages of the Nile River



good years are required before full storage capacity can be reached.

The High Aswan Dam was constructed in the mid 60s with a gross storage of 165 billion cubic meters. Egypt benefited from a series of high inflow years between 1968 and 1975 which allowed the reservoir to be completely filled. The live storage capacity is 135 billion cubic meters and the dead storage is 30 billion cubic meters. Figure 3 shows the net additions to storage in the early years and net withdrawals from storage during the past twelve years. These withdrawals to meet the water requirements of Egypt resulted in lowering the gross storage content to only 40.4 billion cubic meters in July 1988. Fortunately, the current

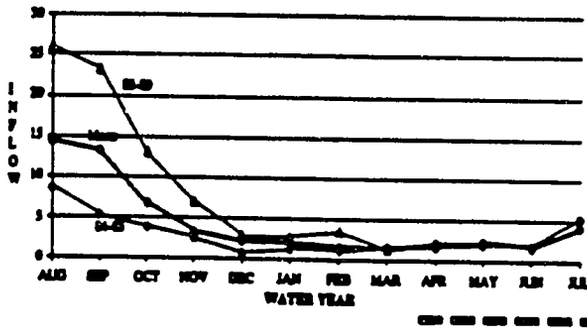
Figure 3
Additions and Withdrawal From Storage



record inflow year increased gross storage to 92 billion cubic meters as of December 1, 1988. Thus, the multi-year regulatory capacity of the High Aswan Dam has given Egypt a reprieve from the severe scenarios that were being predicted during early 1988. Also, if necessary, approximately 20 BCM can be withdrawn from the Dam's dead storage and used productively.

Figure 4 presents the mean water inflows over the past 18 years, a low flow year (1984-85), and the

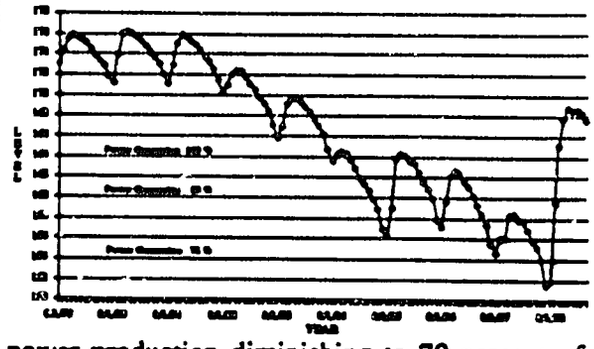
Figure 4
NET INFLOW TO LAKE NASSER



current high flows of 1988-89. There is very little difference in inflows for the various years between November and July. In August the difference between the wet and dry years becomes apparent. 1988-89 is clearly headed for a record high year based on the inflows reported for the first eight months of the water year.

Figure 5 provides the annual high and low water levels in Lake Nasser for the past twenty years showing that the overall levels have declined as a result of the recent drought. The drop in water level behind the Dam resulted in hydroelectric

Figure 5
LAKE NASSER WATER LEVEL



power production diminishing to 70 percent of rated capacity during July 1988. However, this year's inflows have restored power production levels to 100 percent of the rated capacity.

Figure 6 provides a table showing the Nile River water balance for the calendar year 1982. With releases from Aswan of 58.70 billion cubic

Figure 6
NILE RIVER WATER BALANCE - 1982
(Billion Cubic Meters)

Releases From Aswan Dam	**58.70**
Productive Uses	**31.82**
Municipal	1.84
Industry	0.34
Old Lands Consumptive Use	27.01
New Lands Consumptive Use	0.03
Power and Navigation	2.60
Losses	**26.88**
Sea and Terminal Lakes	24.77
Evaporation and Seepage From Canals	2.11
Nile Water Use Efficiency	54%
Irrigation Efficiency	45%

meters, approximately 32 billion cubic meters were beneficially used, including 27 cubic meters for agricultural production. The consolidated overall water use efficiency of 54 percent and the irrigation water use efficiency of 45 percent are misleading in that much of the losses from the operation of the system and from the agricultural lands are recaptured and reused several times throughout the length of the system. In many cases this requires large energy consumption in pumping water from drains back into the irrigation system, pumping water from drains into the farmers' fields and pumping from wells. The actual seasonal irrigation efficiencies at the farm level have been shown to range from 26 (inefficient system) to as high as 76 percent (efficient system). To maximize output per unit of water, the efficiency of delivery and application must be increased.

Water Quality

The overall quality of water in the Nile system is good for most purposes and very good for irrigation. There are particular locations where local pollution loads temporarily exceed the ability of the Nile River to assimilate or dilute. But for the most part the quality of water the Nile system from the Sudan border to Cairo can be described as "good." Downstream from Cairo, in both the Rosetta and Damietta branches, some deterioration does occur. The water quality in the irrigation canal system is also good, although there is more variation both spatially and temporarily. The water quality in the drainage system varies from good to polluted.

There have been no comprehensive water quality studies in Egypt that are in sufficient detail for determining the full impact of multipurpose development. However, based on individual studies carried out in different areas of Egypt, the following general water quality information is available.

The total dissolved solids at Aswan range from 175 to 180 mg/l during the year, increasing to 200 to 210 at the Delta Barrage (Cairo), and further increasing to 312 to 460 at Damietta and 296 to 392 at Rosetta near the Mediterranean Sea. Concentrations, below 1500 mg/l are considered suitable for irrigation at today's level of management knowledge.

The return flows from agricultural drains south of Cairo are of generally good quality with 95 percent being below 800 mg/l while the drains in the middle Delta have flows generally below 1000 mg/l. However, the drains in the Western and Eastern Delta generally have high values of totally dissolved solids greater than 1500 mg/l and are not suitable for irrigation unless they are diluted with good quality river water.

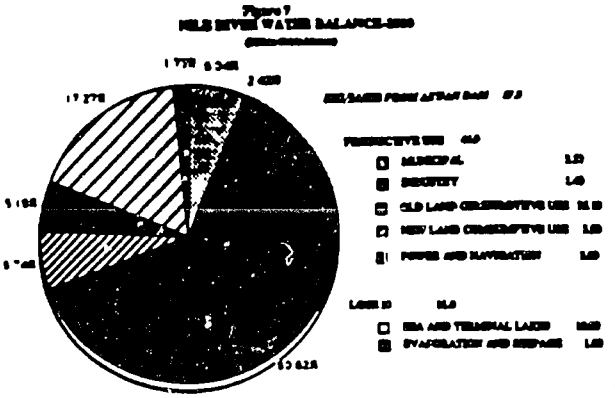
There are many exceptions to the above statements near the larger towns and cities where industrial and municipal waters discharge into the canal or drainage system causing localized pollution problems.

The groundwater drawn from the alluvium in the Nile Valley is generally of good quality except along the edges of the valley where irrigation causes some leaching of desert soils. Wells in the southern half of the Delta produce good water; but in the northern half of the Delta, salinity increases towards the coast. The total dissolved solids in the Nile Valley, Western Desert, and south of Tanta in the Delta are generally less than 1000 mg/l. As one moves towards the coast from Tanta, the values rise rapidly to 4000 at Kafr El Sheikh and 40,000 mg/l near the coast.

Future Water Requirements

Egypt's Water Balance

Figure 7 shows the estimated Nile River water balance for the year 2000. It has been estimated that to increase agricultural production sufficiently to eliminate the food deficit over the next 15 years, approximately 39 billion cubic meters of water will need to be available for consumptive use of crops compared to the current level of 27 billion cubic meters. In addition, industrial and municipal water requirements will raise from the current level of 2.2 (Figure 6) to 4.9 billion cubic meters. Current available information indicates that Egypt cannot



rely on much more than 58 billion cubic meters of net water supplies being available per year during the next 15 years, assuming average inflows. As such, the only way to increase the amount of usable water supplies for consumptive, municipal, and industrial use is to increase the water use efficiency within Egypt. Since the main water user is irrigation, the overall irrigation efficiency will have to be increased from the current level of approximately 45 percent to 67 percent, or 22 percent over the next 15 years. Under the current management conditions and physical systems available to Egypt, including the pumping network for water reuse, this is not an unrealistic goal. In addition to improving the irrigation efficiencies, PWWR is investigating ways of reducing losses to the sea. As was done during 1987-88, approximately four billion cubic meters of water can be saved annually by better management of the hydroelectric and navigation release in the winter when they exceed the irrigation demands.

Irrigation Management

A key to increasing irrigation system efficiency is through improved irrigation management.

The term "Irrigation Management" has come into its importance during the last decade and is an outgrowth of the evolution of on-farm water management and irrigation water management work carried out since the 1960s. Irrigation Management is a mixture of science and art and is not fully understood. There are no formal degrees offered in Irrigation Management.

Irrigation Management can be defined as the process by which water is manipulated and used for the production of food and fiber. This is a comprehensive definition in that it includes water resources, dams, reservoirs, codes, laws, canals, institutions, farmers, soils, crop inputs, and cropping systems. Irrigation Management has to do with how these physical, biological, chemical, technical, legal and social resources are combined and orchestrated along with the essential knowledge, skills and motivations required to achieve improved food and fiber production in terms of a stated set of performance goals.

In Egypt and elsewhere, most of the engineering principles to improve Irrigation Management have been known for years. What is not known is how to devise an Irrigation Management program based on the physical and cultural interfaces in each location. One of the most underrated and misunderstood dimensions of irrigation management today is that of the individual and collective irrigation behavior of farmers.

Government officials and donors are slowly realizing the high economic, social and political costs involved when farmers and users play only a passive role in irrigation projects. What is still not well understood is how to match technologies and management modes with different physical and social environments. Likewise, we need to learn how to diagnose and reform key social organizations and institutions, discover better ways to utilize farmer clients more effectively by giving them a sense of ownership in irrigation systems designed to serve them, and find the proper set or mix of policies which provide incentives which will really motivate farmers. This is hardly possible until all professionals and agencies concerned provide the adequate incentives, institutional support, and services which will in fact make improved production possibilities a reality.

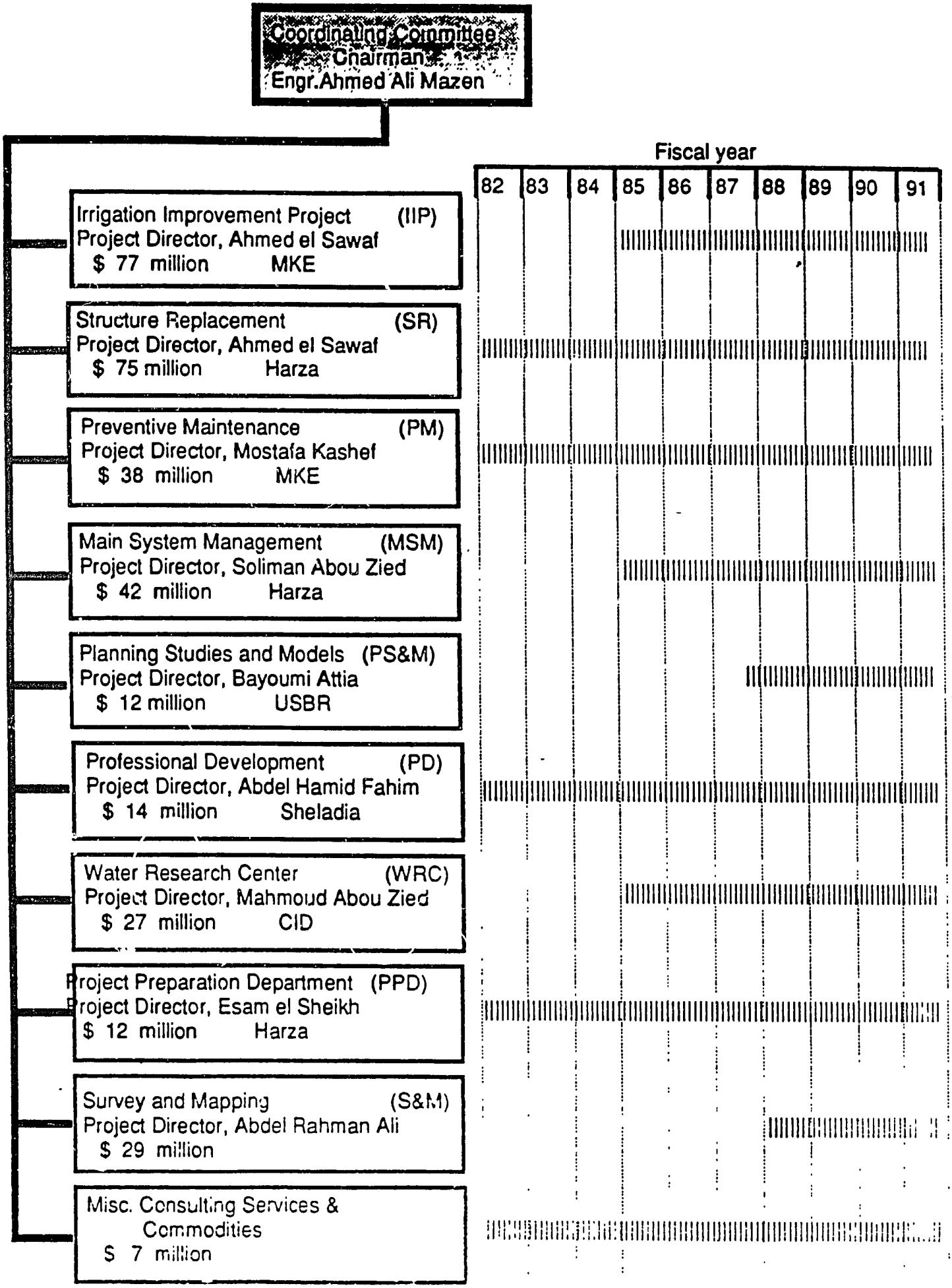
Egypt is beginning to adopt an interdisciplinary approach of using a team of engineers, sociologists, economists, and agronomists to identify Irrigation Management problems and develop and implement solutions to those problems.

Policy Issues

As Egypt progresses toward improving the water use efficiency of the river and canal system, numerous existing policies will have to be reviewed and modified and additional policies established. An Inter-Ministerial Water Planning Committee has been established, headed by the Ministry of Public Works and Water Resources and having representatives from eight other ministries. This body is responsible to review the impact of all proposed projects involving the use of water and has the authority to set policies as required. As the Ministries' existing computer modelling capacity improves, their capacity to test the impacts of alternative policy reforms will increase many fold.

The following is a list of some of the possible policy improvements being discussed with GOE as they relate to Irrigation Management:

1. Proportion of funds allocated for improvement of existing projects versus new schemes.
2. Incentives required to improve the management capability of the PWWR.
3. Cost recovery for water from the beneficiaries, taking into account the present and planned price controls and subsidies.
4. Benefit package (monetary and merit advancement) required to retain qualified professional staff within the PWWR.
5. Public versus private groundwater development to help control water tables and supplement the surface distribution system.
6. Responsibility of PWWR and the farmers at the mesqa level and for the operation of the canal system.
7. Diagnostic multidiscipline "bottoms up" planning and design approach versus the engineering "top down" approach.
8. Coordination responsibilities of the MOA and PWWR.
9. Organization and staffing policies of the PWWR as it begins to utilize more advanced technology.


Coordinating Committee
Chairman
Engr.Ahmed Ali Mazen
Fiscal year
82
83
84
85
86
87
88
89
90
91
Irrigation Improvement Project (IIP)
Project Director, Ahmed el Sawaf
$ 77 million MKE
Structure Replacement (SR)
Project Director, Ahmed el Sawaf
$ 75 million Harza
Preventive Maintenance (PM)
Project Director, Mostafa Kashef
$ 38 million MKE
Main System Management (MSM)
Project Director, Soliman Abou Zied
$ 42 million Harza
Planning Studies and Models (PS&M)
Project Director, Bayoumi Attia
$ 12 million USBR
Professional Development (PD)
Project Director, Abdel Hamid Fahim
$ 14 million Sheladia
Water Research Center (WRC)
Project Director, Mahmoud Abou Zied
$ 27 million CID
Project Preparation Department (PPD)
Project Director, Esam el Sheikh
$ 12 million Harza
Survey and Mapping (S&M)
Project Director, Abdel Rahman Ali
$ 29 million
Misc. Consulting Services &
Commodities
$ 7 million

APPENDIX D

Participant Evaluation Results

APPENDIX D

PARTICIPANT EVALUATION RESULTS

Following are the results of the written evaluations of the workshop. Twenty-eight participants completed the evaluation.

A. Workshop Goals

The goals of the workshop are listed below. The number following each statement indicates how well participants felt each goal was achieved during the workshop. The scale is from 1 (low, goal not achieved) to 5 (high, goal achieved very well).

1. To exchange project information that is essentisl to beginning the project.

   4.29

2. To gain agreement on and commitment to project goals and activities.

   4.25

3. To provide an opportunity for the project team to become acquainted.

   4.32

4. To agree on the roles and responsibilities of the technical assistance team, AID, and the project sponsoring agency.

   4.12

5. To agree on procedures for managing the project.

   3.93

6. To clarify expectations for working together.

   4.07

7. To discuss and develop strategies for the most important issues that will affect the project.

4.32

8. To develop work plans for the first six to twelve months of the project.

3.82

B. Opinions and Feedback

Please answer the following questions as thoughtfully as you can within the time. Your answers will help us plan other conferences in the future and will also indicate if there are concerns which need to be addressed in follow-up activities.

1. What do you think has been the primary benefit of this workshop?

   * Working relationships

   * Understanding of project (objectives and benefits) and relationship between MSM and other concerned organizations

   * At my level (TA Compnent Leader), I was able to get down to some basics that should have been discussed previously but for some reason were not. This came up as a natural course of events in the workshop -- overall project understanding and problems are much clearer now.

   * Developing friendship and mutual understanding beween the members of the workshop

   * The push of work from now exists

   * Cooperation between teams

   * Project understanding among all concerned parties

   * That I exactly understand the goals of the project

* Getting information, agreements from key persons, and role distribution

* Open communication channels

* The workshop was useful and we all benefited from all sharing comments of the participants

* Try to solve the problems between the different parts who are concerned with the project

* Good understanding about the project

* To get agreements on administrative issues, define difficulties facing the MSM project, solve those difficulties, and develop workplans

* I understood the goals of the project and the workshop made the team closer together

* Getting acquainted with others associated with the project (Ministry, AID, Project staff) and discussing issues related to the success of the project

* Agreements on implementation and management

* Know each other (MSM, IIR, USAID, TA Team) much better and know where we stand and what is the real problem

* Per diem decision (cited 3 times)

* That I know some new people

* Training

* I got new information

* The explanation and clarification of the project

2. What workshop activity could have been done better?

* Screen the issues into two groups, one group for discussion and the other for information, but no discussion

* Sharing information in groups

* Training component report (cited by 3 participants)

* Workshop schedule, organization, logistics

* Workplan session (cited by 3 participants)

* 1) English-Arabic interpreter is required, even if from the group 2) Numbering of all printed papers is required 3) New easier questionaire

* Rearrange group after initial discussions, i.e. from AID/MSM/MPWWR/TA to AID/MSM/MPWWR

* Discussing the important issues

* All are good

* Too much repetition in early hours of workshop by facilitators of materials that were either obvious or relatively unimportant

* A little disorganized during information sharing - got into issues before we were ready

* Monitoring

* None, thank you very much (cited by 6 participants)

3. Do you believe there are unresolved issues that should be dealt with in follow-up activities? What are they, and what should be done about them?

   * Telecommunication ARENTO matters (cited by 4 participants)

   * The objective of the project and its relation with the IMS objectives

   * The specific frequency for component 2, the training activities, the incentives, and working hard realistically

* Primary one is delegation of responsibilites by Project Director without delegation of commensurate authority. Only solution, as I see it, is to continue to try to maintain dialogue and communication in attempting to gain his trust. An ideal situation does not appear possible.

* Relation between staff personnel, TA personnel, Responsibilities

* Unresolved issues will be resolved by more discussion beween the concerned parties

* The responsibility for MSM staff of junior engineers must be clear

* Ability to complete TA staff

* 1) Distributing roles according the authority - responsibility balance is not achieved 2) Coordination is required through open discussions

* Getting ARENTO to cooperate and participate in the project, perhaps by GOE decree

* The choice of the places of the stations

* Lack of staff

* Should be some, that is very normal

* Link and cooperation between MSM staff and other Irrigation Directorate staff

* None (cited by 8 participants)

4. What comments do you have about the workshop arrangements and accomodations?

* Adequate, but could have been better (cited by 3 participants)

* Good (cited by 6 participants)

* Very good (cited by 7 participants)

* Thank you for your effort

* B.B.Q. was bad and the time of break was not suitable

* Adequate. Efforts of the arranging committee are commendable and appreciated

* Didn't particularly care for the conference room

* Too much background noise (ventilation system) in meeting room

5. What final comments do you have for the workshop facilitators on their performance?

* Very satisfactory, thanks!

* Excellent (cited by 10 participants)

* They both performed well in holding the attention, most of the time, of a very diverse group

* Activity, hard work

* They did their work very well

* The facilitators were very helpful and they tried to make the workshop in the best shape

* It was ok, but I would like additional display equipements like slide projectors and overhead projectors

* They are very wonderful

* The facilitators did an admirable job under some trying circumstances

* They did their job much much better than we expected

* Believe me, when I came here, I wondered how we can solve these problems? - but now I want to thank you for your very good job to arrive to these very good agreements

* Excellent job - Professional!
* Please review the typing of the report (recommendations) to avoid confusion
* They have done wonderful efforts
* They did their job very good
* Al needs to project his voice
* We like to thank the facilitators for their good job and performance

APPENDIX E

Issues Identified During Interviews

ISSUES IDENTIFIED DURING INTERVIEWS

1. ROLES/RESPONSIBILITIES/AUTHORITIES

* Project Director/ IA IM. Leader/ USAID Project Officer.
* Pressure to spend / reluctance to spend.
* Within MSM Component - between TA Consultants & Counterparts. and component staff.
* Project Director / Steering Comm./ Coordinating Comm.
* New ideas / parallel planning & implementation needed.
* Delegation of authority / delays in decision - making.
* Monitoring Office.

2. COMMUNICATION/COORDINATION

* Ministries of Telecommunications (ARENTO) and PWWR.
* MSM/PS and M/(R)IIP/PD/future FAO (MFS) project.
* Sub-component of MSM.
* MSM project staff and directorates staff.
* Preparation / circulation / communication of minutes / results of all meetings
* Full-time ARENTO person to work with MSM on system design and construction.

3. TRAINING

* English exams / requirements.
* On-the-job training asap by TA staff.
* In-country / Off-shore / on-the-job training (incl. Directorate staff.
* Transfers to other positions on return from training - do we need a requirement to return to project?.
* How are training needs identified and planned for?
* Do we need a full-time TA training consultant for MSM?
* Need to include contract staff in training.
* Rotation practices may block/delay project.
* Need increased coordination W/P.D.
- Training from Telecommunications Institute.

4. STAFFING/PERSONNEL ISSUES

- Complete staffing of MSM-both TA and Egyptian.
- How to attract/keep experienced mid-level Egyptian staff.
- Staff salaries incentives, and travel per diem. Secondment procedures for projects - for how long?
- Responsibility for supervision and performance ratings - TA staff?
- Adequate / up-to-date and standard equipment.

5. CONTRACT/PROCUREMENT ISSUES

Clarity on GOE and USAID:
- procurement policies/procedures.
- contracting policies/procedures.
- payment conditions.

Need for computer maintenance contract and for up-to-date hardware/ software.
Vehicle procurement plan - HARZA.

Project procurement plan - HARZA.

6. ARENTO/FREQUENCIES

- Agreement/assignment of frequencies.
- Long term operations and maintenance.
- Ownership of system - ARENTO, PWWR, Private Sector.
- ARENTO Engineer full-time with MSM.
- Involvement / awareness/ training of ARENTO staff.

7. SITE SELECTION ISSUES

- 66 site for Telemetry stations.
- Pilot site for canal automation (EL Salhia).
- Lessons learned from pilot Telemetry project in Delta Barrage area with Institute of Hydraulics and Simulation.

8. ADDITIONAL ISSUES

- Transfer of knowledge gained from this project to the Directorate - O & M.
- How to involve the "field" in the implementation of this project.
- How many Engineers? Type? Number? When?
- Roles/resp./authority between PWWR and Directorate after the project is operational.

APPENDIX F

Management Expectations

MANAGEMENT EXPECTATIONS

PWWR/GOE EXPECTS:

EXPECTATIONS	MSM PROJ. STAFF	USAID	TA TEAM (HARZA)
1.Sharing	meetings with directorate (quarterly) to discuss status of implementation, constraints and outputs	to provide up-to-date information studies, researches and reports about similar projects outside Egypt. periodic meetings with top officials to exchange information and ideas	All information of the project's implementation, and outputs will not be exchanged without the approval of the project director
2. Ideal Working Relationship	to provide immediate reports about problems, obstacles and constraints. to follow precisely the decisions and guidelines of the steering committee and the IMS C. Comm.	Quick response to issues and problems that may cause delay in the implementation of the project. Periodic meetings with project officer of the project to discuss work status	Encouragement of team work with counterparts and senior staff.
3. Written Reports	to provide (through M.O.) progress reports on quarterly	to provide evaluation reports furnished by external missions.	All written reports will be in accordance with contracts.

	basis status of implementation, constraints, and outputs.	To provide (through M.O.) financial reports	Reports will be exchanged with the approval of the project director.
4. Decision Making	Take immediate decision to solve urgent problems. Follow ministerial decrees concerning the responsiblities of the project directors.		Contract regulations will be the basis of any decision taken by TA team. All decisions concerning the project must be discussed first with project director.
5.Monitoring Performance	To cooperate with M.O. in providing information that leads to establish success factors and indicators of evaluating performance of the project.		Follow instructions of M.O. to establish performance indicators. Work closely with M.O. to establish performance measure indicators and success factors. Follow precisely the contract in providing progress reports about project performance.

6. Involvement in Planning	Give suggestions for long term plans of the project (to be discussed with PWWR/GOE decision makers). Give comments on short-term & long-term plans of MPWWR concerning the project before final approval.	Exchange information and ideas while preparing long term plans of the projects.	Work closely with the project in giving suggestions for short-term and long-term plans of the project.
7. Other			

MANAGEMENT EXPECTATIONS

MSM PROJECT STAFF EXPECTS OF:

EXPECTATIONS	TA TEAM	USAID	PWWR/GOE
1.Sharing information	Inform us periodically with every new item. Transfer the experience. Inform about soft and hardware technical information.	Give information about: percurment regulations whenever the information is changed	
2. Working Relation-ships	To work with the MOI as a team. The best location of consultant to share the office with the staff and explain what is going on.	Meet often to discuss problems & resolve out-standing issues	
3. Written Relation-ship	Preparing technical reports clearly and briefly as specified in the contract. Technical reprots of benefit to PWWR technical staff related to the project technology	Activity report of USAID mission in Cairo	

	Review.	contractor and reviewed by PWWR. Participation in preparation of work plans.	
4. Decision Making	Aid policy & guidelines. Reviews. Disputes between PWWR and TA Team	Broad project objectives and GOE policy matters. Disputes within MSM project staff	
5.Monitoring Performance	Assure consistency W/FRR and AID guidelines. Overall accomplishment of project goals work plans.	TA Team leader and overall project team performance. Satisfactory accomplishment of contract requirements and work plans. Overall evaluation of budgets and schedules.	
6.Involvement in Planning	Review Plans for consistency with overall IMS project goals and AID policy	Expanded role for directorates. Involvement of TA Team in all Planning activities	
7. Other			

MANAGEMENT EXPECTATIONS

USAID EXPECTS OF:

EXPECTATIONS	MSM PROJ. DIR., PWWR/GOE	MSM PROJ. STAFF	TA TEAM
1. Sharing information	Thru Monitoring Office Meetings, Visits, telephone, Mail Box, Seminars.	Thru Project Director	Meeting, telephone office - visits, Mail Box Transfer Technology Project Staff
2. Working Relationship	Collaborative & Professional Cordial, Open, Frankness	NONE	Collaborative & Professional
3. Written Reports	*Life of Proj. work plan *Annual work plan *Budget Reuests *Action memos	NONE	Work plans Progress Reports
4. Decision Making	* In accordance with Imp. plan & AID/GOE requests. *Collaborative & time decisions re-work plan	NONE	Sound Judgement/ technical advice on project Implementation Issues
5.Monitoring Performance	*Annual Reviews/Progress *Advise on problems	NONE	*Status of TDY's *Commodities *Training (participants)

	*Quarterly reports to monitoring office.		
6. Involvement in Planning	Collaborative USC Project Staff	NONE	Collaborative
7. Other	Timely Implementation Decisions	Keep staff informed re-progress	*Strong Leadership *Efficient management of Contract Inputs.

MANAGEMENT EXPECTATIONS

TA TEAM (HARZA) EXPECTS OF:

EXPECTATIONS	USAID	MSM PROJ. STAFF	PWWR/GOE
1. Sharing Information	IMS project information from other projects. Clearer definition of the information required in reports.	Steering Committee meeting minutes. IMS coordinating committee meeting minutes. Advance review of local procurement documents. Dissemination of existing technical information.	Advanced information on local staffing plans. Disseminate staff meeting information to other colleagues.
2. Ideal working relationship	More active involvement of project officer. Expedite approval process.	Delegate authority commenusurate with contract responsibilities. Adequate staff both expatriate and local positions.	
3. Written report.	Define reports contents.	Contract reports to be prepared by	

4. Decision Making	Through discussion	Through discussion
5.Monitoring Performance	We expect the project performance is fine	Monitoring individual is the role of Project performance Director
6.Involvement in planning	Develop the workplan with ministry staff	Review the work plans 7 give recommonations
7. Other	To work with full-cooperation with Ministry staff and to give engineers training when required.	Cooperation & approval of required documents in very short time.

Management Expectations
GROUP TASKS

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.

Review the expectations that the other groups have of your group.

Write on newsprint any expectations you want to negotiate or modify - i.e. any that you cannot accept as stated or for which you want further clarification.

.
.

MSM COMMENTS

.
HARZA:
.

1) OK
2) Explanation: For all responsibilities needed for clarification
   - Both experts & local staff will be expanded as the Project progress
3) The report should be jointly prepared and approved by Project Director
4) OK
5) We want clarification

.
.
USAID:
.

2) All contacts should be through the Project Director

.
.

HARZA COMMENTS

.
USAID EXPECTATONS
.

*5. Provide clarification on requirements re:TDY
*7. This appears conflict with expectations of MPWWR & MSM

.
PWWR EXPECTATIONS
.

*3. Agree to submit reports in accordance with the contract

.
.
MSM PROJECT STAFF EXPECTATIONS
.

*4. Agree that discussion is necessary. Need to define who has ultimate responsibility if discussion does not lead to agreement
*5. Agree to establish MIS with MSM staff assistance and provide TECHNICAL inputs and $ budget inputs required

MININSTRY PWWR COMMENTS

MSM

* Sharing information how do you expect information to be exchanged with TA team
* W. Relationship
  What do you mean by working with MPWWR as one team?
* Monitoring performance your expectation from USAID to "monitoring individuals the role of the project director" is not clear.

HARZA

Written Reports

* To be jointly prepared
* No copies to be transmitted to any agnet without the approval of the contracting authority.

PROJECT MANAGEMENT AGREEMENTS

* If USAID cannot get a rapid response to the Ministry PWWR, they will provide an interim response.
* If Project Director and TA Team Leader cannot reach agreement, the issue will be taken to the Project Steering Committee as soon as possible. Then if the issue cannot be resolved, it will go to the IMS Coordinating Committee.
* Formal contacts between TA Contractor and USAID should be through the Project Director. Occasional informal / information / administrative contacts may be made directly.

APPENDIX G

Results/Agreements of Discussions of Project Issues

RESULTS/AGREEMENTS OF DISCUSSIONS OF PROJECT ISSUES

Group 1

1. Communication With Project Components

   a. MSM-PS &M- IRR Sector

      Reason: IRR Sector will use data from MSM (levels), PS & M (flow models), Irr. Dir. (Discharges, sections & crop patterns)
      Rec : Establish an analysis section with computers in the IRR. Sector.

   b. MSM & IIP

      Reason: For Automation, IIP type activities are needed
      Rec : Select an improved canal command area for automation

   c. MSM & PD

      Reason: PD Facilities are needed for incountry training
      Rec : PD & MSM to coordinate

   d. MSM & FAO(MFS Project)
      Reason: Need to extent Telemetry to the South
      Rec : None due to early as FAO Project not yet developed.

2. Within Sub Components of MSM

   Reason: Coordinate activities for success of the Project.
   Rec : 1. Staff meetings with Project Dir., TA Team & Component Heads to share info., coordinate & monitor progress.
   2. Head of Component to transfer info. to his staff
   3. Copies of Plan of work & progress reports to all staff.

3. MSM Staff & Directorate Staff

   Reason: Dir. Staff are recipients & users of data & have responsibilities in the installation & operation & maintenance of the system.
   Rec : 1. Five regional seminars of Gen. Directors, Inspectors, Chief Eng. for water dist. ASAP!
   2. Training program for directorate staff having direct responsibilities
   3. Training program for district engineers
   4. Reg. meetings with key directorate staff to solve

field imp. problems.

Rec.

Each directorate select 1 part-time civil engineer and 1 electrical engineer to work with MSM staff. Should have English language capability. Need part-time civil eng. ASAP and electrical eng. in 6 mons. MSM Project will provide MSM Steering Committee with list of all directorate staff needs by Jan. 1, 1990. This will include explanation of the job of the electrical engineer.

ROLES/RESPONSIBILITIES/AUTHORITIES
Pressure to spend/Reluctance to spend

Group 2

1. Expedite the implementation schedule & work plans, with starting dates and finish dates (including financial schedules).

2. Start implementation accordingly involving spending funds.

3. The progress of work and corresponding expenditures will be monitored, tracked and evaluated by the monitoring office and submitted to IMS Committee and USAID.

Relations between PWWR & Directorates after the project is Operational.

1. Start planning from now with MSM Project Inception report and not wait until the end of the project about how to continue the project (operation, maintenance, renovation as needed).
Issue of sustainability that will demand much more attention over the life of the Project.

2. Start budgeting for the operation phase gradually as needed with the progress of the project.

3. Technology transfer should now take the utmost concern, as the important target of the project.

4. Continuous training & extension of tech, information.

5. Maintain the trained staff after the project for O & M.

Roles, Responsibilities/ Authorities within MSM, between TA Consultants & their Counterparts

- Team work with main target of technology transfer.

- TA's fully responsible for technical aspects & guidance, the counterpart & staff will share with TA's the responsibility of implementation.

- Keep everbody informed through regular meetings within each component & within MSM.

- Regular & as needed lectures to enhance technology transfer.

- Interviews with the individuals to judge improvement of their technical skills and give awards, certificates, promotions etc. Both positive and negative incentives, Proj. Dir. to recommend.

CONTRACT/PROCUREMENT

Group 3

Issue : Local purchases less than $ 100,000 are time consuming and cumbersome.

Recomm: Use Handbook II regulations (as originally stipulated in the bilateral agreement) for all USAID funded procurement but also maintain limits of authority for approvals stated in the Ministerial Decree (No. 29, 5 Feb.85).

Info: Project Procurement Plan will be part of Inception Report. Vehicle Procurement Plan is done and work is underway to identify best way to maintain computers.

STAFFING AND PERSONNEL ISSUES

Group 4

1. Complete staffing of MSM:
   Take to IMS Committee if problem after approval of MSM Inception Report work plan.

2. How to attract/keep experienced Egyptian Staff
   - Opportunity for advancement
   - Good contact with Sr. Eng. in Ministry & Directorates.
   - Training Opportunity
   - Assure through MSM Project Training Plan.

3. Staff salaries (for contract staff)
   - Do Harza contract limits stand?
     if not, IMS Com. must provide specific limits & contract amended .

- Must respect IMS Coord. Committee levels or get their approval for expectations.

4. Responsibility for supervision & performance ratinngs - TA staff?
   - Policy set by Director & Team leader
   - Responsibilities clarified to all staff

TRAINING

Group 5

1. Do we need a full time TA training consultant for MSM?

Why Important:- We need someone to push arrange the training program.

Solution :- Project Inception Report Work Plan to specify staffing needs for the training component. Recommendation to be made no later than Dec. 1, 1989 subject to Steering Committee approval.

2. English Exams/Requirements.

Why Important:-
a. To be able to take off-shore training.
b. To be able to communicate with TA's and to read technical literature

Solution:- Arrange English courses for every engineer on the Project at all levels including those who pass the pre -TOEFL.

3. Need to include contract staff in training.

Why Important:- They are required to do the same work as the permanent personnel and therefore required training.

Solution:- Include contract personnel in training both in country and also off-shore if requested by Proj. Dir. and approved by subject to Steering / Coordinating Committee approval.

4. In- Country/Off- Shore / On-The-Job Training (Incl. Directorate staff).

Why Important:- Technical Training is essential to the success of the Project.

Solution:- Arrange training as soon as possible and continue through the Project and to allow everyone who is qualified and needs it to receive Off-Shore Training if available.

5. Rotation Practices may block/delay project.

Why Important:- People who are trained and rotated are no longer available to the Project.

Solution:- Establish the Project staff until it is completed . As a matter of policy- and maintain staff for long term O & M.

ARENTO

Group 6

1. Agreement/ Assignment of frequency.
   * everything in Component II depends on freq. (design, specif...etc.)
   * Rec. Meeting Tues. 21/11/89 between MSM Proj. Director and ARENTO to agree on VHF frequencies and schedule later meeting to work out Backbone arrangements.

2. Ownership of system.
   * to know who is responsible for mainting the equipment.
   * Ownership of VHF freq. --- MOI
     M.W. link --- ARENTO

   To be decided through future negotiations per existing regulations. Similar to other agreements between other ministeries and ARENTO or Projects.

3. Long Term O & M.
   * It willl insure that Egypt will have long life proj.
   * Training- Cooperation between PWWR & ARENTO.

4. Rec: Need full or part-time ARENTO engineer during design and implementation phases. To be decided in next meeting between MSM and ARENTO.

5. Training from ARENTO
   Rec: ARENTO Telecommunications Institute in Nasser city to be used to train Project staff- as per Project Training Plan.

SITE SELECT ISSUES

Group 7

Issue (1)
66 sites for Telemetry stations.

Reason
The sites constitute the core of the entire project .

Rec.
Implement planned Phase 1 Telemetry System ASAP. Proceed in parallel to plan Phase 1 expansion in order to implement ASAP.

Issue (2)
Pilot site for canal automation.

Reason
It is not recommended that canal automation be applied at Salhia area.

Rec.
MSM and IIP Project Directors to meet to provide recommendation to a top level comm. of MPWWR will select the suitable site for automation. It is recommended to select one of the 11 sites of the Irr. Impr. Project (IIP) in old lands.

Issue (3)
Telemetry pilot project in Delta Barrage area.

Lessons learned

1. Attention should be paid for the accuracy of instruments & equipments.

2. Precautions should be taken to protect instruments & equipment as well as the Irrigation structure against abnormal conditions (vandalism, weather conditions,..etc.).

3. Funding should be available for long-term proper operation and maintenance.

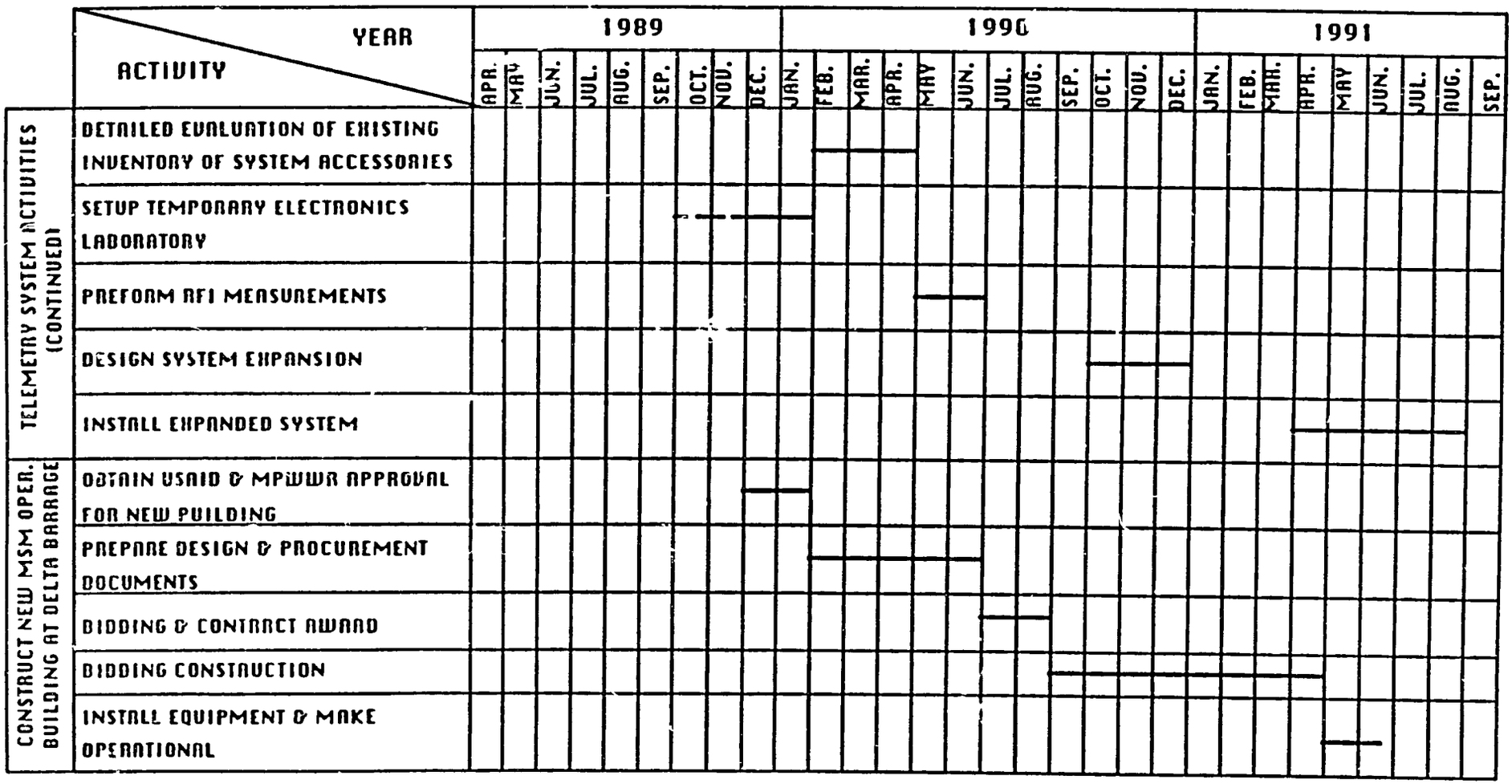
APPENDIX H

MSM LOP Workplan

MAIN SYSTEMS MANAGEMENT
COMPONENT 1 - TELEMETRY SYSTEM
LIFE-OF-PROJECT WORK PLAN

	YEAR / ACTIVITY	1989									1990												1991								
		APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
SITE PREPARATION ACTIVITIES	PROCUREMENT ACTIVITIES																														
	STILLING WELL FABRICATION																														
	SITE PREPARATION & INSTALLATION OF FACILITIES																														
TELEMETRY SYSTEM ACTIVITIES	TELEMETRY SYSTEM PROCUREMENT ACTIVITIES																														
	FABRICATE EQUIPMENT																														
	SHIPPING & CUSTOMS CLEARANCE OF EQUIPMENT																														
	INSTALLATION OF EQUIPMENT																														
	REVIEW SUPPLIERS DESIGN, DRAWINGS AND DOCUMENTATION																														
	SHOP INSPECTIONS																														
	THIRTY DAY FIELD TEST																														

MAIN SYSTEMS MANAGEMENT
COMPONENT 1 - TELEMETRY SYSTEM
LIFE-OF-PROJECT WORK PLAN



MAIN SYSTEMS MANAGEMENT
COMPONENT 2 - COMMUNICATION SYSTEM
LIFE-OF-PROJECT WORK PLAN

	ACTIVITY \ YEAR	1989									1990												1991								
		APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
LOCAL, DIRECTORATE - LEVEL SYSTEMS	SECURE RADIO FREQUENCIES FROM ARENTO																														
	ASSESSMENT OF DETAILED SYSTEM REQUIREMENTS																														
	EVALUATION OF SITES AND FACILITIES																														
	SYSTEM DESIGN																														
	PREPARE PROCUREMENT DOCUMENTS																														
	BIDDING & CONTRACT AWARD																														
	FABRICATION & DELIVERY, PILOT DIRECTORATE																														
	INSTALLATION OF PILOT DIRECTORATE																														
	FABRICATION & DELIVERY OF REMAINING DIRECTORATES																														

MAIN SYSTEMS MANAGEMENT
COMPONENT 2 - COMMUNICATION SYSTEM
LIFE-OF-PROJECT WORK PLAN

	ACTIVITY \ YEAR	1989									1990												1991								
		APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
BACKBONE MICROWAVE SYSTEM	EVALUATE ADEQUACY OF EXISTING ARENTO SYSTEM																														
	PREPARE CONCEPTUAL DESIGN & SECURE ARENTO CONCURRENCE																														
	PREPARE PROCUREMENT DOCUMENTS																														
	BIDDING & CONTRACT AWARD																														
	FABRICATION & DELIVERY																														
	INSTALLATION																														

MAIN SYSTEMS MANAGEMENT
COMPONENT 3 - WATER MEASUREMENT
LIFE-OF-PROJECT WORK PLAN

ACTIVITY \ YEAR	1989									1990												1991								
	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
NEEDS ASSESSMENT				—	—	—																								
PREPARE PROCUREMENT DOCUMENTS						—	—	—	—																					
BIDDING & CONTRACT AWARD										—	—	—																		
EQUIPMENT SUPPLY & DELIVERY													—	—	—	—	—	—												
TRAINING & DELIVER SYSTEM TO DIRECTORATES																			—	—										

MAIN SYSTEMS MANAGEMENT
COMPONENT 4 - INSTRUMENT MAINTENANCE ORGANIZATION
LIFE-OF-PROJECT WORK PLAN

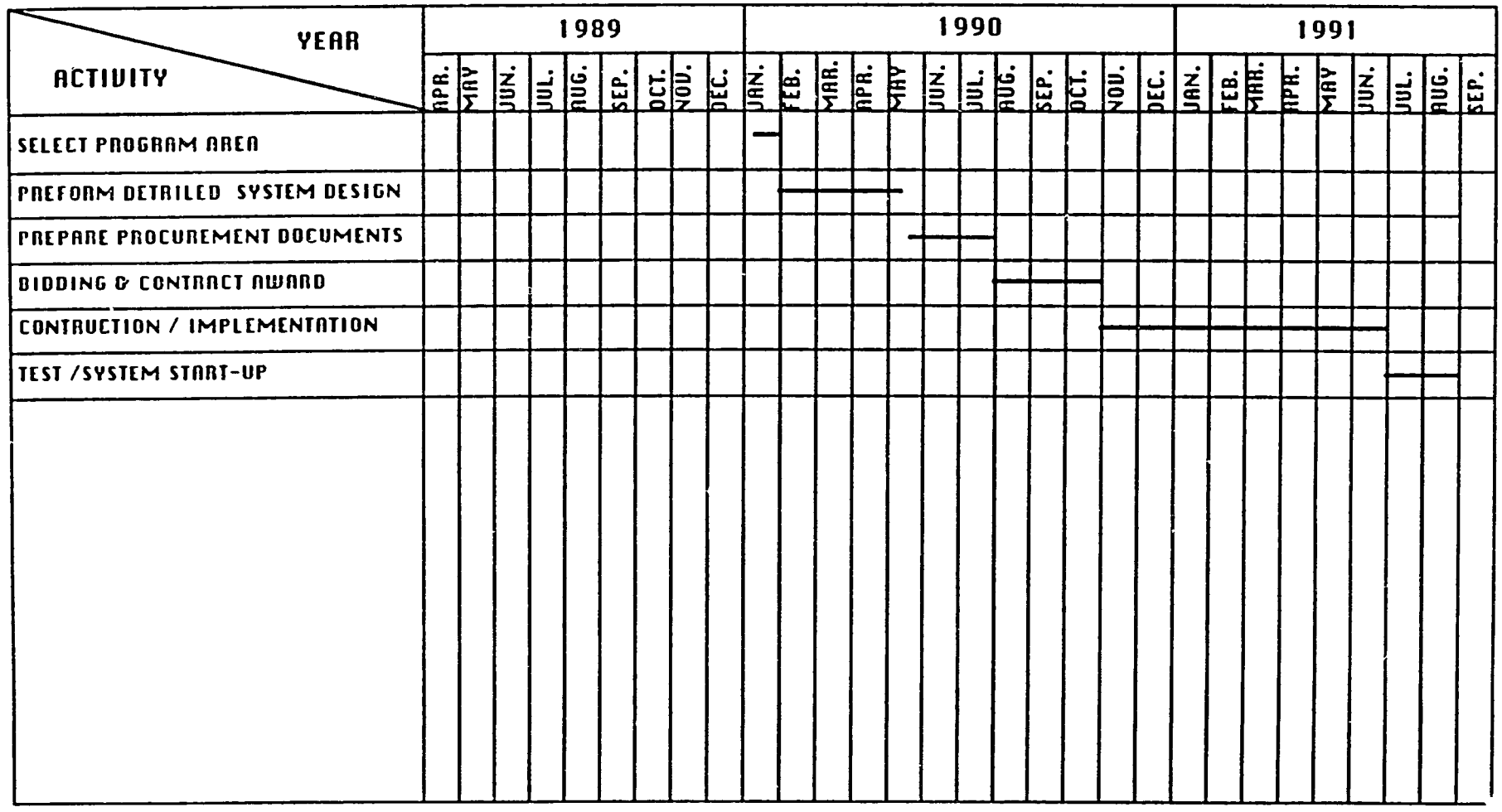
ACTIVITY \ YEAR	1989									1990												1991								
	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
IDENTIFY AND MOBILIZE STAFF																														
IDENTIFAY AND PROCURE TEST & REPAIR EQUIPMENT																														
MAKE TEMPORARY FACILITY OPERATIONAL																														
IMPLEMENT COMPUTERIZED INVENTORY SYSTEM																														
PERFORM TEST/MAINT. FUNCTIONS AS REQUIRED																														
MAKE PERMENENT FACILITY OPERATIONAL																														

MAIN SYSTEMS MANAGEMENT
COMPONENT 5 - DATA MANAGEMENT
LIFE-OF-PROJECT WORK PLAN

ACTIVITY \ YEAR	1989									1990												1991								
	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
FLOW DATA BASE MANAGEMENT SYSTEM																														
MISC. PROJECT SOFTWARE SUPPORT																														
COMPUTERIZED MAINTENANCE SYSTEM																														
COMPUTERIZED INVENTORY SYSTEM																														
DEPT. OF IRRIG. PRELIMINARY SYS.																														
FLOW DISTRIBUTION MODEL APPLICATION *																														

* TIMING IS DEPENDENT ON AVAILABILITY OF MODEL.

MAIN SYSTEMS MANAGEMENT
COMPONENT 6 - CANAL AUTOMATION
LIFE-OF-PROJECT WORK PLAN



MAIN SYSTEMS MANAGEMENT
COMPONENT 7 - TRAINING
LIFE-OF-PROJECT WORK PLAN

YEAR / ACTIVITY	1989									1990												1991								
	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
EVALUATE LOCAL FACILITIES & PREPARE NEEDS ASSESMENT																														
PREPARE TRAINING PLAN																														
PREPARE SYLLABUS FOR SHORT TERM COURSES																														
IMPLEMENT TRAINING PLAN																														

MAIN SYSTEMS MANAGEMENT

CONSOLIDATED LIFE-OF-PROJECT WORK PLAN

ACTIVITY \ YEAR	1989									1990												1991								
	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.
TELEMETRY SYSTEM																														
COMMUNICATIONS SYSTEM																														
WATER MEASUREMENT																														
INSTRUMENT MAINTENANCE ORGANIZATION																														
DATA MANAGEMENT																														
CANAL AUTOMATION																														
TRAINING																														

APPENDIX I

Draft First Year (1990) Training Schedule

DRAFT

FIRST YEAR'S SCHEDULE 1990

STARTING DATE - ACADEMIC TRAINING -OFF- SHORE (MS-DEGREE)

COURSES	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
CE/ HYDRAULICS												
WTR RESOURCE/ HYDROLOGY												
CE/HYDROLOGY												
CE/HYDROLOGY												
COMPUTER SCIENCE												
COMPUTER SCIENCE												
EE/CONTROL SYSTEMS												
EE/DIGITAL DESIGN												
MICROWAVE TRANSMISSION												
METEORBURST TRANSMISSION												

DRAFT

FIRST YEAR'S SCHEDULE 1990

STARTING DATE -OFF- SHORE NON- ACADEMIC TRAINING AND OBSERVATION VISITS

COURSES	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
MICROWAVE TRANSMISSION				—	—							
METEORBURST TRANSMISSION									—	—		
CONTROL SYSTEM											—	—
OBSERVATION VISITS					—					—		

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FIRST YEAR'S SCHEDULE 1990
IN-COUNTRY TRAINING -STARTING DATES (CONT.)

COURSES	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
OPERATION MAINTENANCE & REPAIR OF FIELD EQUIPMENT										—		
COMPUTER BASICS	—					—						
QUALITY CONTROL BASICS							—					
DATA BASE MANAGEMENT-I			—								—	
DATA BASE MANAGEMENT-II	—											
MSM TELEMETRY SYSTEM COMPONENT I				—								
ANALOG AND DIGITAL TRANSMISSION			—								—	
USING VOICE GRADE-LEVEL NETWORKING										—		
USE OF CODED FORMATS & PRESENT BINARY TRANSMISSION								—				
MODULATION FREQUENCY SHIFT KEYING									—			

DRAFT

FIRST YEAR'S SCHEDULE 1990
IN-COUNTRY TRAINING -STARTING DATES (CONT.)

COURSES	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
OPERATION MAINTENANCE & REPAIR OF FIELD EQUIPMENT										—		
COMPUTER BASICS	—					—						
QUALITY CONTROL BASICS							—					
DATA BASE MANAGEMENT-I			—								—	
DATA BASE MANAGEMENT-II	—											
MSM TELEMETRY SYSTEM COMPONENT I				—								
ANALOG AND DIGITAL TRANSMISSION			—								—	
USING VOICE GRADE-LEVEL NETWORKING										—		
USE OF CODED FORMATS & PRESENT BINARY TRANSMISSION								—				
MODULATION FREQUENCY SHIFT KEYING									—			

DRAFT

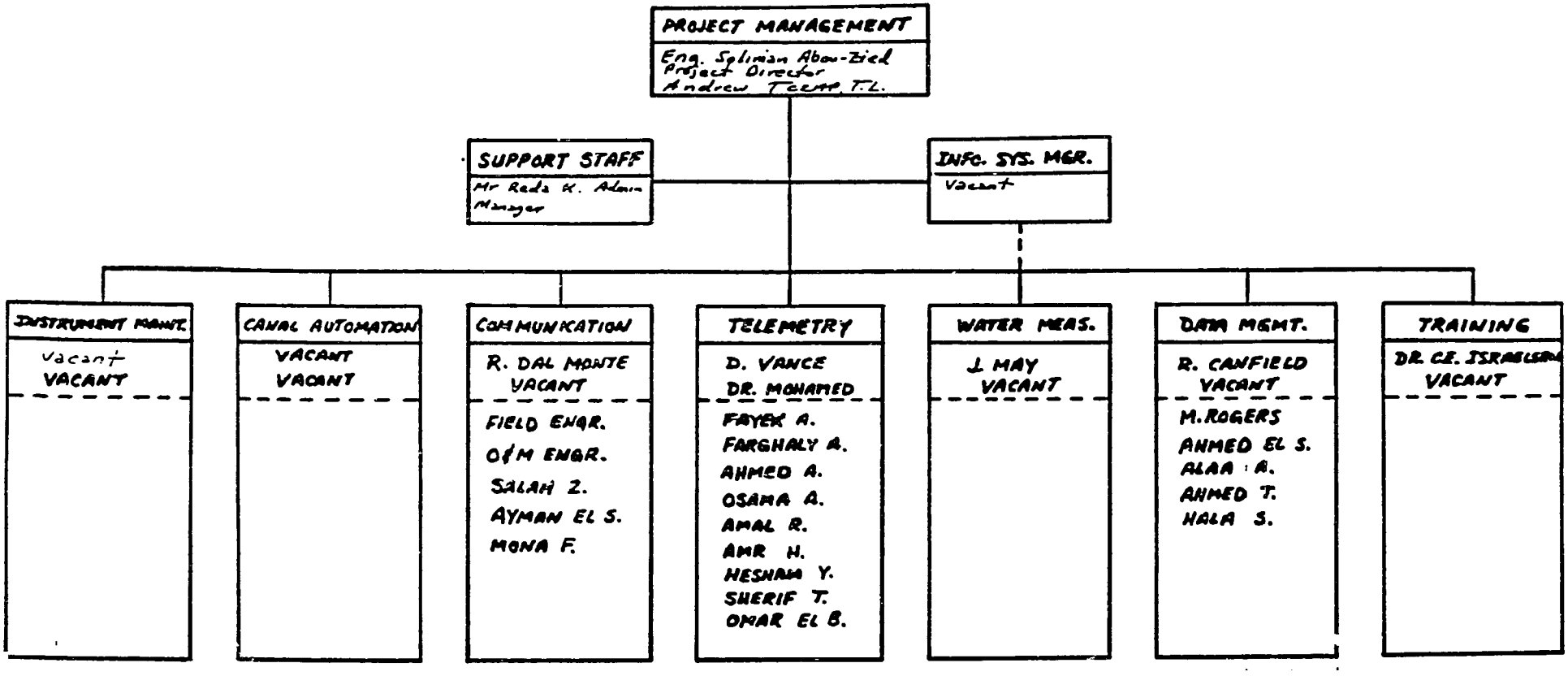
FIRST YEAR'S SCHEDULE 1990
IN-COUNTRY TRAINING -STARTING DATES

COURSES	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
WATER MEASUREMENTS					—		— —					
ANTENNAS AND ASSOC. EQUIPMENT		—										
INTERFACING (A-D & D-A)			—									
OPERATIONAL AMPLIFIERS INSTRUMENTATION				—								
TROUBLE-SHOOTING			—						—			
SIGNAL CONDITI-N3, GROUND LOPS & GROUNDING					—							
CONTROL SYSTEMS						—						—
MICROWAVES AND ANTENNAS		—						—				
DIGOTAL DESIGN COMPUTER NETWORK							—					
INSTRUMENTATION AND ANALOG SYSTEM						—						
OPERATION MAINTENANCE AND REPAIR OF TEST EQUIPMENT				—								

APPENDIX J

Project Organization-Implementation Phase
As of Nov,1989

IRRIGATION MANAGEMENT SYSTEMS PROJECT

MAIN SYSTEMS MANAGEMENT COMPONENT

PROJECT ORGANIZATION - IMPLEMENTATION PHASE as of 11/89