

R. Ashton

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PROJECT PAPER

Volume I

Egypt: Irrigation Management Systems
263-0132

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A A = Add
C = Change
D = Delete

Amendment Number
2

DOCUMENT CODE
3

2. COUNTRY/ENTITY

Arab Republic of Egypt

3. PROJECT NUMBER

263-0132

4. BUREAU/OFFICE

03

5. PROJECT TITLE (maximum 40 characters)

Irrigation Management Systems

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM ND YY
09 | 2 | 19 | 1

7. ESTIMATED DATE OF OBLIGATION
(Under "B" below, enter 1, 2, 3, or 4)

A. Initial FY 81 B. Quarter 2 C. Final FY 91

8. COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	16,860	25,140	42,000	150,000	190,000	340,000
(Grant)	(16,860)	(25,140)	(42,000)	(150,000)	(190,000)	(340,000)
(Loan)	()	()	()	()	()	()
Other U.S.						
1.						
2.						
Host Country	0	22,600	22,600	-	421,000	421,000
Other Donor(s)						
TOTALS	16,860	47,740	64,600	150,000	611,000	761,000

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ESE	133	064		93,000		92,000		340,000	
(2)									
(3)									
(4)									
TOTALS				93,000		92,000		340,000	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

022 032 053 070 252

11. SECONDARY PURPOSE CODE

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code
B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

Strengthening the capabilities and capacity of the MOI for planning, design, operation, and maintenance of the total irrigation system.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY
08 | 85 | 03 | 89 | 06 | 91 |

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page FP Amendment.)

The purpose remains as originally stated and there are no changes in the amendment not fully consistent with it.
Controller, USAID/Egypt, concurs with the methods of implementation and financing proposed herein.

William A. Miller, Controller

17. APPROVED BY

Signature

Frank B. Kimball

Title

Frank B. Kimball
Director

Date Signed

MM DD YY
03 | 30 | 87

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

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- M. Scope of Work for Preparing Required RFTP's and IFB's
- N. IMS Project-Target Benchmarks
- O. IMS Project Concept Paper and AID/W Response
- P. AID/W Response to Environmental Analysis

Note: The following Annexes are bound separately and are available in USAID/Cairo files.

- Q. National Irrigation Improvement Program Report
- R. Strategies for Irrigation Development in Egypt
- S. Training Assessment Report
- T. Water Research Center Work Plans

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GLOSSARY

ADB	African Development Bank
AGR	Agriculture
ARC	Agricultural Research Center
ASAE	American Society of Agricultural Engineers
BCM	Billion cubic meters
CAMD	Center for Agricultural Management Development
CID	Consortium for International Development
CIDA	Canadian International Development Agency
CIF	Cost, Insurance and Freight
CO	Chairman's Office
CRI	Coastal Research Institute
CSU	Colorado State University
DCP	Data Collection Platform
DRI	Drainage Research Institute
EEC	European Economic Community
EGSA	Egyptian Government Survey Authority
EMCIP	Egyptian Major Cereals Improvement Project
EPADP	Egyptian Public Authority for Drainage Projects
ERRAT	Egyptian Rice Research and Training Project
EWUP	Egyptian Water Use and Management Project
FAO	Food and Agriculture Organization (UN)
feddan	an Egyptian measure equal to 1.038 acres
FOB	Freight on-board
FRLC	Federal Reserve Letter of Credit
FNS	Foreign Service National
FX	Foreign Exchange
FY	Fiscal Year
GDP	Gross Domestic Product
GOE	Government of Egypt
GWRI	Groundwater Research Institute
HAD	High Aswan Dam
HB	USAID Handbook
HSRI	Hydraulics and Sedimentation Research Institute
IAS	Irrigation Advisory Service
IBRD	International Bank for Reconstruction and Development
ID	Irrigation Department
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IFB	Invitation for Bids
IIMI	International Irrigation Management Institute
ILD	Office of Irrigation and Land Development
IMF	International Monetary Fund
IMS	Irrigation Management Systems
IPSA	Irrigation Public Sector Authority
IRR	Internal Rate of Return
ISAWIP	Integrated Soil and Water Improvement Project

LE	Egyptian Pound
MACS	Mission Accounting and Control System
marwas	farmers' individual water delivery ditches
M&E	monitoring and evaluation
MED	Mechanical and Electrical Department
MERI	Mechanical and Electrical Research Institute
Mesqa	farmers' communal water delivery channel
MOA	Ministry of Agriculture
MOI	Ministry of Irrigation
MOP	Ministry of Planning
MPIC	Ministry of Planning and International Cooperation
NARP	National Agricultural Research Project
New lands	planned extensions of irrigation into new areas
NIIP	National Irrigation Improvement Program
NITI	National Irrigation Training Institute
NOAA	National Oceanographic and Atmospheric Administration
NPV	National Agricultural Research Project
NRIDCS	Nile River Irrigation Data Collection System
OFWM	On-Farm Water Management
OJT	On-the-job-training
PASA	Participating Agency Services Agreement
PECS	Public Excavation Companies
PFSU	Planning and Feasibility Studies Unit
PID	Project Identification Documentation
PIO	Project Implementation Order
PIS	Project Information System
PPD	Project Preparation Department
PLL	precision land leveling
PPU	Project Preparation Unit (predecessor of PPD)
PSA	Public Sector Authority
PSA	Procurement Services Agent
PSC	Personal Services Contract
RFTP	Request for Technical Proposal
RIGW	Research Institute for Groundwater
RIIP	Regional Irrigation Improvement Project
Saqla	animal powered water lifting device
SERI	High Dam Side Effects Research Institute
SRI	Survey Research Institute
SFPP	Small Farmer Production Project
SMRI	Soil Mechanics Research Institute
SMS	Subject Matter Specialists
SR	Structure Replacement
SRP	Salt River Project
TA	Technical Assistance
Tambour	Archimedes' screw
TDY	Temporary Duty
TMD	Training and Manpower Development
U/S	Undersecretary
UCA	Unit Command Area
UNDP	United Nations Development Program
USAID	United States Agency for International Development

USDH	United States Direct Hire
WB	World Bank
WCRI	Weed Control Research Institute
WDISRI	Water Distribution and Irrigation Systems Research Institute
WRDI	Water Resources Development Institute
WMP	Water Master Plan
WMS	Water Management Synthesis
WMSII	Strategies for Irrigation Development in Egypt
WPG	Water Planning Group
WRC	Water Research Center
WUA	Water Users Associations

Preface

This Project Paper consolidates information for previously approved activities, contained in the original Irrigation Management System Project Paper and its First Amendment. In addition this Project Paper provides further justification for expanded and new project components.

The Project: (1) continues assistance to the Structural Replacement and Project Preparation Department components; (2) expands the Regional Irrigation Improvement Program (RIIP), Preventive Maintenance, Main System Management, Professional Development, and Water Research Center components; and (3) initiates AID support to two components--Planning Studies and Models, and Survey and Mapping .

The PP (Volume I) provides a basic description of the project following the general guide lines of H.B.3 and summarizes studies and findings presented in the Annexes. If the reader is interested in more detail, Volume II provides 16 annexes supporting Volume I. In addition there are three annexes bound separately in four volumes that provide the results of supporting studies.

We wish to acknowledge the contractor assistance specifically hired for developing this Second Amendment to the Project Paper; Dr. Fletcher R. Riggs, Economist, for overall Project Paper coordination; Dr. Willis Shaner, Economist, for developing the RIIP economic model; Dr. Raouf Khozam and Richard Suttor, Economists, for analyzing the Internal Rate of Return and cost/benefit; and Ms. Karen B. Lisle, Editor/Word Processor Operator.

The Project Committee responsible for the clearance of the IMS Project are:

Harry Proctor, AGR/ILD
Thomas Clarkson, FM/FA
Michael Williams, LEG
David DuLavey, PPP/P
Fatma Naguib, HRDC/ET
Hiram Smith, IS/CMT
Bill Libby, DR/PS

SECOND AMENDMENT TO PROJECT AUTHORIZATION

Name of Country: Arab Republic of Egypt Name of Project: Irrigation Management Systems

Number of Project: 263-0132

1. Pursuant to Section 532 of the Foreign Assistance Act of 1961, as amended (the "Act"), the Irrigation Management Systems Project was originally authorized on August 27, 1981, and amended on July 3, 1984.

a. Paragraph 1 is amended to read as follows:

Pursuant to Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Irrigation Management Systems Project for the Arab Republic of Egypt involving planned obligations of not to exceed three hundred forty million U.S. dollars (\$340,000,000) in grant funds over a ten year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process to help in financing foreign exchange and local currency costs for the project. The planned life of project is ten years from the date of initial obligation (9/22/81 through 9/21/91).

b. Paragraph 3(b) is amended by adding the following new conditions, which shall be included in the Amendment to the Grant Agreement substantially as follows:

(3) Initial Disbursement for New Project Components under this Fourth Amendment. Prior to any disbursement, or the issuance of any document pursuant to which disbursement will be made for new project components, the Grantee shall, except as the Parties otherwise agree in writing, furnish to A.I.D. in satisfactory form and substance, the names and specimen signatures of persons authorized to act as representatives of the Grantee for these components.

(4) Additional Disbursements.

(a) Prior to any disbursement for construction under the RIIP component, the Grantee shall, except as the parties may otherwise agree in writing, issue a Ministerial Decree establishing a multi-disciplinary organizational structure for the RIIP component.

(b) Prior to disbursement for construction on individual selected RIIP areas, the Grantee shall, except as the parties may otherwise agree in writing, provide a feasibility report describing the problems in the area, proposed solutions, and the project's economic, social, and political feasibility.

c. Paragraph 3(c) is amended by adding the following new covenants, which shall be included in the Amendment to the Grant Agreement substantially as follows:

(8) Staffing. In addition to the agreement in paragraph 3.c. (2) regarding staffing patterns and recruitment efforts, the Grantee agrees (1) to appropriately strengthen the multi-disciplinary staff required

for RIIP implementation; (2) to increase maintenance staffing in appropriate units of the MOI, including (a) strengthening the Office of Undersecretary, Irrigation Sector, Maintenance to have the capability to plan and execute a preventive maintenance program throughout Egypt; (b) adding a staff level Chief Engineer for maintenance in the office of U/S for Irrigation in each Governorate responsible for maintenance; and (c) adding an engineer to the staff of each irrigation district to be responsible for managing maintenance activities in the District; and (3) to make a special effort to recruit and maintain the highly technical staff required for successful implementation of the Project Planning Department and Main System Management (Telemetry) components.

(9) Cost Recovery. The Grantee agrees to develop and implement a cost recovery program, mutually acceptable to the parties, by December 1988 to collect all or part of the operation and maintenance costs of the irrigation system and 100 percent of the site specific costs of mesqa and on-farm improvements. The development and implementation of such a program will include, but not be limited to; (1) the technical aspects of a cost recovery program; (2) preparation and proposal of necessary legislation to the Assembly; and (3) issuances of the necessary decrees and other relevant documentation for implementation of a cost recovery program.

(10) MOI/MOA Collaboration. The Grantee agrees (1) to develop and issue appropriate decrees defining the roles of MOI and MOA in mesqa improvement and on-farm development related to irrigated farming, and (2) to establish technical, local coordination, and other committees required for project implementation.

(11) Water Users Associations. The Grantee agrees to develop the necessary procedural and legal requirements; propose necessary laws to the Assembly; and issue the necessary decrees for establishing Water Users Associations.

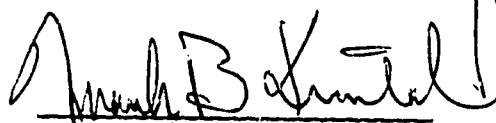
(12) Planning and Operational Models. The Grantee agrees to supply to USAID on an annual basis, a report that compares irrigation system operation under present procedures with various improved models that have been developed and tested over the last several years by the Water Planning Group. This report will provide recommendations on how to facilitate the acceptance of utilizing the improved models.

(13) Authority for NIIP. The Grantee agrees to establish an authority to carry out the activities of NIIP by 1990. The authority will be of the same status of the present Drainage Authority and be created with a multi-disciplinary technical staff including engineers, economists, sociologist, and agricultural scientists as well as essential support staff.

(14) Public Sector Companies. The Grantee agrees that no claims for reimbursement will be made for construction activities carried out by public sector companies. This agreement affects all new contracts awarded after the approval of this amendment.

2. Based on the justification set forth in Annex E to the Second Project Paper Amendment, I hereby waive Handbook requirements by: (a) allowing procurement of small quantities (approximately two percent of the total construction cost or \$2,000,000) of non-free world origin shelf items such as cement and reinforcing bars, and (b) authorizing the procurement of up to \$150,000 of lightweight motorcycles from Code 935 countries.


3. The authorization cited above remains in force except as hereby amended.



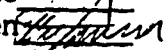
Frank B. Kimball
Director, USAID Egypt

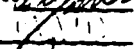
March 30, 1987
(Date)

Clearances:

DD: AHandly 

AD/PPP: GLaudato 

AD/AGR: WJanssen 

LEG: MWilliams 

AD/FM: WMiller 

DR/PS: FMiller 

DR/PS: JStarnes 

CERTIFICATION PURSUANT TO SECTION
611 (e) of FAA 1961 AS AMENDED

Background:

The Irrigation Management System Project (263-0132) is intended to strengthen the capabilities and capacity of the Ministry of Irrigation for planning, design, operation, management, and maintenance of the irrigation system. The result will be to improve the operating efficiency of the agricultural irrigation system and remove key constraints to increased production.

The project has and will continue to finance technical assistance, construction, equipment and training. \$139.5 million has been authorized to date and \$93 million has been obligated. This amendment will bring the authorized level to \$340 million.

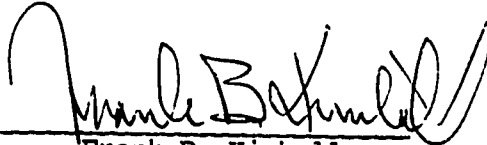
Justification:

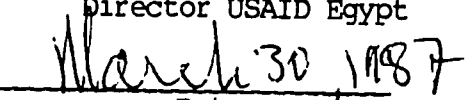
The MOI has demonstrated its capability to install, maintain, and utilize previously AID financed activities under the IMS project and the Egyptian Water Use and Management project. \$70 million has been disbursed on these activities and the relevant structures and vehicles are being properly maintained and the TA and training is being effectively utilized.

Under the expanded program the MOI has increased their Chapter I and II funding levels to assure proper maintenance of existing and improved systems. In addition, the Project provides TA and equipment to focus on improving the MOI's capability to manage and maintain the entire irrigation system.

Certification:

I, Frank B. Kimball, Director, the principal officer of the Agency for International Development in Egypt, having taken into account among other things, the maintenance and utilization of projects in Egypt previously financed or assisted by the United States, do hereby certify that in my judgement Egypt has both the financial capability and the human resources to effectively install, maintain and utilize the capital assistance to be provided for the successful implementation of the Irrigation Management System Project.



Frank B. Kimball
Director USAID Egypt


Date

I. Summary and Recommendations

- A. Project Title: Irrigation Management Systems (IMS) Project
- B. Project Number: 263-0132
- C. Source of funds: Economic Support Fund
- D. Amount of Total Project Grant: \$340 million consisting of:

\$42 million original Project Authorization	8/27/81
\$97.480 million authorization increase	
First Amendment	7/3/84
\$200.520 million increase Second Amendment	(proposed)

E. Obligation Schedule:

Through FY86	\$93 million
Proposed FY87	\$92 million
Proposed FY88	\$76 million
Proposed FY89	\$56 million
Proposed FY90	\$23 million
Proposed FY91	\$ 0 million
Total	\$340 million

- F. Terms: Grant to Government of Egypt
- G. Grantee: Government of Egypt
- H. Primary Coordinating Agencies: USAID/Cairo and the Ministry of Irrigation
- I. Implementing Agency: Ministry of Irrigation
- J. Life of Project: Ten years (Original Grant signed 9/22/81 and this Amendment will extend the PACD to 9/21/91).
- K. Project Goal: To improve the control of Nile waters for all uses and particularly their optimal allocation to and within agriculture as a means of helping production and productivity.
- L. Project Subgoal: To improve the operating efficiency of the agricultural irrigation delivery and drainage system in Egypt.
- M. Project Purpose: Strengthening the capabilities and capacity of the MOI for planning, design, operation, and maintenance of the total irrigation system.
- N. Environmental Soundness of Project: A considerable amount of historical data exists regarding the environmental impacts of irrigation projects in Egypt. General indications are that the overall impact of the project upon the environment will be positive. An environmental assessment will be prepared in accordance with the requirements of 22 CFR 216, "AID Environmental Procedures", to address environmental issues.

O. Purpose of Project Paper Amendment: This Project Paper Amendment is being prepared to clarify the GOE and USAID responsibilities under the IMS Project, expand the scope of some of the existing project components, and add two new components. These changes will result in removing constraints to improving agricultural production on the old lands of Egypt.

P. Project Summary: The IMS Project was originated in 1981, and expanded 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 consists of technical and capital assistance for the planning, design, construction (rehabilitation) and management of Egypt's irrigation system.

The amended project will consist 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 MOI through continued research, training, and improved data base.

The revised life of project funding for the 10 project components as a result of this amendment are as follows:

Component	('000)	USAID \$	GOE \$ L/C	TOTAL \$
Regional Irr. Improv. Project		105,900	180,925	286,825
Structural Replacement		76,055	124,840	200,895
Preventive Maintenance		39,845	50,741	90,586
Main System Management		32,272	1,301	33,573
Planning Studies and Models		5,365	812	6,177
Professional Development		11,776	15,363	27,139
Water Research Center		32,138	16,603	48,741
Project Preparation Dept.		10,725	748	11,473
Survey and Mapping		6,067	12,179	18,246
Misc.TA & Commodity Proc.		5,711	0	5,711
Subtotals		325,854	403,512	729,366
Contingencies		14,146	17,141	31,287
Grand Totals		340,000	420,635	760,635

Q. Section 611 (a and b) Considerations: Prior to the initiation of the IMS Project in 1981 an analysis indicated that the Section 611 (a and b) requirements as set forth in the Foreign Assistance Act would be met. Five years of implementation experience has confirmed that analysis. The technical, economic and financial analyses presented in this amended Project Paper, along with the revised Implementation

Plan, have identified the specific interventions required in the irrigation subsector. The costs and benefits of each intervention have been computed, insofar as practicable, in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning act (42 U.S.C. 1962, et seq.) or acts amendatory or supplementary there to.

No further legislative action on the part of the GOE, other than that specified in the "Conditions and Covenants", is required for Project implementation.

- R. Issues: The USAID/Project Committee felt that the following three issues should be brought to the attention of the Director:
1. The current system for disbursement of funds for construction is based on the "percentage of actual cost reimbursement" procedure of FAR and not the "pure" FAR system as outlined in AID Handbook 3, Annex J. The Project Committee reviewed the current procedure and concluded that it should be continued based on the following: (1) the current system is working well, (2) all parties are familiar with the documentation required, (3) to change systems at the mid point of the LOP would be difficult and confusing, and (4) the current system does utilize the FAR system.
 2. The level of funding available for obligation in FY 87 and 88 is insufficient to fully fund TA and PSA contracts. The obligation levels as shown in the PP will require that most contracts only be partially funded and amended each year to add funds as additional obligations are made. The Project Committee recognizes that it will increase the Mission's work load, especially AGR/ILD and IS/CS, but higher level of obligations may not be feasible considering overall Mission needs.
 3. The issue of cost recovery was debated at length and no resolution reached. DR/PS felt that the cost recovery programs should be implemented early in the project thus providing the MOI funds to supplement their O & M budget receipts from the GOE. The GOE would have to issue regulations to increase land tax collected by Governorates or allow MOI to collect the O & M charges and place them in a special fund. It was argued that unless a system is developed and put in place early on, it will never happen because USAID involvement will end in 1991.

The PP proposes setting up a system to start collecting the full capital costs of the mesqa improvements by 1990 and development of a system to begin collecting water charges for O & M after 1991. AGR/ILD stated that insufficient information is currently available to initiate a system at this time and several years will be required to develop a system, test it, develop the legal structure, and put it in place.

Studies by USAID, FAO, and IBRD conclude that two elements must precede initiation of water charges. One is to establish the necessary legal framework and to determine the appropriate level of charges. The second is to provide the farmers with a proven reliable system so that they will see the value of their investment. The IMS project will provide both elements during the next five years of implementation. Furthermore, if the project is successful, USAID will most likely continue its involvement in irrigation beyond 1991 and therefore have a direct impact on implementing the overall cost recovery mechanisms developed.

4. In all Project Committee meetings the question of the overall agricultural policy issues were discussed. It was concluded that this project would not be tied directly to the overall agricultural policy issues outside the control of MOI. However, as the impact of the IMS project will be greatly enhanced by improved agricultural policies, they have been included as a key assumption in the PP and the logical framework.

S. Recommendations: The USAID/Cairo Project Committee recommends that:

1. The LOP authorization be increased from \$139.48 million to \$340.00 million. This increase will basically be used to fund the U.S. dollar costs of expanded technical assistance, commodities, training, and local currency costs for major construction activities.

The GOE's contribution increases from the dollar equivalent of \$248 million to \$421 million.

2. An obligation of \$92 million or more be made in FY 87 to continue the current program and initiate the expanded activities.
3. Extend the PACD to September 21, 1991, making the total LOP ten years.

T. Resolution of Issues: The USAID/Cairo Executive Committee met on March 11, 1987, resolved all outstanding issues, and approved the Project. The issues raised under section R were resolved as follows:

1. Proposed FAR systems is acceptable.
2. FY87 Obligation level will be based on project needs for 18 months of operation.
3. Cost recovery schedules moved up to December 1988.
4. Overall agricultural policies are not to be directly linked to this project.

II. Background

A. Introduction

This Project Paper Amendment is being prepared to clarify the GOE and USAID responsibilities under the Irrigation Management Systems (IMS) Project (263-0132), expand the scope of the existing project components, and add two new components.

In July of 1981 the Minister of Irrigation (MOI) requested USAID assistance in rehabilitating the irrigation systems and to strengthen MOI's capacity to operate, maintain and plan for the irrigation network. USAID, with the assistance of MOI and the IBRD, developed a Project Paper in 1981 for \$112 million for six components. The major component (\$92 million) was for structural replacement (SR). The project was authorized at \$42 million, and those funds were provided primarily to accelerate structural replacement in five directorates and to strengthen the planning and management capacity of the MOI. Supplemental funding beyond the initial obligation was conditioned on successful MOI management in eliminating the SR backlog in the five directorates. Based on the first two years of implementation and an evaluation of the SR component, the project was amended in June 1984. The SR component was increased to \$93 million and expanded country wide to 19 Directorates. Three additional components were also added bringing the total authorization to \$139.5 million and the PACD was extended to July 31, 1987. The current PACD is July 31, 1989.

Since the beginning of the project the SR sub-project has been evaluated periodically and an overall mid term evaluation was carried out for the IMS Project in September 1985.

In January 1986 a report was prepared by the USAID Water Management Synthesis II Project, "Strategies for Irrigation Development in Egypt" (Annex R) which, along with the evaluations, formed the basis for USAID's approval of a Concept Paper (Annex O) to further expand the IMS Project. The Concept Paper proposed the addition of two new components, expansion of others, a total increase in the authorization of \$200 million, and extension of the PACD to September 21, 1991.

The following table provides a summary of the components and their previous and proposed funding levels.

	<u>Previous \$ mil</u>	<u>Proposed \$ mil</u>
1. Regional Irrigation Improvement Project	6.7	105.9
2. Structural Replacement	92.7	76.1
3. Preventive Maintenance	0.4	39.8
4. Main System Management	4.3	32.3
5. Planning Studies and Models	0	5.4
6. Professional Development	2.8	11.8
7. Water Research Center	18.3	32.1
8. Project Preparation Department	10.0	10.7
9. Survey and Mapping	0	6.1
10. Miscellaneous Technical Assistance & Commodities	4.4	5.7
Contingencies		14.1
	<u>139.5</u>	<u>340.0</u>

B. Egypt's Irrigated Agricultural System^{1/}

1. The Agricultural Production Plant

Egypt has one of the richest endowments of natural resources in the world. It has a year-round favorable climate with three cropping seasons, fertile soils; and an abundant and 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 greenhouse where: temperatures seldom, if ever, fall to the freezing or frost level; there is almost continuous sunlight; photo-periods 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.

Historically, agriculture was the dominant sector in the Egyptian economy, providing the bulk of employment and output crucial to foreign exchange earnings, and received substantial budgetary support. The sector maintained its strong performance during the 1960's. Agricultural production grew at over three percent annually--an exceptional performance, given the relatively high base level.

In the 1970's, the pace of growth declined to around two percent. Given that the high growth rates of the previous decade included the impact of controlled releases of water from Aswan, this does not reflect a significant change in the underlying growth trend and is still an impressive performance. However, other factors accentuated the slow down in agricultural growth: first, population continued to grow over 2.5 percent; second, per capita income grew very rapidly, and third, consumer prices for foodstuffs were artificially held to extremely low levels compounding the demand increases generated by the first two factors.

The net effect of these trends is summarized in the following Table.

	<u>1960</u>	<u>1974</u>	<u>1981</u>
Share of Agriculture in value added (%)	28	25	20
Agricultural Exports as % of total Exports	33	25	9
Agricultural Trade Balance (US\$M, current prices)	255	300	-2,500
Self-sufficiency (%) in major products:			
Wheat	70	37	25
Rice	144	111	102
Sugar	114	96	53
Lentils	92	81	6
Cotton	400	232	150
Meat	95	99	73
Milk	94	93	62
Population Index	100	138	170

^{1/} Abstracted from joint UNDP/FAO/World Bank Report on "Review of Technical Assistance Requirements of the Agriculture and Food Security Sector," January 1986.

2. The Irrigation and Drainage System

a. The Overall System

The irrigation delivery system with its single source of supply running the full length of the country appears deceptively simple. However, with its two dams at Aswan, seven large barrages (diversion dams) on the 1,200 km of river below Aswan, 31,000 Km of public canals (some discharge up to 1,000 m³ sec), approximately 80,000 Km of mesqas^{2/} and farm drains, 560 large public pumping stations, over 17,000 Km of public drains, 450,000 saqias,^{3/} small pumps, and over 22,000 water control structures, the system is extremely complex. It provides water for 5.8 million feddans, 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).

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 offtake 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 1900s-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. As of June 1984, some 2.6 million feddans have been provided with subsurface drainage and improved open drain systems. This figure is increasing annually at about 170,000 to 200,000 feddans.

The MOI 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 (See Annex H-Administrative Analysis).

The MOI 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 MOI 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.

b. 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

^{2/} A mesqa is a private ditch serving from 10 to 300 feddans and 10 to 200 farmers.

^{3/} A saqia is a water wheel to lift water.

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 x 10 m. These basins enable the farmer to control the on-farm irrigation systems, and permit a fairly uniform application of water even on unlevelled 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. When farmers have no need for water or at night, water flows to the drain.

3. Water Resources

Egypt's agriculture is almost entirely dependent on water from the Nile River stored behind the High Aswan Dam in Lake Nasser. Annual rainfall in Egypt ranges from 10 to 20 cm. along the Mediterranean Coast, to 1.5 cm. at Cairo and 0.5 cm at Aswan. These levels are insufficient for significant rainfed agriculture in Egypt. The average annual net inflows that can be used by Egypt from the Nile River into Lake Nasser is 55.5 billion m³ ^{4/}, 84 percent of which comes from Ethiopia and the Blue Nile and the remainder from the White Nile. The High Aswan Dam's usable storage capacity of 102 billion m³ gives Egypt complete control of the flood flows of the Nile.

During high runoff years such as 1969-75, excess net inflows beyond the 55.5 billion m³ are stored behind the dam. During dry years, such as the 1982-85 African drought, the net inflows are less than 55.5 and the storage levels are drawn down. The current level of the reservoir is so low that power generation is being restricted. Two additional years of drought at this time could cause the usable reservoir storage to completely drain out stopping power production and reducing water available for all uses.

The quality of irrigation water is excellent. Total dissolved solids of the Nile River at Aswan range from 175 to 180 mg/l, it increases to 200 to 210 at the Delta Barrage (Cairo), is 310 to 460 at Damietta; and 300 to 400 at Rosetta. Drainage water quality in many areas of the Nile Valley is only slightly lower than canal water quality except during the winter closure. This reflects the fact that a great proportion of the water in the delivery system flows directly to the drains.

4. Water Supply/Demand

Adequate supplies of water, in the aggregate, are generally available and most farmers irrigate only during the daytime even though canals

^{4/} Egypt's share of the Nile waters in accordance with agreements with Sudan.

and ditches run full all night during the "on" period of the rotation cycle. For most areas and for most purposes, the system provides limited control capability. When water is on in a given channel it flows at full capacity throughout the "on" period of the rotation irrespective of the quantity of water being diverted (lifted) by farmers onto their fields. This characteristic has not been a serious problem since the High Dam, until recent years, had made water available in excess of requirements. The result is that the former traditional scarcity of water was relieved and thus no longer encouraged exercise of discipline in water control and management. In 1984 this situation changed as the irrigation crop needs (consumptive use) matched the available supplies that could be delivered to the farm at the current overall water delivery efficiencies of approximately 55 percent.^{5/} In 1986 the irrigation demands exceeded the ability of the delivery system to adequately respond resulting in a deluge of farmer complaints to the MOI.

The GOE/MOA are in the process of developing improved policies and extension programs that will result in the ability of the farmers in the existing irrigated areas to significantly improve agricultural production. This will result in increased demands for water at the farm gate in the old lands that the current delivery system will be unable to respond to. The Agricultural Production Credit Project (263-0202) and the National Agricultural Research Project (263-0152) focus on these policies.

C. Sector Problems

The problems in the agricultural sector that are constraining future agricultural growth can be placed in the following categories:

1. A conglomeration of policies and controls over the agricultural sector that impede optimal resource allocation to, and within, the sector;
2. Population growing at a rate of about 2.8 percent per year, making the ratio of population to arable land among the highest in the world;
3. Limited fertile land base (old lands) that is being reduced by waterlogging, salinity, uneconomical farm operations, and urbanization;
4. Inefficient water management resulting in high water tables, salinity increases, and water logging in many areas;
5. Agricultural production increases on the existing irrigated lands limited due to poor management and application of water at the farm level and the inability of the existing irrigation system to meet the future needs of the farmers; and
6. A weakness in the GOE agricultural planning and managerial capability.

This project will focus on the last four constraints listed above. These constraints are discussed in detail in Annexes Q and R and can be translated into the following specific problems with the irrigation system: (1) Physical (Infrastructure); (2) Managerial (Physical system and personnel); (3) Technical (staff need to be updated on modern irrigation technology); (4) Support services (research, project planning, design, and survey); and (5) Institutional.

^{5/} Irrigation and overall water use efficiencies provided by the MOI Water Master Plan Unit.

The physical system suffers from a change in its basic function and from age. The commissioning of Lake Nasser changed the function of the canal system from spreading flood water to supplying irrigation water to crops throughout the year. It also changed the channel maintenance requirements from principally salt removal to control of aquatic weeds. This shift requires different planning and design procedures, different control structures and machinery, and the application of new techniques. Currently the irrigation distribution system does not have enough control structures nor the physical capability to respond to the needs of modern agriculture. The existing system is unable to provide the water to the crops on a timely basis and in the quantities needed. In addition, approximately fifty percent of the existing structures have served out their useful life and need to be replaced. The MOI is in the process of improving the system and the IMS project is designed to improve and accelerate the process.

The management of the physical system and the personnel that operate it lack the information and tools required to efficiently run the system. Efficient operation of the system, which includes the canals, the Nile river, and Lake Nasser, requires timely and accurate translation of crop water needs to flow distribution requirements. Timely flow distribution requirements are needed throughout the canal system, at each of the barrages and pumping stations, and at the High Aswan Dam. To provide the information needed to manage the irrigation system, a comprehensive data collection, analysis, and dissemination system is required. The MOI has started such a system through the IMS project with the telemetry component and through the UNDP Water Master Plan project. These efforts will be expanded and completed under this amendment.

The technical capabilities of the MOI staff need to be improved and updated on the use of appropriate technology to improve the functioning of the water distribution system. Professional staff development is needed at all levels within MOI on a wide range of technical and managerial subject areas. Over 60 subject matter areas have been identified (Annex S) for intensive training of MOI staff over the next few years under the IMS project.

To provide adequate and timely implementation of structural and management improvements to the irrigation system, vital support services are required. These include research, project planning, design, and survey support. Continued research on economical ways to improve the effectiveness and acceptability of improved on-farm irrigation techniques and of the irrigation distribution systems' operation as the supply and demand equations change. Improved planning and design techniques, along with accurate survey information, are required to apply the research findings on a large scale. These support elements within MOI need to be strengthened to assure that the IMS project meets its objectives.

The last of the six problems stated above is institutional. The current benefits to MOI staff (salary, incentives, housing, health, training, etc) are inadequate to obtain maximum performance from the staff. There is also insufficient interorganizational communications between units within MOI as well as with units of MOA where collaboration is essential to improve distribution and on-farm water use. In addition certain organizational improvements are required, mainly for the irrigation improvement and preventive maintenance programs, to effectively improve the overall irrigation system.

D. Agricultural Development Strategy

1. GOE Strategy

The GOE strategy for removing the constraints listed in Section C above, as reflected in the current 5-year plan, focuses on increasing agricultural productivity through vertical expansion and higher cropping intensity; development and dissemination of new technology and improved water distribution; horizontal expansion through new lands reclamation; integration of vertical and horizontal expansion and coordination of all projects and decisions of relevance to the agricultural sector; a system for pricing agricultural outputs and inputs that allows prices to perform their real functions in the allocation of resources; reducing crop losses in the marketing and processing channels; and improving physical and social infrastructure in rural areas. The investment program is consistent with this strategy but has generally overemphasized lower productivity horizontal expansion and the GOE has, of yet, failed to let prices perform their real function.

2. USAID's Strategy

USAID's views on the constraints and the overall strategy for agricultural development in Egypt are not substantially different from that of the GOE. However, USAID considers pricing policy, explicit controls over agricultural production and sale by the GOE, inadequately planned horizontal expansion through new lands development, and the lack of private sector involvement in providing services and inputs to farmers as major factors in the disappointing performance of the sector. This view has brought about a decided shift in USAID strategy from agricultural production technology development and dissemination to farmers toward a focus on policy dialogue with the GOE in order to encourage certain policy changes. All of AID's resources touching on the agricultural sector--PL 490, fertilizer plant loan, agricultural research, agricultural credit, and irrigation--currently totalling \$800 million are used as foray for the policy dialogue.

USAID and GOE, through the policy dialogue, have identified a number of specific agricultural policy changes, and their expected financial consequences, that will vastly improve the overall performance of the agricultural sector. These policy changes in the agricultural sector and related benchmarks of progress are still evolving. They are focused on elimination/reduction of GOE compulsory crop procurement; adjustment of cotton exchange rates and increased cotton procurement price; liberalization of red meat imports; raising fertilizer prices and legalization of private sector imports; reduction of maize subsidies and maize imports; elimination of government and cooperative marketing monopolies on crops and legalization of imports; and increased crop loan interest rates.

The Project as a whole, by creating an improved supply of water for farmers, directly supports programs being developed for the introduction of improved agricultural production packages through strengthened and intergrated research and extension services of the Ministry of Agriculture.

In addition to the above agricultural sector reform actions, certain policy reforms are needed which relate to the irrigation sector. The major policy areas are listed below with appropriate annual benchmarks of progress presented and discussed in the Implementation Plan.

- (1) Staffing for certain components
 - adequate staff must be assigned to various MOI units to enable them to carry out their responsibilities.
- (2) Incentive program
 - an appropriate incentive structure must be adopted to enable the MOI to recruit, mobilize and retain quality technical staff.
- (3) Cost recovery
 - mechanisms must be developed to generate revenue for operation and maintenance of the irrigation systems, and to recover the capital improvement costs of improved mesqas.
- (4) Improved coordination
 - the activities of the MOA and MOI must be coordinated to enable them to meet the needs of irrigated farms.
 - activities at the field level and between Departments within MOI require improved coordination to maximize project benefits.
- (5) Maintenance planning
 - procedures must be adopted to assure timely maintenance to protect irrigation investments and to assure dependable water deliveries to farmers.

From the above the USAID irrigation subsector strategy has evolved with five basic elements. The first element of the strategy is to design a project of sufficient scope, and magnitude of resource commitment by AID, that it becomes a significant factor in the overall management of the MOI.

Second, is to finance the essential foreign exchange and other capital budget items that are key to improving the effectiveness of the MOI. Removing these financial constraints will accelerate the accomplishment of the objectives/outputs for each component.

Third, is to involve MOI staff and organizational units in actions and activities that focus on the total irrigation system rather than just the water delivery system. This more balanced approach should result in higher productivity. More attention will be placed on the mesqa and farm level needs.

Fourth, because of the complex nature of the overall irrigation system, the Project will bring to bear the most appropriate technology in each of the project components.

Fifth, is to apply modern concepts of irrigation management. These are bottoms-up oriented, focusing attention on mesqas and farm level problems, in contrast to the top down approach which delivers water to the physical capacity of the distribution system without consideration of farm level requirements. This is a major change in current MOI philosophy, and day-to-day irrigation systems operation and is, therefore, a difficult and time consuming change for the MOI and USAID to bring about. The need for such a philosophical change, if on-farm water management is to be improved, was a conclusion of the 1985 IMS evaluation.

Consistent with USAID's interest in agricultural sectoral reform as well as related irrigation reform issues, an annual ministerial level review meeting will be held involving the MOI, MOA, MPIC, MOP, the Director of USAID, and appropriate staff, to assess performance in both the irrigation and agricultural sectors and review progress towards meeting the Target Benchmarks defined in Annex N. Emphasis will be on major policy reforms, and focused

specifically on GOE performance in achieving the agricultural sector reforms and irrigation policy benchmarks listed above. A positive performance by the GOE can substantially increase the level of AID resources available for use in the agricultural sector. The IBRD and IMF resources for the agricultural sector are targeted on the same major policy reforms.

In summary, USAID 's strategy is to maintain strong encouragement to the GOE for certain policy reforms and at the same time support the key elements in GOE's agricultural development strategy--the creation and dissemination of new agricultural technology; improvement of the River Nile irrigation distribution system, and a farmer responsive agricultural credit system.

E. Other Donors

There are a large number of donors and donor assisted projects/activities for the development of Egyptian agriculture. A number of these relate specifically to the irrigation systems and some have been developed with USAID collaboration. This section briefly describes current donor projects and discusses collaboration with USAID, where it exists.

1. IBRD

The World Bank is currently implementing/planning several projects that impact in various degrees on the IMS Project.

a. Channel Maintenance

The IBRD has completed its final appraisal of the Channel Maintenance Project. The agreement is being discussed with the GOE and will be a loan of \$70 million. The Preventive Maintenance component of this Project Amendment is intended to complement the IBRD/MOI program. USAID has identified, in collaboration with IBRD and MOI, the items in the Bank's appraisal report that could receive AID financing. USAID proposed financing of selected private sector oriented equipment and the Technical Assistance and Training would involve close collaboration with the Bank but not formal co-financing. Technical and other information about the Preventive Maintenance component are contained in Annex F.

b. Planning Studies and Models

The IBRD has participated in the assistance program for the Water Planning Group as the executing agent for the UNDP which has provided the financing. This will be discussed in more detail under UNDP activities.

c. PPD

During the early stages of the IMS PP development, a joint review mission between the IBRD and USAID agreed to both providing support to the PPD. After the TA contractor was selected, IBRD entered into a separate agreement with MOI to fund two additional resident staff of the selected contractor to provide a stronger team in the area of economic evaluation. That support is still ongoing.

d. Other Projects

The IBRD Drainage Project complements the improvements proposed for the RIIP program, SR and Preventive Maintenance. Agreements totaling \$178 million for the completion of underground drains covering 3.1 million feddans by 1988 have been implemented with 1.1 million feddans yet to be completed.

The Second Agricultural Development Project which finances integrated farming packages will also complement improved water distribution and management to be created through the IMS Project.

2. UNDP

The UNDP will be providing assistance to the Water Planning Group and the Water Research Center during its upcoming Fourth Cycle of assistance to the GOE. The UNDP is also financing (IBRD executing) detailed planning studies for eight RIIP canal command areas.

a. Water Planning Group (WPG)

The UNDP initiated assistance to the WPG in 1977. The current set of models and programs was developed during Phases I and II of UNDP assistance (1977-84). Phase III (1985 and 1986) focussed on transfer of the planning models to operational models and delivering them to the concerned Ministries and Authorities, but this has not yet been fully achieved. UNDP assistance was to have been phased out with Phase III but a small amount (\$250,000) of funds are proposed for additional work on Phase III and in particular the transfer and use of the models by appropriate parts of MOI and other agencies.

USAID has taken over as the primary funder of the WPG activities described in Annex F, but will continue close collaboration with UNDP and IBRD on the models and their use and on the telemetry system (NRIDCS), which is an offshoot of UNDP financial assistance. NRIDCS is also described in the Main System Management Component of Annex F.

b. Water Research Center (WRC)

The UNDP is proposing modest (\$750,000) assistance to the WRC over their next programming cycle. This assistance has been taken into account in developing USAID's assistance program for WRC (See Annex F). Collaborative arrangements between UNDP and USAID will be developed for areas of mutual interest at the WRC.

c. RIIP Planning Studies

The UNDP is financing (\$1.65 million), IBRD is executing, and a contractor is carrying out a feasibility analysis and preliminary design of improvement programs for eight RIIP canal commands totaling 193,000 feddans. The selected contractor's staff began arriving in August 1986 and the studies are scheduled to be complete by early 1988. The contractor will be managed and directed by the same MOI project director as the USAID RIIP component with joint management plans being prepared. Close coordination between USAID, IBRD, and UNDP is planned. Improvement programs for the canal commands that are approved for construction may be financed under the USAID RIIP component.

3. Canada (CIDA)

a. Integrated Soil and Water Improvement Project (ISAWIP)

This pilot effort covering 80,000 feddans in the Gharbia Governorate is attacking social and physical problems in a canal command area related to irrigation and agricultural production. CIDA plans on providing US\$ 31 million over a five year period. Results coming from ISAWIP, which is managed by MOI and MOA, will be closely monitored by USAID for programmatic, organizational, and other outputs that might be of assistance in implementing RIIP.

b. The River Nile Protection and Development Project

This project assists data collection agencies as well as preparation of pre-feasibility studies of River Development options. These studies will focus on the main channel and be complementary to the USAID and MOI efforts.

4. Other Donors

Italy is providing \$6 million for the construction of the Damietta barrage on the Damietta branch of the Nile. Japan is currently financing some small land reclamation projects that are not expected to impact directly on IMS activities.

The Hamoul Drainage and Soil Improvement Project, approved by the European Economic Community, covers 65,000 feddans reclaimed from Lake Burullus in the early sixties. The project area is located in Kafr el Sheikh Governorate. The five-year project includes ditching and land improvement works in 30,000 feddans, installation of pipe drains in 35,000 feddans and improvement of irrigation infrastructure. Total project cost in 1981 prices amounts to US\$ 40 million equivalent.

III. Project Rationale and Description

A. 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 of the IMS Project does not change as a result of this amendment. The purpose is to strengthen the capability and capacity of the MOI to plan, design, operate, and maintain the water distribution system.

To achieve this purpose the project will:

a. Plan, design, and construct an improved operationally efficient irrigation system in selected canal commands throughout the country, including formal organizations of farmers to liaison with MOI and MOA, and involvement of MOA in on-farm water management.

b. Strengthen MOI maintenance capability through the following activities: (1) completion of the SR component which will correct past faulty maintenance; (2) the implementation of a pilot Preventive Maintenance Program in the Gharbia Directorate with replication in the other remaining Directorates; and (3) support an IBRD/MOI project on earthen channel maintenance, with particular emphasis on mesqa maintenance and the use of private contractors.

c. Further develop and add to the set of computer models and computer programs that are designed for planning, operation, and management of the irrigation system and bring the Project Preparation Department (PPD) to a state of preparedness where it can analyze the feasibility of most MOI developmental options without expatriate assistance.

d. Implement the computer models designed for operation of the irrigation system and further develop and enlarge the telemetry data collection and analysis system, including pilot investigations of system automation.

The above activities will be supported by: an extensive research operation covering all aspects of irrigation development and management; a MOI-wide training program, carried out by a new National Irrigation Training Institute; the preparation of contour maps from new aerial photography; and essential miscellaneous technical and commodity assistance.

3. Implementation Strategy

From the problems identified in the previous chapter, USAID and MOI have developed an implementation strategy. The strategy is built around four groups of activities: (1) Infrastructure and Maintenance, (2) Main System Management, (3) Professional Development, and (4) Support activities.

The ten project components defined later in this chapter and in Annex F provide vital support to the above four groups. For implementation purposes the project components will address one or more specifically identified working level constraints as follows:

(1) the deteriorated condition of the water distribution system (structures and channels) which prevents effective control of water delivery, increases water logging and salinity, and reduces crop production (RIIP, SR, and Preventive Maintenance will replace and rehabilitate structures, remodel channels, and improve maintenance).

(2) the poor condition of the mesqas (RIIP and Preventive Maintenance will improve).

(3) a water application system of small (10 m x 10 m) basins which effectively prevents modernization (RIIP will promote land leveling and long furrow irrigation which would remove the small basins).

(4) unlevel fields which cause farmers to over-irrigate; (RIIP includes leveling).

(5) control and operation of the delivery system that is based on water elevation rather than on the rate of flow (Planning Studies and Models, Main System Management and RIIP will experiment with deliveries based on rate of flow).

(6) the lack of tile drains and the existence of poor field drains in many areas (Being addressed by IBRD drainage program RIIP includes treatment of drainage as well as irrigation canals).

(7) a shortage of technical and skilled manpower in the MOI (Professional Development will address).

(8) the absence of incentives to the farmer to increase crop production or to grow export crops (WRC and RIIP to address).

(9) irrigation deliveries to the mesqa based on rotation time period does not match crop water requirements for optimum crop production (RIIP will experiment with continuous flow to meet crop demands).

(10) the shortage of operation, maintenance, and research equipment (Preventive Maintenance and WRC are providing equipment).

(11) the absence of adequate maps of the area for the design and construction of improvements of the system (Survey and Mapping Component will provide maps and mapping services to the Egyptian General Survey Authority).

4. Outputs

The end of project status visualizes an upgraded irrigation systems under tight and efficient operational control of modern MOI managers.

In order to achieve this status for the irrigation system, the MOI managers of the ten project components and the USAID support staff are tasked to produce/create the following Project outputs. The Logical Framework is presented in Annex B.

a. A system improvement approach developed and tested for improved planning, design, operation, management, and maintenance, of canal delivery and drainage systems through actual field experience in RIIP areas.

b. The backlog of required structure replacement eliminated and MOI funding for SR exceeding depreciation rate.

c. A preventive maintenance system for structures, canals and drains tested in the Gharbia Directorates and installed in at least five additional directorates.

d. Weed research capability developed to support new maintenance procedures.

e. Operationally useful models developed, calibrated, supplied with telemetric data inputs, and in use for all operational aspects of the irrigation system.

f. Pilot canal automation installed and tested and the feasibility of automation expansion studied.

g. Professional Development component fully equipped, staffed and operational.

h. The research capability of the 11 Institutes of the Water Research Center generating useful results.

i. High quality feasibility and design studies produced and specific developmental problems analyzed.

j. High quality topographic and cadastral maps and aerial photography available to MOI/MOA project designers and implementors.

k. MOI personnel fully capable of analyzing, for the GOE decision makers, the effect of various existing and proposed policies on the distribution system and on agricultural production.

5. Inputs

The above outputs are to be created through substantial quantities of technical assistance, training, commodities, and local currency inputs by USAID; and through MOI inputs of staff, equipment and facilities, and considerably increased local currency. These inputs are detailed in Section IV, The Financial Plan and in Annex F under the detailed description of each component.

B. Project Components

The major problems and constraints impeding optimal performance of the irrigation system were discussed in previous sections. It was also noted that the GOE has assigned sole responsibility for the system to the Ministry of Irrigation. This responsibility is exercised through a set of primary functions common to any irrigation system--planning, design, operation, and maintenance. It is these primary functions of MOI that must be strengthened in order to remove the identified constraints and improve the performance of the irrigation system.

The strengthening of MOI will be accomplished through implementation of 10 IMS project components:

1. Regional Irrigation Improvement Project
2. Structural Replacement
3. Preventive Maintenance
4. Main Systems Management
5. Planning Studies and Models
6. Professional Development
7. Water Research Center
8. Project Preparation Department
9. Survey and Mapping
10. Miscellaneous TA and Commodity Procurement

These 10 components involve a large number of participants: starting with several hundred thousand farmers that will be directly involved in RIIP areas and/or system maintenance; numerous separate parts of the MOI and the staff of these units; the MOA extension and farm mechanization (land leveling); and other local staff involved at mesqa level with MOI staff and farmers.

Farmers are expected to be the key beneficiaries in the RIIP improvement areas. Constraints that currently prevent farmers from obtaining full benefits from the proposed physical improvements under RIIP have been identified. The constraints include the lack of: farmers inputs to the improvement process; MOI-MOA coordination; information transfer to farmers, and coordination between farmers. The Project will remove these constraints through the formation of Water User Associations (WUA) and the implementation of an Irrigation Advisory Service (IAS). Both of these concepts have been identified and successfully tested under EWUP on a pilot basis. They are now being implemented on a large scale on the Serry canal by a joint team of MOI and MOA technicians with the assistance of a USAID contractor. Experience has shown that the most effective way to form the WUA's is to build on the informal farmer groups that are now functioning at the mesqa level (See Annex Q for details of the WUA's and IAS). In addition, field level coordinating committees will be established in each Governorate to coordinate the development and extension activities of the MOI and MOA. At the problem identification and design stage farmers will have an input into what happens to their mesqa through the WUA's. In the implementation stage, farmers will be required to agree to a cost recovery program, which is yet to be worked out. Farmers must agree to pay for their mesqa improvement costs in cash and/or in kind. If agreement cannot be reached, that mesqa would not be improved through this project and the Program would move to the next appropriate mesqa where the same process would be carried out.

Farmers will also be participating more actively in the operation of the irrigation system at mesqa level. The WUA will be the liaison between farmers and the MOI in development, operation, and maintenance of their mesqas and the MOA for on-farm assistance. The IAS will assist in the formation of the WUA's, inform the farmer in advance of irrigation system improvements and help obtain their inputs, and provide key information on irrigation water management currently unavailable to farmers.

Local merchants, manufacturers, and service industries will be secondary beneficiaries of the project through the increased level of economic activity resulting from increased agricultural output and income in and near the RIIP area. Private contractors will benefit directly from the large amount of construction under RIIP (no public contractors will be used) and from the maintenance contracts for small channels in the channel maintenance program.

The GOE will be a primary beneficiary from several aspects. The canal improvement and other construction will create or improve the physical assets of the country. Increased agricultural output will reduce food import requirements. In addition, the institutional strengthening of the MOI will increase the efficiency and effectiveness of its services.

The GOE will also benefit from the support components of the Project--WRC, Professional Development, Survey and Mapping, Miscellaneous

Models, and Telemetry components. These activities are directed at the long-term improvement of the overall water delivery system and its operation. They will increase skill levels of various MOI personnel, as well as provide information about, and improved control over the country's water and land resources.

The following sections provide a brief summary of each of the ten components under this project. Section IV (Financial Plan) of this PP provides a summary of the financial costs and the Implementation Plan (Section V) summarizes the training plan. Annex F provides a detailed description of each component beginning with a background statement describing the events that lead up to inclusion of the component in the IMS project (new item) or the status of existing components, followed by sections on the components' objective, proposed activities, and which items will be supported by USAID. In addition, detailed year-wise budgets (USAID and GOE) are provided for each component.

1. Regional Irrigation Improvement Project

The RIIP component is an ongoing IMS activity that is being expanded under this project amendment. The RIIP will establish and field test an organizational structure within the MOI capable of providing technical assistance, construction assistance, economic analysis, on-farm development assistance, and user involvement to remodel selected irrigation canal commands. The objective is to make the system more responsive to the needs of farmers and to assure that water is available in the quantities needed at the time it is needed to support increased agricultural output.

The RIIP^{6/} will plan, design, and construct a rehabilitation/modernization program in selected canal commands covering an area of over 300,000 feddans during the life of the Project.

A prefeasibility study has been carried out for GOE's National Irrigation Improvement Program (Annex Q) and forms the basis for RIIP. The national program was developed based on seven years of research and planning carried out by the Egyptian Water Use and Management Project (EWUP) with USAID assistance. Annex Q provides the administrative, technical, economic, and environmental justification for RIIP and Annexes H and J provide the agricultural and social soundness justifications.

As the 1985 IMS evaluation stressed, the RIIP will require administrative changes within MOI, a multi-disciplinary staff to carry out this large and vital program, and the eventual creation of an Authority within MOI to carry the program into the next century. Special conditions and covenants have been provided for this component.

The RIIP will be carried out in four phases within each area to be improved: (1) constraints to improved agricultural production will be identified; (2) a feasibility study of potential solutions will be carried out to identify the least cost alternatives; (3) the selected alternative (which must be technically sound, economically viable, and socially acceptable) will be designed and implemented; (4) the implemented solutions will be monitored and evaluated to improve the effectiveness of future improvements.

The total USAID contribution to the RIIP will be \$105.9 million including approximately 580 person months of technical assistance, 380 person months of nondegree training, and five persons receiving degree training.

^{6/} The term RIIP as used in this paper relates to the first phase of the National Irrigation Improvement Program (NIIP).

USAID will help 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, support commodities, training, and technical assistance. The TA will focus on three areas within the country and construction on eleven areas. The TA for the eight additional areas is to be provided for by the UNDP in coordination with the USAID program. The TA will result in the development of a multi disciplinary approach to problem identification within canal commands, development of cost effective and economic solutions, and implementation and evaluation of the selected interventions. The MOI staff capability will be developed to handle a national program of canal command modernization and rehabilitation by the PACD.

2. Structure Replacement

This is an on-going activity, one of the original components of the IMS project, and one of two components that are focused on improving the maintenance capability of the MOI and its field units.

The SR component is aimed at the smaller structures in the irrigation system--intake regulators, head regulators, weirs, tail escapes, spillways, bridges, and crossing structures. It is also aimed at improved quality of structures and assuring that they are built to MOI specifications. During Phase I, over 3,000 structures were replaced or rehabilitated. During Phase II, which is currently underway and will be completed under this amendment in FY 89, an additional 6,500 structures will be replaced by structures of acceptable quality or rehabilitated.

The SR component has been evaluated periodically and found to be technically and economically sound and meeting all of USAID's criteria. This component complements the new RIIP activities and removes the backlog of old and existing nonfunctional irrigation structures in the system.

Under this component USAID is financing TA, training, support commodities, and 80 percent of the cost of the structures.

The total USAID contribution to the SR component will be \$76.1 million including approximately 78 person months of technical assistance, and 25 person months of nondegree training.

An important aspect of the SR program is the increase in the MOI budget for maintenance of structures so that the large backlog on nonfunctioning structures cannot accumulate again. The MOI budget has been increased to satisfactory levels so that, with the elimination of the structural backlog at the completion of the SR component, small structure maintenance can be kept in a satisfactory condition (See Section 5 of Annex F).

TA being utilized under the SR component is resulting in design and construction specifications being upgraded and quality control improved. As confirmed by the evaluations, improved specifications have already been developed and implemented, monitoring and training intensified, and quality control improved. In addition, concrete and soil testing labs are being set up at the Headquarters and certain Directorates to further improve quality control.

3. Preventive Maintenance

Preventive maintenance had not been a high priority activity in the field level units of the MOI which has resulted in the undesirable state of maintenance of most of the irrigation system.

The preventive maintenance system will give the selected Directorates the equipment and staff training necessary to perform first eschelon maintenance. It will also install the procedures to plan for, manage, and control higher levels of maintenance, including replacements that are contracted out.

The initial phase of the preventive maintenance component is progressing under the ongoing IMS project, with the establishment of a preventive maintenance organization in the Gharbia Directorate. With the implementation of this unit the MOI has committed to reorganize, staff and fund this vital element needed to assure proper and reliable maintenance of the system. Once operating, this unit can act as a model for extension to the other 18 Directorates in the irrigated areas.

Associated with this program is a proposed 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 MOI Public Excavation Companies which carry out most of the large channel maintenance work.

To assure full coordination between the IBRD and USAID activities and obtain involvement of the private sector, USAID will provide assistance to MOI regarding the IBRD program focusing on TA, equipment and vehicles for the MOI, and support for bringing the private sector into the channel maintenance program through procurement of mesqa and small channel improvement equipment. In addition, to help cope with the new procedures involving weed management, assistance will be provided to the Weed Research Institute under the Water Research Center component of the IMS Project for research on the economic, technical, environmental, and other effects of specific weed control measures.

This component, as in the case of RIIP, will require additional staff resources although not specifically for the USAID portion of the component. The IBRD program calls for the addition of 175 field engineers (one in each district) and a stronger central office to manage the higher level of maintenance. USAID and MOI concur with that proposal and will utilize the same staff under this program.

During FY89 there will be a joint USAID-IBRD evaluation of this component to assess progress and provide guidance for improved implementation. Under this component USAID will provide \$39.8 million including approximately 290 person months of technical assistance and 80 person months of nondegree training. The end result of this effort will be a preventative maintenance program, tested, accepted, functional, and fully staffed in at least six Directorates. The Directorate level organization and training mechanism can then be replicable throughout the remaining 13 Directorates.

4. Main System Management (Telemetry)

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 will provide real time data to the managers of the system resulting in improved management and reduction of waste and irrigation shortages.

The initial phase of the telemetry system, currently being installed with USAID assistance, will provide detailed data (basically water levels) on the hydrology and other characteristics at 255 specific points in the irrigation system. Under this Project Amendment, the kinds of data obtained will be increased (flow rates, water quality, communications), as planned for in the original design, as will the number of data collection points in the system (300 additional points). Data are assembled utilizing meteor burst transmission of collected data to computerized stations at both Cairo and Aswan. This appropriate technology was selected because of its low cost, the desirability of not needing to rely on satellite technology supplied by other countries, and its relatively simple operation and maintenance requirements.

This component will also assist the MOI in experimenting with automation of control gates in a pilot area (Salheya Canal command) of the irrigation system. The pilot effort will define the resulting decrease in operation losses and improvement in irrigation efficiencies. A communications network and canal feasibility studies for determining the economic extent of automation will also be financed under the Project. Implementation will be considered on a case by case basis after analysis of the results of each study.

The 1985 IMS evaluation cited the telemetry component as a classic example of good cooperation among agencies (MOI, UNDP, IBRD and USAID) and of a well planned development.

The total USAID contribution to this component will be \$32.3 million including approximately 285 person months of technical assistance and 60 person months of nondegree training. In addition to the infrastructure mentioned above, the TA will build the capability within MOI to operate and maintain the installed system and plan, construct and operate an expanded systems in the future.

5. Planning Studies and Models

The MOI, through its Water Planning Group (WPG), 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, ie, the basic source of water supply. This group also concerns the operating rules of the High Aswan Dam (HAD), ie, how the stored water supply is to be released in accordance with power, navigation, irrigation and other needs.

The other group of models is concerned with the service area between the HAD and the Mediterranean Sea. They are used to analyze the impact of the water delivery system on agricultural policies and programs, and vice-versa; plan the distribution of water through the system; and provide detailed operating parameters, such as gate movement schedules, for operation of the system within a specified set of system operating constraints.

The development of these two groups of models has been assisted by the UNDP, starting in 1977. During the past two years IBRD and UNDP, with USAID participation, have carried out two 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 they have requested USAID to finance further refinement of the two groups of models and the addition of several new models to the two groups.

The objective of this new IMS component is to benefit from the time and effort gone into developing the basic set of models by providing a minimal investment (one percent of the IMS cost) to take the models to the fully integrated operational stage where they can be used by decision makers to test impacts of various policies. The UNDP will continue to provide a minimum TA input to assure full coordination with the previous program.

The total USAID contribution to the component will be \$5.4 million including approximately 128 person months of technical assistance and 75 person months of nondegree training. As a result of this support, the MOI will be able to finalize all models and develop procedures to incorporate model results into the planning, operation, and decision making process of managing Nile River waters. In addition, other departments within MOI will be provided with key models and appropriate training to use them in their planning, design, and operation activities.

6. Professional Development

The IMS Project has supported a Training and Manpower Development Unit (TMD) which forms the nucleus for the Professional Development component. This component institutionalizes a multi-disciplinary training program to serve the total manpower training and development requirements of the MOI.

The 1985 IMS evaluation noted the need to reorient the MOI's approach from starting planning at the center to starting from on-farm. This requires a multi-disciplinary rather than strictly an engineering approach. The evaluation also noted that the TMD was the most successful component of the overall project and was making headway in utilizing the multi-disciplinary approach. The evaluation team recommended that a study be conducted to determine the desirability to expand the TMD into an organization to serve the total training needs of the MOI.

As a result a training assessment team carried out an analysis to determine the training needs of the MOI, investigate alternative training facilities, and recommend an action program. The National Irrigation Training Institute (NITI) concept was found to be the least cost alternative to meet the MOI training needs.

The NITI will provide a structured in-service training program for the five to seven thousand professional and 70 to 80 thousand nonprofessional staff of MOI, plus some from the Ministry of Land Reclamation. Training will be in over 60 subject matter areas. NITI will have the capability to provide high quality training to 2,500 students per year focusing mainly on the professional staff.

The NITI will build on the TMD and embody a multi-disciplinary approach to technical training and will utilize an action research focus under field conditions. Management training will be organized by NITI but will mainly be carried out at the existing center for Agricultural Management Development and other regional and national training centers and Universities.

USAID will provide a total of \$11.8 million including approximately 225 person months of technical assistance, 150 person months of nondegree training, 12 persons receiving degree training, and limited commodities to assure that the Professional Development component is fully developed by the PACD. The MOI will provide all staff support and facilities required for the training activities and TA staff.

7. The Water Research Center

The scope and complexity of the MOI responsibilities for the irrigation system involve a wide range of scientific disciplines and widely varying subject matter areas. The Water Research Center was created by MOI 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 and are fully operational.

The Water Distribution and Methods of Irrigation Research Institute was the implementing agency for the USAID supported Egyptian Water Use and Management Project (EWUP). The Weed Research Institute will be involved in the currently proposed Preventive Maintenance component. The 11 institutes and their responsibilities are defined in Annex F and detailed work plans for each institute are provided in Annex T.

The 1985 evaluation pointed out the need for interdisciplinary research and close coordination with the MOA if the WRC institutes responsible for on-farm water management research were to achieve the needed shift in emphasis towards farm-level water delivery. In addition, the USAID Project Committee has raised the question of duplication between WRC and ARC work, both institutions are receiving substantial USAID support. Both the IMS and the NARP provide mechanisms to strengthen cooperation between MOI and MOA research institutes. Some of these are listed in Annex F and include joint project-financed research grants between WRC and ARC and annual joint MOI/MOA conferences to renew research activities.

The total USAID contribution to the WRC will be \$32.1 million including approximately 479 person months of technical assistance. The objectives of this component will be to strengthen the existing staff of all eleven institutes with TA and a significant amount of degree training (26 PhD and 44 MSc) and nondegree training (468 person months). In addition the institutes will improve their capabilities to utilize private contractors, Universities, and other research organizations to carry out special research projects rather than increasing core staffing. The USAID support including TA, training, commodities, and local support will be reviewed each year based on revised annual work plan updates from the five year plan provided in Annex T.

8. Project Preparation Department

The Project Preparation Department (PPD) was created by MOI under the original IMS program to provide international quality economic and technical feasibility analyses of investment options open to the MOI and to prepare reports in English for submission to international financial agencies and foreign donors. The PPD was also to serve in a staff capacity for the Minister of Irrigation to provide economic and technical analysis of various developmental problems as assigned by the Minister.

The PPD, heavily supported by an experienced contractor staff, has turned out a number of studies of acceptable quality. For example, its North Zifta feasibility study demonstrated (1) the proper methodology for carrying out such studies and (2) the importance of such studies in making funding decisions. Staff attrition and turn-over, however, have kept the PPD in a growing/learning posture rather than becoming a mature and independent organization.

The total USAID contribution to the PPD component will be \$10.7 million including approximately 400 person months of technical assistance and 25 person months of nondegree training.

The PPD has recently been elevated to a department level from that of a unit. In addition, the required numbers of staff have been recruited. These changes along with the TA, training, and professional development activities that have been and will be provided to the PPD should assure that the target of self sufficiency is met by FY89. At that point the PPD will be carrying out feasibility studies at international standards without outside technical assistance.

9. Survey and Mapping

Part of the normal planning/design apparatus for irrigation systems is high quality aerial photography and detailed topographic maps. These routine support facilities are not adequate for RIIP nor for many of the other project components.

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

An analysis showed that the most cost effective manner of obtaining the required maps and photos was to contract the process to an outside firm.

This Project Amendment will finance contracts for aerial photography and high quality maps of varying scales produced from it. It will also provide training and equipment to the Egyptian General Survey Authority to upgrade its capability to provide certain mapping services.

The total USAID contribution to the Survey and Mapping component will be \$6.1 million including approximately 130 person months of technical assistance and 40 person months of nondegree training.

By the PACD the project will provide new cadastral maps for about five million feddans of the irrigated lands, large scale contour maps of all the agricultural land, and staff fully trained and equipped to maintain and upgrade the mapping system and the map products developed.

10. Miscellaneous Technical Assistance and Commodity Procurement

This component is a residual supply of technical, commodity, and training assistance to cope with problems not addressed by the other components or to take advantage of particular developmental targets of opportunity.

To date over one million dollars have been utilized for special studies carried out in conjunction with other donor agencies, nondegree training for MOI officials outside the normal IMS components, project evaluations, invitational travel in conjunction with IBRD projects, and miscellaneous procurement.

In the future this component will provide an additional \$4.6 million to help MOI strengthen their monitoring and evaluation procedures by providing TA and commodities. In addition, TA will continue to be made available for special needs such as the Upper Nile Barrages panel, the panel reviewing the progress on Esna Barrage, and other special projects.

IV. Cost Estimates and Financial Plan

The total cost of the project is estimated at \$761 million. AID will provide a grant of \$340 million. The GOE contribution will be equivalent to \$421 million in cash plus in kind contribution for the use of existing facilities, commodities, equipment, etc. During the LOP, the GOE's cash contribution represents 10 percent of the total MOI budget.

A. Funding Categories

Each of the ten project components include the following standardized funding categories: (1) Consulting Services; (2) Training; (3) Construction; (4) Commodities; (5) Services; and (6) Other.

A Contingency Fund has been established at about five percent of the total project amount.

B. Cost Estimates

The cost estimates used in this amendment have been developed based on an analysis of historical cost data required to implement the project since it was originally authorized on August 27, 1981. The current costs (1986 prices) of items were adjusted for a rate of inflation at 17 percent for locally procured items and a rate of five percent for offshore (primarily U.S. source and origin). These inflation rates were then compounded annually over the life of the project.

The official exchange rate used to determine local costs prior to August 1986 is \$1.00 = L.E. 0.83168. The rate of exchange for costs incurred after that date is \$1.00 = L.E. 1.35.

C. Financial Tables (Expenditures and Obligations)

The tables in this section provide a breakdown of AID and GOE costs incurred and anticipated over the life of the project.

Table IV. 1. provides a projection of expenditures by U.S. fiscal year for USAID and GOE. It also provides an estimated obligation schedule.

Table IV.2. is a project summary showing the costs, without contingencies, by project component and again by type of expenditure. Costs are summarized by US FY and the equivalent dollars in local currency and then five percent contingencies are added on to obtain the grand totals.

Table IV.3 & 4. expands the summary in Table IV.2. to show the annual totals. There are also detailed tables for each project component in Annex F which includes financial data under the six standardized funding categories for each year.

Figures IV.1, IV.2, and IV.3 provide a percentage breakdown of the total, USAID, and GOE expenditures by component and by Type. Figure IV.4 presents the annual expenditures and obligations in a line graph.

Table IV.1

PROJECTION OF EXPENDITURES AND OBLIGATIONS BY U.S. FISCAL YEAR
(\$1,000)

Fiscal Year	USAID \$	GOE \$ L/C	TOTAL \$	* Oblig. *Schedule
Thru FY 1986	54658	60702	115360	93000
FY 1987	23193	31907	55100	92000
FY 1988	56683	56898	113581	76000
FY 1989	85491	67200	152691	56000
FY 1990	55121	84649	139770	23000
FY 1991	50708	102156	152864	0
Sub Totals	325854	403512	729366	
Contingency	14146	17141	31287	
TOTALS	340000	420653	760653	340000

Table IV.2

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(\$1,000)

	USAID \$ FX	GOE \$ L/C	Total \$
BY COMPONENT			
Regional Irr. Improv. Project	22155	83745	286825
Structural Replacement	2244	73811	200895
Preventive Maintenance	34910	4935	90586
Main System Management	28541	3731	33573
Planning Studies & Models	4255	1110	6177
Professional Development	8844	2932	27139
Water Research Center	28485	3653	48741
Project Preparation Depart.	8542	2183	11473
Survey Equipment & Mapping	5318	749	18246
Misc. TA, Com. Proc., & audit	5594	117	5711
Project Totals	148888	176966	729366
BY TYPE OF EXPENDITURE			
Consulting Services	48877	3557	55878
Training	16227	2583	20895
Construction	0	154160	374624
Commodities	78622	1798	106792
Local Services	2974	14868	148973
Other	2188	0	22204
Project Totals	148888	176966	729366
Contingencies	7490	6656	31287
Grand Totals	156378	183622	760653

*The GOE budget figures are subject to adjustments after the finalization of the GOE Five Year Plan.

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Table IV.3

Projected Expenditures by Component - USAID Funds(000's)

Component	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$
Regional Irr. Improv. Project	1061	180	2514	1220	6688	8982	5386	16632	3458	24577	3048	32154	22155	83745	105900
Structural Replacement	1391	41352	284	9775	292	12140	277	9594	0	950	0	0	2244	73811	76055
Preventive Maintenance	190	25	2405	165	6551	962	18646	1428	5803	1457	1315	898	34910	4935	39845
Main System Management	2689	50	861	50	3150	1489	14123	1772	5254	180	2464	190	28541	3731	32272
Planning Studies & Models	0	0	114	50	827	100	1359	280	1358	320	597	360	4255	1110	5365
Professional Development	600	650	602	331	1755	448	2339	535	1935	488	1613	480	8844	2932	11776
Water Research Center	570	190	2057	385	6610	738	7172	743	6214	774	5862	823	28485	3653	32138
Project Preparation Depart.	3778	836	1010	240	1605	430	1382	582	767	95	0	0	8542	2183	10725
Survey Equipment & Mapping	0	0	100	30	2315	639	2306	50	597	30	0	0	5318	749	6067
Misc. TA & Commodity Proc.	1096	0	985	15	940	22	861	24	838	26	874	30	5594	117	5711
Combined Annual Totals	11375	43283	10932	12261	30733	25950	53851	31640	26224	28897	15773	34935	148888	176966	325854
Contingencies	0	0	547	613	2151	1298	2693	1582	1311	1445	789	1719	7490	6656	14146
Grand Totals	11375	43283	11479	12874	32884	27248	56544	33222	27535	30342	16562	36654	156378	183622	340000
Cumulative Totals	11375	43283	22854	56157	55738	83405	112281	116627	139817	146968	156378	183622			

Projected Expenditures by Type of Expenditure - USAID Funds(000's)

Expenditure	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$
Consulting Services	5610	458	2581	387	11613	738	11183	730	9711	621	8179	623	48877	3557	52434
Training	959	100	1255	280	3654	518	3650	601	3397	567	3312	517	16227	2583	18810
Construction	0	41000	0	10060	0	21182	0	26728	0	24388	0	30802	0	154160	154160
Commodities	4517	50	6437	434	14521	937	38012	168	12070	119	3065	90	78622	1798	80420
Local Services	250	1675	263	1100	530	2575	591	3413	607	3202	733	2903	2974	14868	17842
Other	39	0	396	0	415	0	415	0	439	0	484	0	2188	0	2188
Combined Annual Totals	11375	43283	10932	12261	30733	25950	53851	31640	26224	28897	15773	34935	148888	176966	325854
Contingencies	0	0	547	613	2151	1298	2693	1582	1311	1445	789	1719	7490	6656	14146
Grand Totals	11375	43283	11479	12874	32884	27248	56544	33222	27535	30342	16562	36654	156378	183622	340000
Cumulative Totals	11375	43283	22854	56157	55738	83405	112281	116627	139817	146968	156378	183622			

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Table IV.4

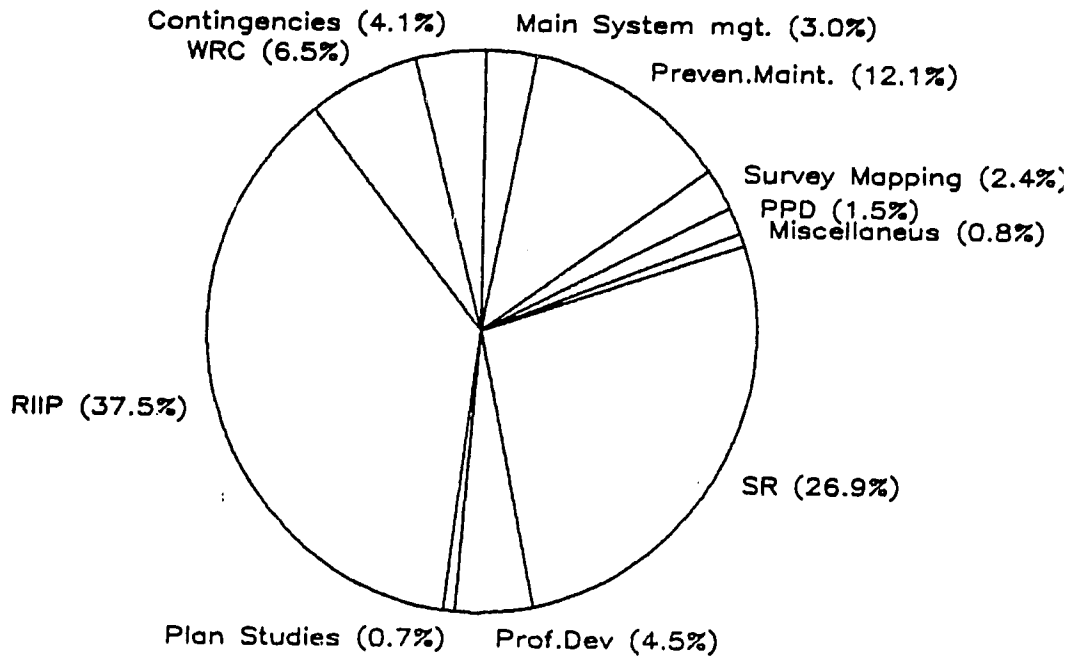
Projected Expenditures by Component - GDE Funds (000's)

Component	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C
Regional Irr. Improv. Project	9410	10977	24686	34506	44031	57315	180925
Structural Replacement	50250	15350	16670	13490	14310	14790	124840
Preventive Maintenance	100	441	402	8554	15321	22303	50741
Main System Management	50	250	275	205	240	281	1301
Planning Studies & Models	0	116	136	159	185	216	812
Professional Development	789	423	4426	4539	4555	631	15363
Water Research Center	0	3129	3161	3454	3341	3518	16603
Project Preparation Depart.	103	110	120	131	138	146	748
Survey Equipment & Mapping	0	1111	3422	2162	2528	2956	12179
Misc. TA & Commodity Proc.	0	0	0	0	0	0	0
Combined Annual Totals	60702	31907	56898	67200	84649	102156	403512
Contingencies	0	1595	2845	3360	4232	5108	17141
Grand Totals	60702	33502	59743	70560	88881	107264	420653
Cummulative Totals	60702	94204	153947	224507	313389	420653	

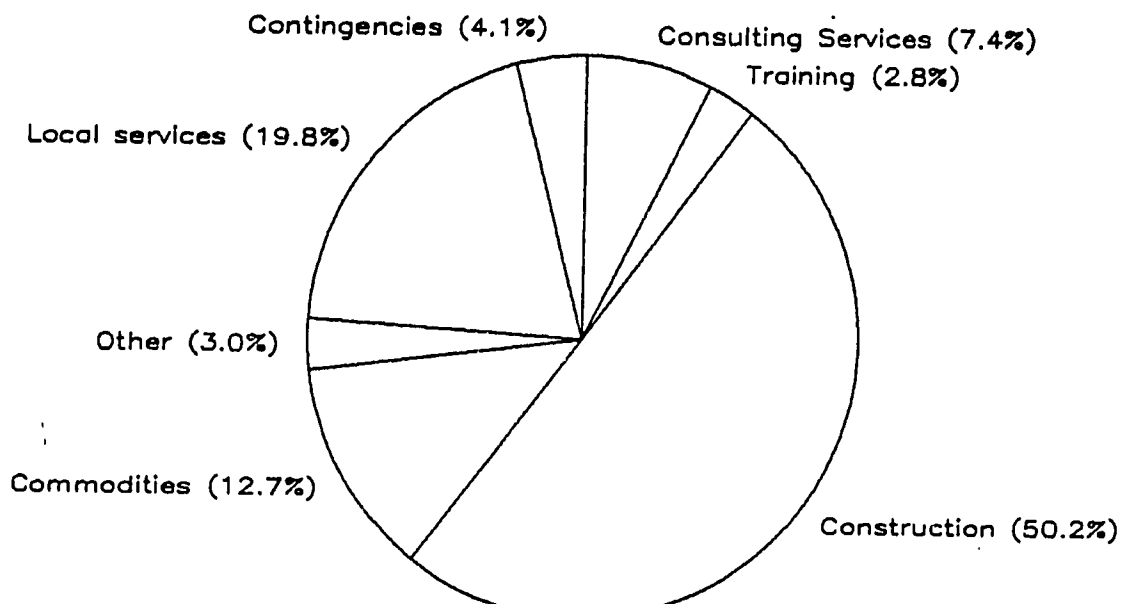
Projected Expenditures by Type of Expenditure - GDE Funds (000's)

Expenditure	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C
Consulting Services	0	498	1678	366	420	488	3444
Training	30	328	508	355	406	458	2085
Construction	26500	12500	33550	42291	51223	54400	220464
Commodities	4155	2754	4019	4695	5029	5720	26372
Services	29664	15223	16510	16770	21836	31128	131131
Other	353	604	633	2729	5735	9962	20016
Combined Annual Totals	60702	31907	56898	67200	84649	102156	403512
Contingencies	0	1595	2845	3360	4232	5108	17141
Grand Totals	60702	33502	59743	70560	88881	107264	420653
Cummulative Totals	60702	204	153947	224507	313389	420653	

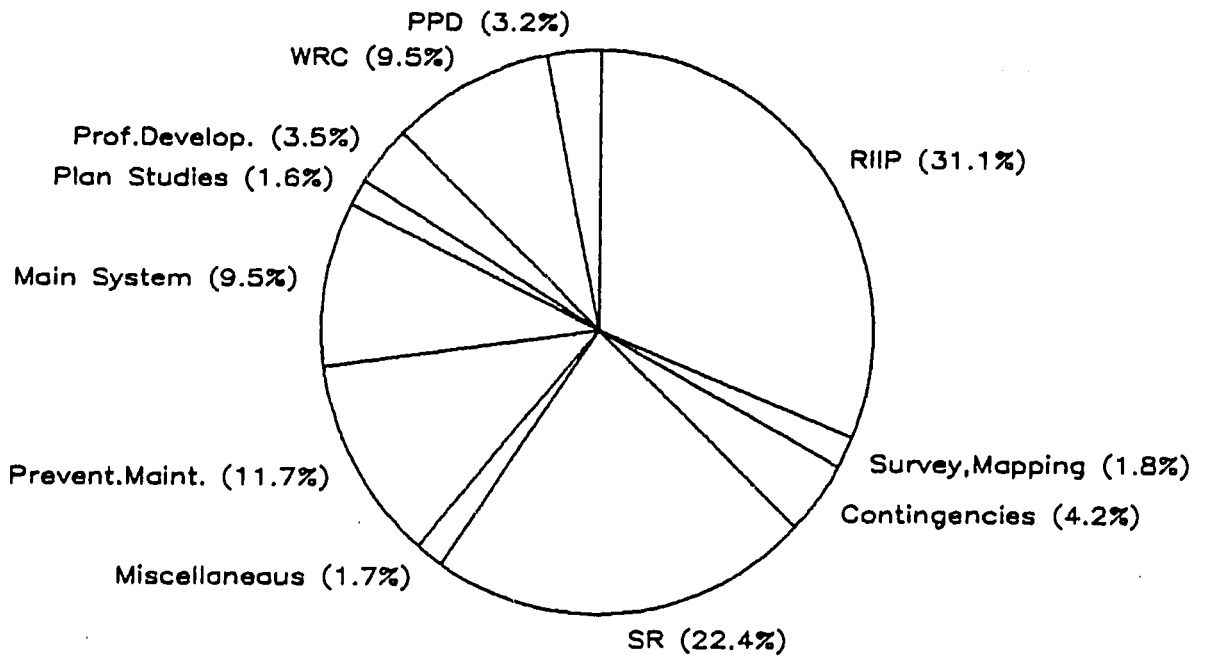
ESTIMATED PROJECT EXPENDITURES BY COMPONENT (USAID + GOE)



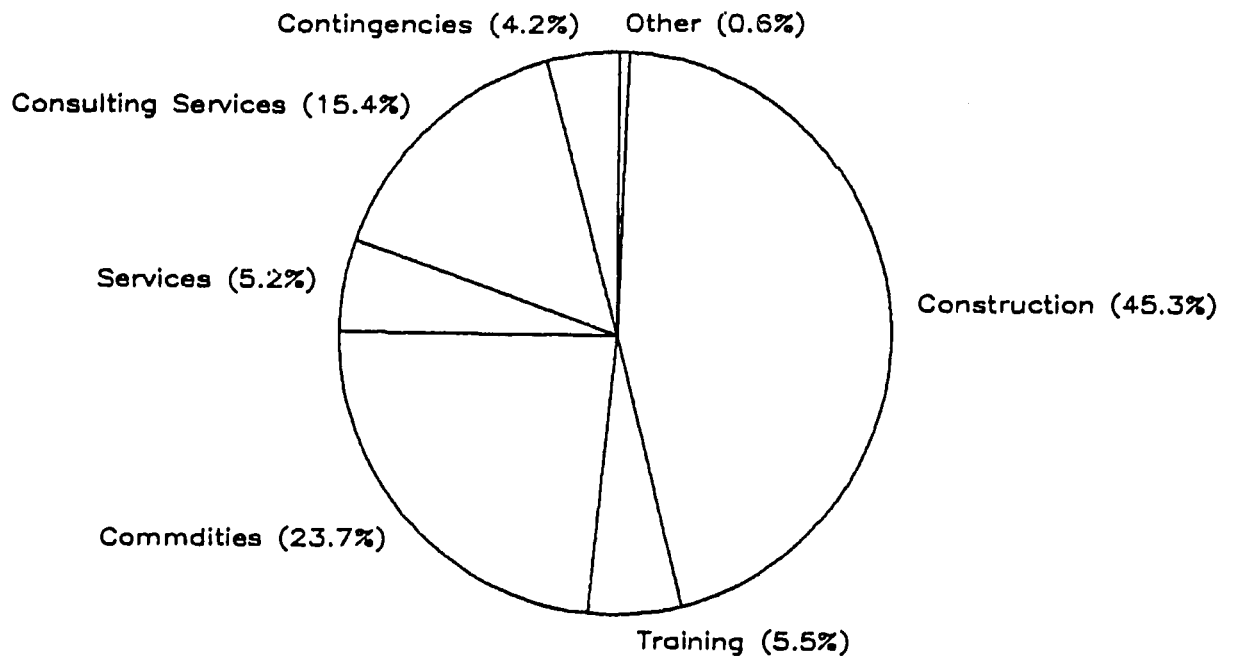
ESTIMATED PROJECT EXPENDITURES BY TYPE OF EXPENDITURE (USAID + GOE)



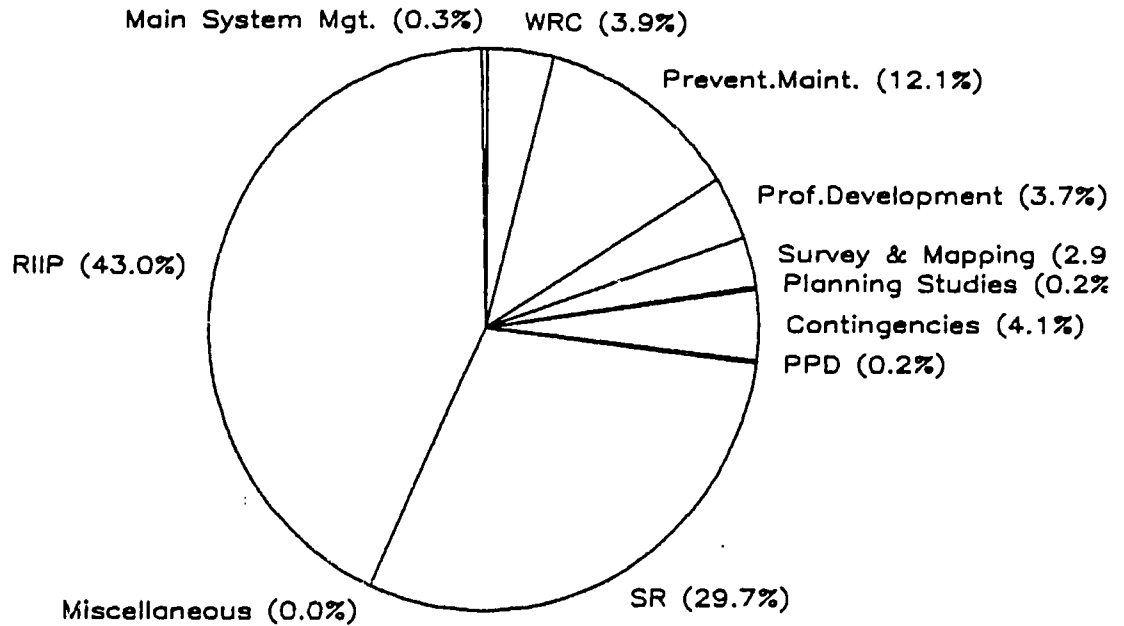
ESTIMATED PROJECT EXPENDITURES BY COMPONENT (USAID FUNDS)



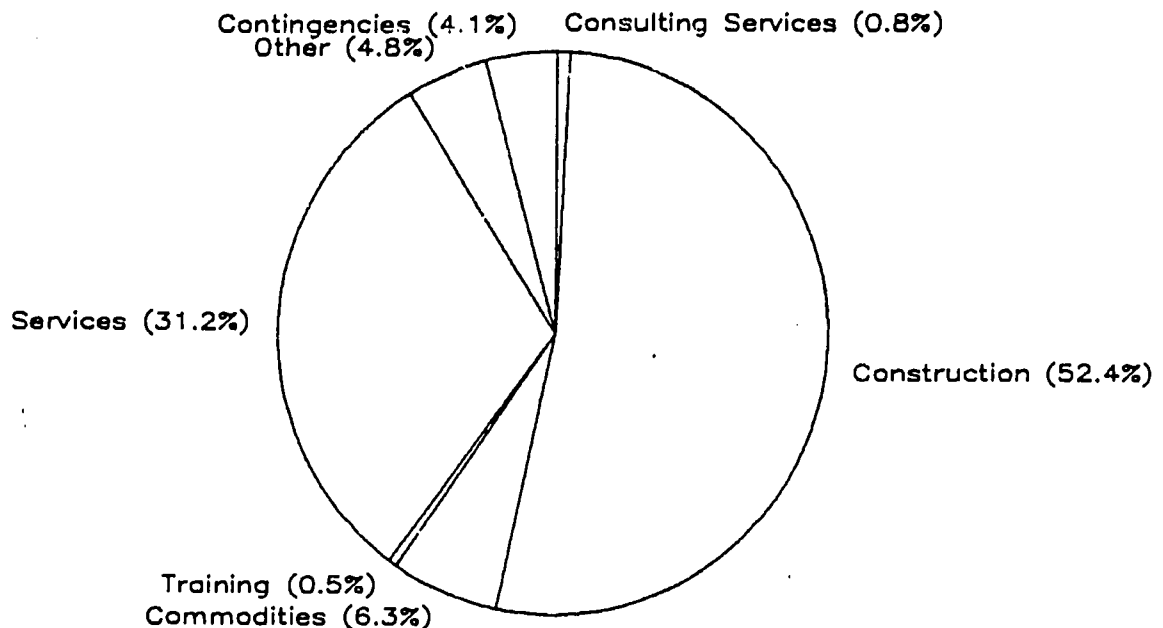
ESTIMATED PROJECT EXPENDITURES BY TYPE OF EXPENDITURE (USAID FUNDS)

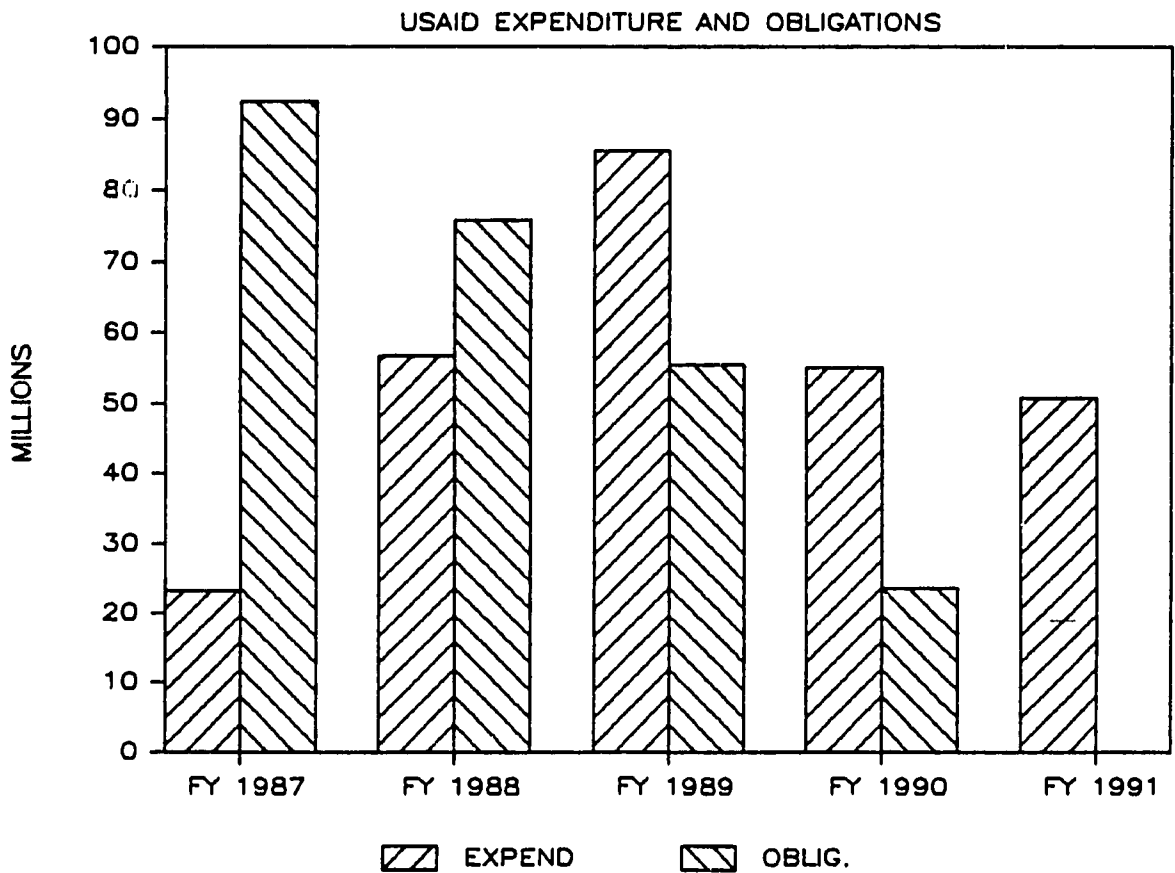
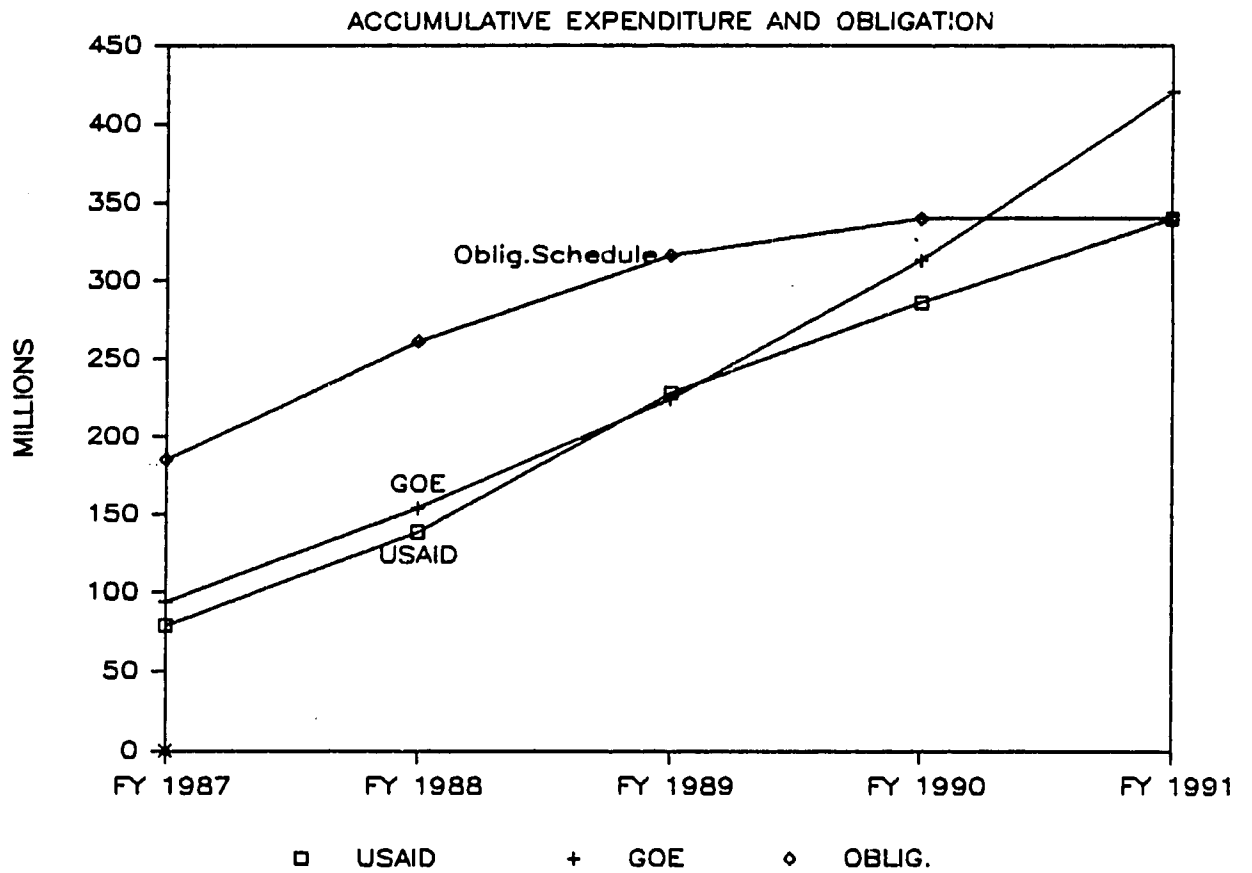


ESTIMATED PROJECT EXPENDITURES BY COMPONENT (GOE FUNDS)



ESTIMATED PROJECT EXPENDITURES BY TYPE OF EXPENDITURE (GOE FUNDS)





D. Method of Implementation Financing

1. Chart on Methods of Implementation and Financing

Payment Policy Verification Statement 5.B.2.a. requires an assessment by the Mission Controller of the proposed methods of implementation and financing. The assessment should justify the use of methods differing from AID's preferred methods. The following chart (Figure IV.5.) lists the current and proposed methods for the entire project. Narrative justification is provided where required, and explanations are given where necessary. The narrative is keyed to the item numbers provided in the leftmost column of the chart.

2. Narrative on Methods of Implementation and Financing

Of the 42 different procurement activities identified on Figure IV.5, 14 will involve AID direct procurement methods. These require no special justification or explanation as they are for existing contracts or for minor procurement activities. It is USAID's current policy that all additional procurements for major TA and commodities under this project be done utilizing Host Country contracting procedures.

Item No. 3

Under the RIIP component approximately \$78 million of irrigation system improvement construction is proposed. The implementation method proposed is an AID preferred method, FAR, requiring no special justification. The proposed method conforms to the Percentage of Actual Cost Reimbursement Method described in AID Handbook 3, App. 3J-7.

The same procedures have been successfully used already under the structural replacement component of the project. The Controller's Office has nearly completed a detailed assessment of these procedures. Based on this review to date the Controller has determined that the related reporting and accounting systems are adequate to provide reasonable assurance that AID funds are properly managed.

Item No. 4

Local Services-Administration refers to the operating costs of the Office managing the RIIP component. AID and MOI will share these costs.

The implementing mechanism will be a PIL. The financing method, Direct Reimbursement, is an AID preferred method, requiring no special justification. The fact that advances will be given does not require special justification.

The Controller's Office has completed a detailed assessment of the reporting and accounting procedures used by PFD in their Local Services-Admin PIL and found them adequate. Based on the results of that review the Controller is satisfied as to the capability of the MOI to manage similar activities.

Please note, however, that a new system is proposed to channel the MOI's contribution for Operating Expenses. The purpose of this new system is twofold: first, to assure the availability of GOE funds when required; second, to allow GOE project personnel working on IMS project to receive per diem compensation at a rate which is comparable to rates paid to similar personnel working on projects in the MOI financed by the World Bank and other donors. These rates are higher than GOE standard rates and less than or equal to AID standard rates. The Mission Director has determined that such rates are contributory to the success of the project.

CHART ON METHODS OF IMPLEMENTATION AND FINANCING IN IMS
FEBRUARY 10, 1987, LOP AID FUNDS ONLY

ITEM NO.	ACTIVITY	METHOD OF IMPLEMENTATION	METHOD OF FINANCING	APPROXIMATE COST \$(000)	HC OR AID CONTRACT		MOI IMPLEMENTING UNIT
					HC	AID	
<u>Reg. Irrig. Imp. Proj. (RIIP)</u>							
	Consultant (Res/Non Res)						
1.	Current Cont thru 5/88	Aid Direct Contract (CID)	Direct Pay	6,900		AID	
2.	Future Cont. from 5/88 -includes TA-10.1M Training- 1.9M Commod.- 7.7M	Host Country	Direct L/Com	19,700		HC	
3.	Local Const. Irr. Impr.	PIL-Alternative FAR, Fixed % Reimbursement 80% AID, 20% MOI	Direct Reimbursement	72,000		HC	Irrigation Dept/NIIP/RIIP
4.	Local Services-Admin.	PIL	Direct Reimbursement (with advance)	3,000		HC	Irrigation Dept/NIIP/RIIP
5.	Invitational Travel	PIO/P or Inv. TA	Direct Pay	500		AID	
<u>Structural Replacement (SR)</u>							
	Consultant (Res/Non Res)						
6.	Current Cont. thru 9/89	Host Country Cont. (Harza)	Direct L/Com	1,400		HC	Irrigation Dept/Projects/SR
7.	Training-Non Degree	PIO/P	Direct Payment	200		AID	
8.	Local Const.-Struct. Repl.	Same as #3,Above		73,000		HC	Irrigation Dept/Projects/SR
9.	Commodities	HCC-IFB or RFQ's or AID Dir. Cont. w. PSA	Direct L/Com or Direct Pay with Bank L/Com	1,000		if HC	Irrigation Dept/Projects/SR
10.	Local Services-Admin.	Same as #4,Above		500		HC	Irrigation Dept/Projects/SR
<u>Preventive Maintenance (PM)</u>							
	Consultant (Res/Non.Res)						
11.	Previous - (Harza)	same as #6,Above		200		HC	Project Preparation Dept
12.	Proposed -includes TA-5.0M Training-1.7M Commod.-27.0M	Host Country	Direct L/Com	32,700		HC	
13.	Local Services/Admin	Same as #4,Above		3,800		HC	Gharbia Directorate Project Mgr. (five add'tl Dir's. to be det'md)
<u>Main System Mgt. (MSM)</u>							
14.	Consulting Services -includes TA-5.3M Training & Inv Travel-0.7M	Host Country Cont.	Direct L/Com	6,000		HC	
15.	Local Construction Commodities	Host Country Cont.	Direct L/Com	3,000		HC	
16.	Prior-Telemetry	HC IFB	Direct L/Com	3,300		HC	Planning Sector/Telemetry Office
17.	Future-Telemetry Flow Meters & Installation	HC IFB	Direct L/Com	7,300		HC	
18.	Other Commodities	Same as #9,Above		10,300		if HC	Planning Sector/Telemetry Office
19.	Local Services/Admin	Same as #4,Above		1,500		HC	Planning Sector/Telemetry Office

ITEM NO.	ACTIVITY	METHOD OF IMPLEMENTATION	METHOD OF FINANCING	APPROXIMATE COST \$(000)	HC OR AID		MOI IMPLEMENTING UNIT
					CONTRACT	HC OR AID	
<u>Planning Studies & Models (PSM)</u>							
20.	Consulting Services	PASA	Direct Pay	2,300	AID		
21.	Training	PIO/P	Direct Pay	500	AID		
22.	Commodities	Same as #9,Above		1,000	if HC		
23.	Local Services/Admin.	PIL	same as #4.	600	HC		Planning Sector/Water Planning Gp Planning Sector/Water Planning Gp
<u>Professional Development (PD)</u>							
24.	Consulting - Shigetomi	PASA	Direct Pay	300	AID		
25.	Consulting Contract -includes TA+A&E-6.0M Training-2.2M Commodts-2.0M	Host Country (probably with university)	Direct L/Com	10,200	HC		
26.	Local Services/Admin	Same as #4,Above		1,700	HC		
27.	Invitational Travel	Same as #5,Above		600	AID		Water Research Center/NITI/TMD
<u>Water Research Center (WRC)</u>							
28.	Consultant-current	AID Direct (w. CID same as #1,Above)		6,400	AID		
29.	Consultant-future includes TA-11.1M Training-7.7M Commodit-6.4M	Host Country	Treasury Letter of Cr Direct L/Com	25,200	HC		
30.	Local Services/Admin	same as #4,Above		1,300	HC		
31.	Invitational Travel	same as #5,Above		100	AID		Water Research Center
<u>Project Preparation Dept. (PPD)</u>							
32.	Consultant-now thru 9/90	HCC w. Harza (same as #6)		8,400	HC		
33.	Training	Same as #20,Above		280	AID		Planning Sector/PPD
34.	Commodities	same as #9,Above		700	if HC		
35.	Local Services/Admin	same as #4,Above		1,600	HC		Planning Sector/PPD Planning Sector/PPD
<u>Survey, Equipment & Mapping</u>							
36.	Consulting includes TA-2.4M Training-0.3M Commodts-3.2M	Host Country IFB	Direct L/Com	5,900	HC		Survey Authority
37.	Local Services/Admin	same as #4,Above		200	HC		Survey Authority
<u>Miscellaneous</u>							
38.	Technical Assistance	AID Direct PSC or IQC	Direct Pay	900	AID		
39.	Training	PIO/P	Direct Pay	1,100	AID		
40.	Commodities	AID Direct PIO/C	Direct Pay	1,300	AID		
41.	Services	AID Direct PSC or IQC	Direct Pay	2,400	AID		
42.	Invitational Travel	Travel Authorization	Direct Pay	30	AID		

To expedite the project implementation, the GOE's local currency contribution to the operating expenses of the project will be disbursed through the FT-800 Trust Account.

Initially, MOI will deposit an amount equal to six months cash needs for operating expenses. MOI will then, on a quarterly basis, deposit into the Trust Account, an amount equal to at least the estimated total IMS local currency operating expenditures for the forthcoming quarter. Upon requests from the MOI, funds will be disbursed to the MOI Project Directors by USAID from the Trust Account.

MOI will use such funds for all office operating costs including cost of office equipment, furnishings, supplies, local TA contract costs, travel, per diem, vehicle operations, other special field costs, etc., but excluding basic salary costs and incentives. MOI will present to USAID a summarized statement, by project component, of (a) proposed expenditures for the upcoming quarter before requesting the initial disbursement from the Trust fund and (b) actual expenditures for the previous quarters and estimated expenditures for the forthcoming quarter when requesting subsequent replenishments. The advance will be liquidated and expenses recorded based on these reports.

A bilateral PIL will be signed by USAID and MOI before the beginning of each GOE fiscal year, detailing the quarterly pound installments to be transferred to and from the Trust Fund. The initial PIL will be issued prior to 31 May 1987, with the first MOI disbursement scheduled for 1 July, 1987.

A single bank account will be established for each MOI office into which AID will deposit funds from both sources. No other funds will flow through these accounts. The Controller approves of this proposed method on the condition that all expenses of these accounts conform to AID mission policies, and that no other funds are kept in these accounts.

It is recognized that the funds to be deposited in the Trust Account by the MOI will be GOE owned and the disbursement from the fund will be done in fulfillment of the GOE's local currency contributions to the operating expenses of the Project.

Table IV.6 provides estimated yearly amounts by US FY of MOI's local currency operating expenditures for the Project. These amounts will be adjusted annually.

Table IV. 6

PROJECT DIRECTOR TRUST FUND
(\$1,000 L/C by US FY)

Component	FY 87	FY 88	FY 89	FY 90	FY 91	Total
Regional Irr. Improv. Proj.	100	360	432	520	622	2234
Structural Replacement	50	150	100	100	100	600
Preventive Maintenance	10	60	464	1274	2978	4806
Main System Management	20	70	82	96	113	421
Planning Studies and Models	3	7	8	9	10	40
Professional Development	30	109	123	146	146	614
Water Research Center	150	460	489	516	536	2441
Project Preparation Dept.	10	30	32	33	34	157
Survey and Mapping	3	7	8	9	10	40
Grand Totals	376	1253	1738	2703	4549	10619

Item No. 6

The Host Country Contract with Harza Engineering is financed with an AID Direct L/COM. Although this is not an AID preferred method of financing, it is justified because the GOE does not have the foreign exchange capability to permit direct reimbursement.

The Controller's Office has not yet performed a detailed assessment of the MOI capability to manage host country contracts of this sort. However, based on the experience thus far with the MOI as related in discussions with Mission project personnel, the controller has reason to believe that such a capability exists.

Item No. 9

The methods for procuring and financing commodities for this project have not been finally determined. Some host country methods involving host country bid tenders financed by Direct L/COM seem to be working satisfactorily. However, serious consideration is being given to consolidating most of the offshore procurement in an AID Direct P.S.A. contract, with the commodities being financed by Bank L/COM. If so, this would be an AID preferred method requiring no special justification. If not, the Controller will assess the adequacy of other proposed methods.

If an AID direct P.S.A. mechanism is adopted, then commodity procurements tentatively included in the consulting contracts would be moved to the P.S.A., with the consultant providing only the technical specifications.

Item No. 16

Host Country IFB's for some telemetry commodities have already been executed. These are financed by Direct L/COM to enhance control and save banking charges which would follow from using Bank L/COM's.

The Implementation and Financing methods proposed for the rest of the project are repeats of those justified and described above.

3. Detailed Assessments

The Payment Policy Verification Statements prescribe detailed assessments of the implementing agency's contracting and accounting capabilities. Two such assessments have been done as described above in relation to Item No. 3, and No. 4. Other assessments will be performed as necessary. However, based on those assessments already performed, and on discussions with mission personnel, the Controller has reason to believe that the MOI has the capability to properly contract and account for its use of funds in connection with the activities proposed for their direct administration.

It is also recognized that the USAID's local currency contributions to the project will be contingent upon the receipt of the MOI's contribution into the Trust Fund. USAID will advance its portion of the local currency only after the deposit of contributions from MOI into the Trust Account. Within the FT-800 Trust Account, USAID will establish a 'sub-account' to account for deposits from and disbursements to MOI.

E. Financial Tracking

The Mission's Financial Management Office (FM) keeps the official project accounting records using the automated Mission Accounting and Control System. The project budget element lines will be revised to segregate activity by project component. The few activities which span components will be assigned to separate budget elements. Periodic reports will be provided to each Project (component) Director to keep him abreast of the financial progress of his component.

If necessary, the MACS reports will be manually adjusted to assign the activity of large contracts to specific components.

F. Recurrent Cost Summary

The estimated increase in annual recurring costs resulting after completion of the project is about \$7.16 million (Table IV.7) which amounts to seven percent of the MOI's O & M projected budget at the PACD and less than two percent of MOI's overall budget. Annex F, page 55 provides the actual and projected O & M budgets from GOE FY80/81 through 90/91 with a 367 percent increase over the ten year period. The GOE in its request for assistance (Annex D) has stated that it has both the financial capability and human resources to effectively install, maintain, and utilize the capital assistance to be provided for the successful implementation of the IMS Project and its ten components.

The Structural Replacement and Preventive Maintenance components address the need to improve and maintain the existing delivery system infrastructure. The Structural Replacement Component will reach its target of eliminating the backlog of structures requiring replacement during the decade of the eighties, thus facilitating the MOI's ability to maintain the system by bringing maintenance requirements to levels within the MOI's capability and budgetary capacity. The Preventive Maintenance Component will further improve MOI's allocation of budgetary resources to maintain the system. As the improved maintenance system is replicated nationwide, it will improve efficiency and coordination between offices, reduce duplication of effort, and provide equipment better suited to current maintenance needs.

Operational constraints at the mesqa and farm level are being addressed through the Regional Irrigation Improvement Project (RIIP). Rehabilitation and improvement of selected canal commands will not only improve operational efficiency of the system, but will also reduce the extent of system maintenance requirements. This activity is adequately budgeted by the GOE in the current five year plan. However, to address long rang cost implications, a covenant has been included requiring that a cost recovery program be developed in which the beneficiaries of the improvements pay their fair share of those costs, in cash or kind.

Table IV.7

GOE Recurrent Cost
End of Project Estimate ^{1/}

<u>Component</u>	<u>Annual Cost</u> <u>Increase (\$000's)</u> ^{2/}	<u>Brief Description</u>
Regional Irrigation Improvement	-0-	Existing Systems being improved, therefore no new costs to GOE. Improvements should reduce costs and cost recovery system will generate new income.
Structural Replacement	-0-	Backlog of over age obsolete structures being replaced which will reduce current level of recurrent replacement costs to GOE.
Preventive Maintenance	\$3,200	Strengthening the maintenance organization will improve the utilization of GOE resources allocated to maintenance.
Main System Management	1,370	Expansion of a system introduced under the project. The GOE will train personnel and has budgeted for the continued operation of the system.
Planning Studies and Models	320	Continues development of planning group introduced under a UNDP project. The GOE has trained personnel and budgeted for its continued operation.
Professional Development	1,050	Ongoing development of the training program introduced under the project. The GOE will train additional personnel to operate the program.
Water Research Center	850	Existing organization whose operational efficiency will be improved by the project.
Project Preparation Department	200	Department established by the project and the GOE has budgeted for its continued operation.
Mapping and Survey	170	Existing organization's operational efficiency will be improved by the project.
Miscellaneous TA and Commodities	<u>-0-</u>	
Total	\$ 7,160	

^{1/} Detailed budgets included in Annex F.

^{2/} Cost increase-Estimated increased recurrent costs to GOE as a result of the project.

Main system operational refinements involving advanced communications and analytical technology are addressed through the Planning Studies and Models Component and the Main System Management (Telemetry) Component. These two components are closely related. They will collect and analyze overall irrigation system data and send instructions to field sites for system operations.

Technical, qualitative manpower constraints are addressed by the Professional Development Component. The development of in-country institutions to meet training needs is a high GOE priority in its program to reduce the need for offshore training which has significant foreign exchange implications. This component will also develop a system of assessing fees to help recover costs of training non-MOI personnel. Internal MOI training is funded directly by MOI's operational budget.

Other components are intended for general MOI support, which include: the Water Research Center; Mapping and Survey; and Miscellaneous Technical Assistance and Commodity Procurement Component. Although these components have a significant impact of MOI operational efficiency, they have minimal budgetary implications as most of the staff and facilities already exist.

To adequately complete the implementation of the IMS Project over the next five years, additional staff will be required for the RIIP, Preventive Maintenance, Main System Management and Professional Development components. However, the majority of approximately 300 new staff (185 are being assigned to the IBRD Channel Maintenance Program) are being recruited against vacant authorized positions. There will be approximately 20 Sociologists, Economists, and Agronomists that will be hired against newly created positions. Annex S provides a detailed breakdown of the current 7,800 professional and 72,200 non-professional positions within MOI.

The Mission believes that the recurrent cost implications have been adequately addressed and accepts the MOI's certification that it has the ability to implement and maintain the IMS Project.

V. Implementation Plan

A. Overview

The Irrigation Management Systems Project Agreement was signed September 22, 1981 and will be extended to September 21, 1991 as a result of this Amendment. The IMS project is subdivided into 10 components, each with a responsible MOI Project Director, budget, and implementation time frame. Figure V.1. provides an organizational chart showing the responsible Project Directors, the components, the period of implementation of each component, and the period of time that technical assistance is required to assist in the implementation of the individual components. The key activities that have and will be implemented under the IMS Project are shown in Figure V.2. Annex F. of this PP provides a description of each component, its current status of implementation (existing components), planned activities (existing and new components), and required inputs by both MOI and AID.

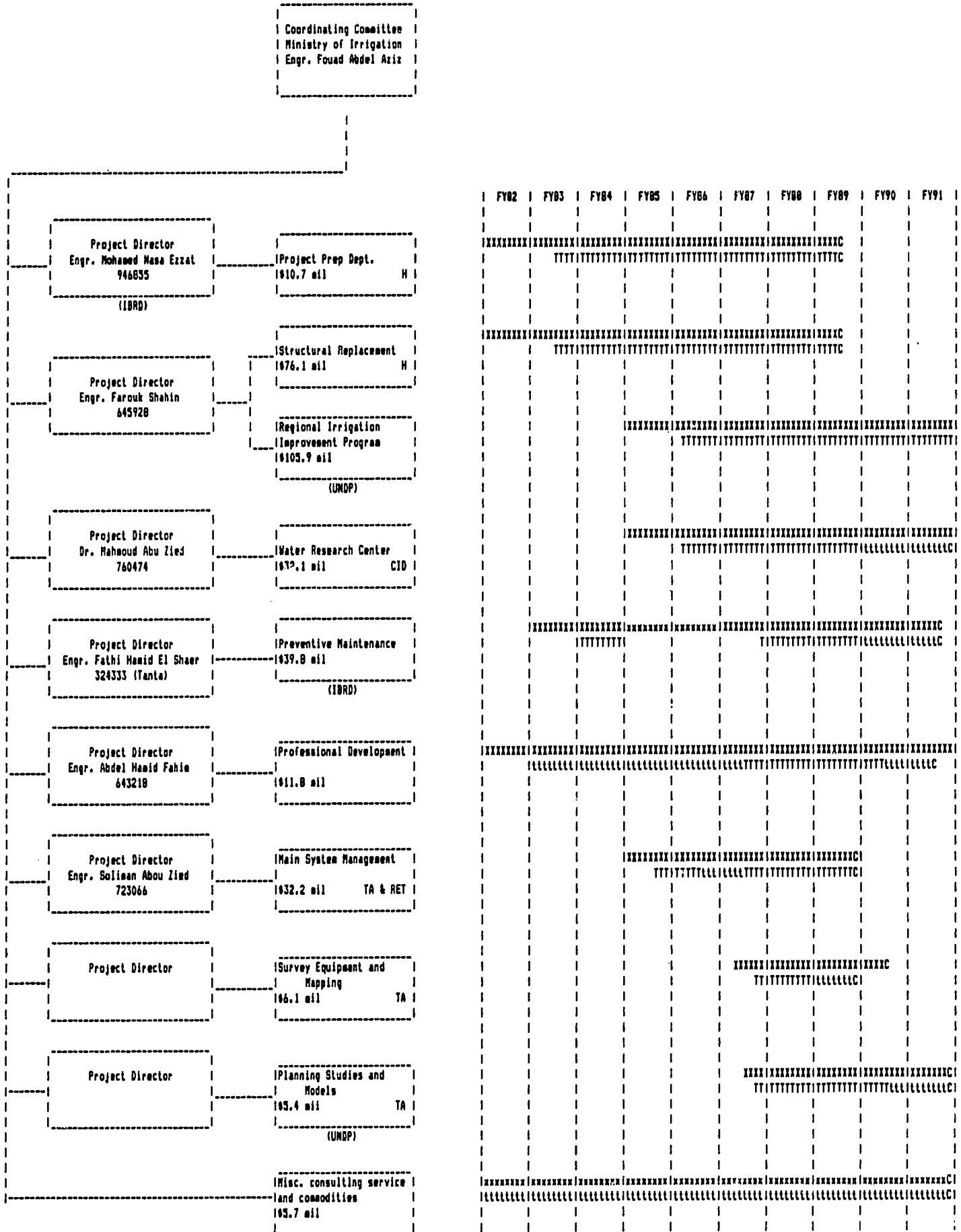
This section outlines the MOI's control over the implementation of the individual components and discusses the components and their relationship with the basic activities of technical assistance, procurement, construction, and training. During the development of the implementation plan, special attention has been given to assure that the MOI's reliance on resident technical assistance is phased down over time and that the staff time required by USAID is minimized. Greater responsibility for commodity procurement and arrangement of training abroad has been shifted to MOI and its consultants.

B. Implementation Management

1. IMS Project Coordinating Committee

The Committee was established in the early stages of the IMS Project to set policies regarding the implementation of the Project and assure coordination between the various departments within the Ministry of Irrigation responsible for implementing the Project. The Committee is also responsible for carrying out the following tasks: a) reviewing progress of individual components and assuring that the Project is kept on schedule; b) approving annual work plans and budgets of each Project Director; and c) monitoring the dissemination of information being generated from the Project throughout the Ministry and to other Ministries and organizations as appropriate. The Committee is currently chaired by the chairman of the Irrigation Department and is comprised of the Project Directors, key heads of departments and authorities within the Ministry, a representative from MPIC and a representative from AID. This committee meets one to two times per month to discuss issues and address implementation problems.

On an annual basis there will be a special meeting of the Coordinating Committee to review the progress in meeting the more significant targets as summarized in Annex N. The meeting will be attended by the Director of USAID, or his designated representative. The extent of progress will be used as an indicator of the level of annual obligations to be provided by USAID.



H = Harza Engineering Co.
 CID = Consortium of International Dev. 614.1 mil contingencies
 RET = RET Corporation
 TA = Technical assistance requirement
 (UNDP) = in coordination with other Donors

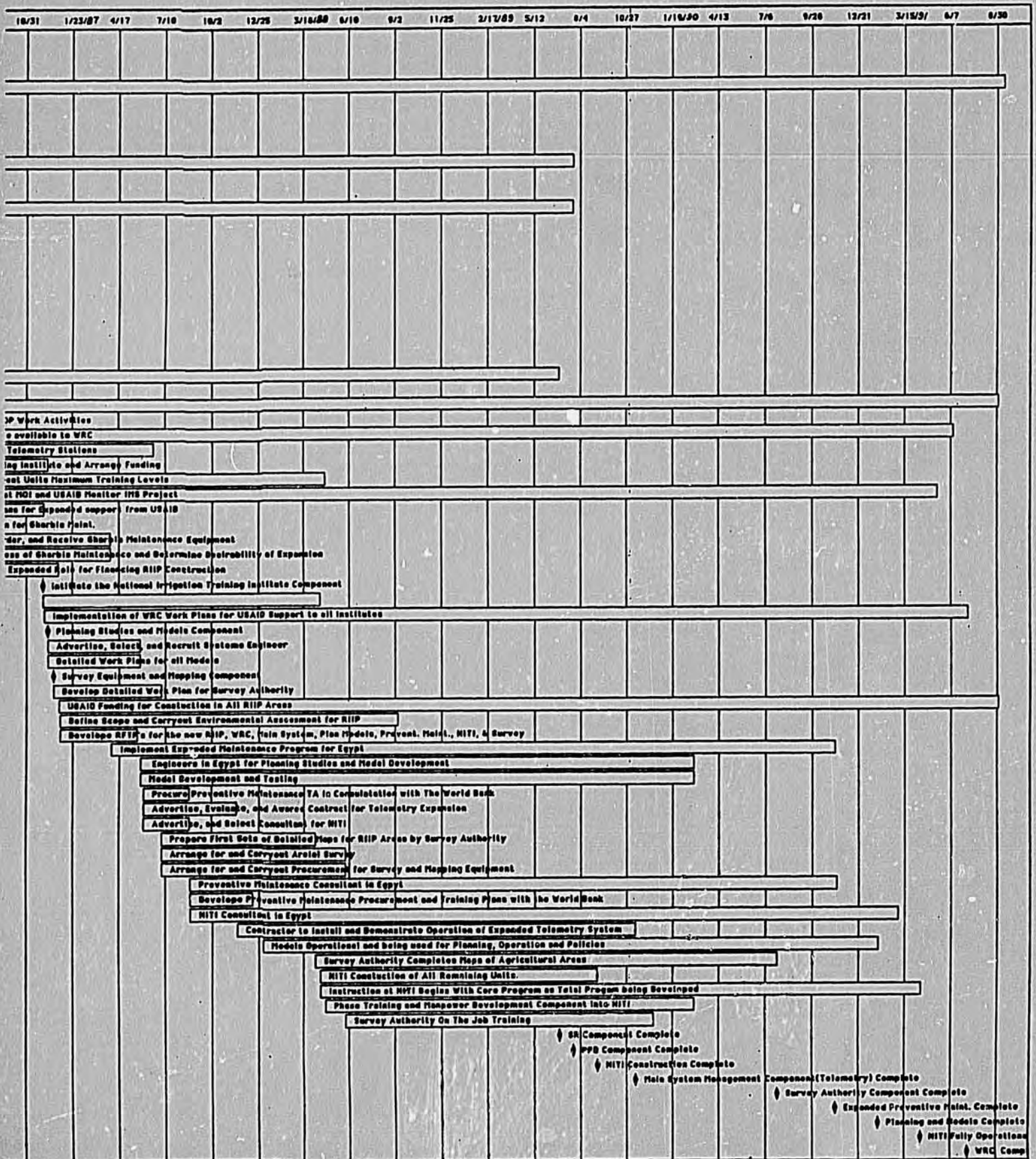
xxx = intermittent sub project activity
 tt = part time technical assistance
 C = activity or TA complete

xxx = full time project activities
 TTT = full time technical assistance

-45-
Irrigation Management Systems

IMPLEMENTATION PLAN

1/1/82	3/26	6/18	9/10	12/3	2/25/83	5/20	8/12	11/4	1/27/84	4/20	7/13	10/5	12/28	3/22/85	6/14	9/6	11/29	2/2/86	5/16	8/8	10/
IRRIGATION MANAGEMENT SYSTEMS PROJECT AGREEMENT SIGNED SEPTEMBER 22, 1981																					
Develop Core Program for the Training and Manpower Development Component and Become Fully Operational																					
Mobilization of Gharbia Operation and Maintenance Component																					
Misc. Commodities and Consulting Services Throughout the Life of the IMS Project																					
Project Preparation Department Becomes Operational																					
Obtain Resident Technical Assistance for Project Preparation Department																					
Develop Work Plans and Obtain Consultant for Structural Replacement																					
Phase I of Structural Replacement, install 2,500 Structures and Evaluate																					
Herzog Engineering Technical Assistance for the Project Preparation Department and Structural Replacement																					
Gharbia Maint. Study by MOI and Herzog																					
North Zifta Feasibility Study carried out by PPD and Herzog																					
PPD Normal Operations Carrying out Feasibility and Special Studies																					
Expand TPO Program to Maximum Capacity Under the Original IMS Project																					
Amend IMS PP for Phase II of SR and Complete the 3,000 Phase I Structures																					
Evaluation of Gharbia Maint. Study																					
Regional Irrigation Improvement Program Component Begins																					
Select TA Contractor, Negotiate Contract, & team arrives for RIIP																					
RIIP Initial Work Plans on Gharbia Canal, Data Collection, Initial Plans and Designs																					
Water Research Center Component Begins																					
Obtain Resident Technical Assistance for WRC																					
Main System Management Component (Telemetry) Begins																					
Develop R/D for Telemetry Project																					
Implement and Complete Phase II of SR (3,000 Structures)																					
Advertise, Evaluate, and Award Contract for Telemetry																					
TA Team for RIIP in Egypt																					
Finalize RIIP Work Plans for TA and Define UNDP Vot																					
General Resident and IDV Technical Assistance via																					
RET Corporation install and Commission 250 Telem																					
Planning for the National Irrigation Training in																					
Maintain Training and Manpower Development U																					
Project Funded PASA to Assist MO																					
Development of WRC Work Plans for																					
Revised Implementation Plan for																					
Prepare for, Order, Evaluate Progress																					
Define USAID Expe																					



2. Committees for RIIP

There will be three committees that give special attention to the Regional Irrigation Improvement Program. One of their responsibilities will be to focus their efforts in assuring and improving coordination with and receiving inputs from MOA at both the central and field levels. The committees are briefly described here with details provided in Annex H.

a. National Irrigation Improvement Committee (NIIC)

The NIIC was formed in 1984 by Ministerial decree and is a committee within MOI to recommend policy changes to the Minister and provide coordination of overall irrigation improvement activities. The NIIC is comprised of the heads of all of the authorities and departments within MOI. The MOI will now add an MOA representative to NIIC to improve high level coordination for the RIIP activities.

b. Technical Advisory Committee (TAC)

The TAC will be formed under this project to advise the Director of the National Irrigation Improvement Program (part of which is RIIP). Its membership will consist of specialists from the MOA, MOI, consultants, USAID, UNDP, and Universities. The TAC will provide the breadth of technical scope and integration needed in this large national program.

c. Coordinating Committee (Governorate)

In each Governorate a coordinating committee will be formed as part of this project to facilitate the implementation of RIIP at the field level. The committee will consist of the Undersecretary of Irrigation, Undersecretary of Agriculture, Director General of RIIP, District Engineers, and others to assure full understanding and coordination of the RIIP implementation.

3. Project Directors

The MOI currently has six Project Directors responsible for implementing seven of the components (Figure V.1.). Two additional Project Directors will be appointed upon the initiation of the new activities as defined in this project paper to be responsible for the Survey and Mapping Component and the Planning Studies and Models Component. Each IMS Project Director is directly responsible for the day-to-day operation of his component, including establishing budgets, recruiting necessary staff, arranging for and working with the consultants, and keeping the responsible AID officer and his staff informed of all activities regarding the implementation of his project component. The Project Directors meet with the AID officials on a weekly basis to discuss project implementation issues.

Under this Amendment the Project Directors will each be provided with a computer and specialized training to develop and maintain a detailed implementation and management plan for his Project component. The plan will identify all the tasks on a weekly basis, resources required, and persons responsible for each task. The plan will be reviewed and updated with the assistance of the assigned USAID official on a monthly basis. The plan will be reviewed by the IMS Coordination Committee on a quarterly basis.

C. GOE Responsibilities

As indicated above, the GOE/MOI will have overall responsibility for implementing the various project components. In addition to those implementation actions identified above, the MOI will also be responsible for: (a) the detailed planning of each component and the necessary actions to implement the component such as local contracting for SR and RIIP; (b) providing necessary staff and budget for each project component; (c) reporting to AID on the status of implementation of all components; (d) identifying personnel for in-country and external training; (e) maintaining necessary financial records; and (f) maintaining and evaluating activities.

The various activities of the project will be administered by the following existing units of the MOI organization: (a) the Irrigation Department will supervise and manage the Structural Replacement, RIIP, and Preventive Maintenance Components; (b) the Planning Sector will be responsible for the Project Preparation Department, Main System Management, and Planning Studies and Models Components; (c) the Water Research Center will administer the Professional Development and WRC Components; and (d) the Survey Authority will manage the Survey and Mapping component. Recognizing the interrelationship of the various activities, the Ministry will continue to operate the Coordinating Committee for the Project. Operational responsibility will be in the respective units but the Committee will provide a means of developing coordinated policies which it will recommend to the Minister. Use of specific consultant services will be under the direction of each responsible Project Director.

D. Technical Services Contractor (s) Responsibilities:

Technical assistance staff will provide necessary technical advice in planning, designing, and implementing activities; in identifying and planning training programs and arranging for training in Egypt and abroad; and in evaluation activities. If procurement is not consolidated under a single P.S.A., the technical services contractor or contractors, including any subcontractors, will procure commodities to support technical assistance utilizing AID financed procurement procedures established in Handbook 11. All procurement will require MOI approval. Prior AID approval of all procurements and awards by the contractor in excess of \$100,000 or the Egyptian pound equivalent will be required. Contracting procedures have previously been approved by AID for those host-country procurements under \$100,000.

E. Procurement (Complementary to Section IV.D.)

1. Construction services

a. Irrigation Improvement and Minor Buildings

(1) Contractor Capacity:

The MOI has executed virtually all of its major investment programs through public and private contractors. It is therefore necessary to review briefly the capacity of the Egyptian contractor community to continue to absorb additional demands which will be placed on it with both the SR and RIIP programs.

Contractors located in the outlying areas where construction work is being, or will be, carried out are generally small private companies, though their numbers are substantial. Like such entities everywhere, they have been constrained by lack of capital and have found some difficulty in increasing their capacity. However, those firms in the Governorates already doing SR construction for the MOI and similar work for other institutions have developed the capacity to absorb some additional work.

The larger volume of work in the SR and RIIP programs has opened up new possibilities for contracting. Larger private firms which would not have been interested in scattered small structure work are interested when larger numbers of such jobs are available within a limited radius. There should be no serious problem in obtaining competitive bids and successfully awarding contracts to the larger contractors. Skilled labor is not a constraint as the private sector companies pay competitive wages.

The Project follows standard GOE procurement practices in the award of its contracts. In the past, private sector construction companies have performed most of the Project's construction work. As the RIIP and Preventive Maintenance components are expanded, the public sector's share of contracting could increase. However, under this project amendment, USAID will not reimburse the costs of any new construction activities carried out by public sector companies. This represents a major shift in current MOI policy and will be monitored closely to determine its impact.

(2) Disbursement Method

The system to be used for irrigation improvement activities (SR, RIIP, and Preventive Maintenance) and for minor buildings will be reimbursing the GOE for a fixed percentage of the costs of each Host Country Contract. This method has been used since the inception of the Project and is in accordance with the "percentage of actual cost reimbursement" procedure under FAR. Since FAR procedures are being used the requirements set forth in HB 11 do not apply. A separate implementation letter will clearly define the system to be used for each sub-project activity.

In summary this method provides that AID reimburse a fixed percentage of the estimated cost of the construction activity. The amounts are derived as follows: Structural Replacement--the annual amount is based on the projected total disbursements over one year; RIIP--the amount is based on the estimated cost of improving a canal command; minor buildings--the amount is based on the estimated cost of the structures. All of these improvement activities solicit bids for the work competitively from local contractors following established GOE procurement procedures (See Annex K for a detailed description of the system used).

b. Major Buildings

There will be no major buildings constructed under this project.

2. Technical Services:

Technical assistance is currently being provided through an AID-financed host country contract with a U.S. firm selected through the competitive selection procedures set forth in AID Handbook 11, Chapter 1, and by a direct AID Contract with a Title XII University consortium. Evaluations have been funded by AID direct contracts.

The project will continue to follow AID contracting procedures for technical services. The mode, whether AID direct or host country, will depend on the specific circumstances of each procurement.

As a result of this PP Amendment the following RFTP's will be issued covering technical assistance procurement needs (TA contractors may also have responsibility for training and commodities specifications.):

Component	TA Portion (\$ mil)	Contracting Mode Anticipated
Regional Irri. Improve. Program	(10.1)	Host Country
Water Research Center	(11.1)	Host Country
Preventive Maintenance	(5.0)	Host Country
Professional Development	(6.0)	Host Country
Main System Management (Telemetry & Automation)	(5.3)	Host Country
Survey Equipment & Mapping	(2.4)	Host Country

Short term TA will be arranged to assist MOI and USAID in developing the above RFTP's. Annex M provides the scope of work for such assistance.

The Mission reviewed the possibility of obtaining a waiver for predominant capability to continue the services of CID to provide assistance to the WRC and RIIP. However, it was decided, even though a case could be made to AID/W to approve a waiver to continue CID, that AID was best served by keeping within the spirit of competition mandated by the April 1985 revision to the Federal Acquisition Regulations.

The Mission recognized that a cost savings may result by continuing with CID thus avoiding any procurement and implementation delays. However, it was felt that award should be made in each case to the contractor submitting the most responsible and responsive proposals. If the procurement process becomes delayed a waiver will be prepared to enable an extension of the CID contract for a suitable transition between contractors.

The project has sufficient contingency funding to cover probable start up delays should a different contractor be awarded the contract for RIIP and/or WRC.

3. Commodities:

Project commodities, other than those included in eligible TA or PSA contracts, will be procured by the Ministry of Irrigation utilizing AID-financed procurement procedures established in Handbook 11, Chapter 3. This includes prior AID approval of all commodity procurement and awards in excess of \$100,000 or the Egyptian pound equivalent, whether by the MOI or a contractor. Procedures used for those host country or contractor commodity procurement under \$100,000 have previously been approved by AID. The TA contractors may assist and advise on procurement specifications, preparation of RFTP's, RFQ's, IFB's, and bid evaluations. Each procurement action will consider the lead time required to allow the commodities to be effectively utilized by the project. The ownership of all procured commodities, including vehicles and motorcycles will be with the GOE.

A minor amount of equipment will also be procured using AID direct contracts. However, to help assure that small business has adequate opportunity to participate and to facilitate this type of procurement AID direct contracting will be considered as a viable option to host country contracting as the situation warrants.

4. Training

Short course and academic training outside Egypt will be handled using regular AID participant training procedures administered directly by AID or the contractors. In-country training will be arranged by the MOI and the appropriate contractor.

The total offshore training outlays over the remaining life of the Project are approximately \$17 million. Training varies substantially among components, from \$10 million for WRC to \$200,000 each for SR, as shown in the following Table:

Summary of Training Costs (\$1,000)

COMPONENT	NON-DEGREE	DEGREE	LOCAL	TOTAL
1. Models	517			517
2. Main Syst.	450			450
3. WRC	3,034	6,225	340	9,599
4. PPD	200	50	30	280
5. SR	200			200
6. Prevent. Maint.	531		499	1,030
7. Prof. Devel.	1,128	982	151	2,261
8. RIIP	1,961	289	210	2,460
9. Mapping	268			268
10. Misc.	986	116		1,102
TOTAL	9,275	7,662	1,230	18,167

The above table represents the training activities that will be carried out outside of NITI. That is the training outside Egypt and a portion of local training for some of the project components during the initial stages of the NITI development. After NITI is fully operational, all local training and the coordination of training outside Egypt will be under its control.

The Project Director for each component, with the assistance of his contractor, will be responsible for developing a specific training plan tailored to his staff requirements. Each training plan developed will be submitted to and approved by the High Committee for Training within MOI and by USAID. The plan will then be implemented by the Project Director and his contractor.

While amending the current TA contracts and developing the contracts that will serve the future activities, USAID and MOI will shift primary responsibility for offshore training to the contractors. Essentially the total training budgets will be incorporated in the contracts.

The majority of the local training will be carried out in the Professional Development component. The Project Director (Professional Development) will assist each of the other Project Directors in developing their training plans and assure that sufficient courses are scheduled to meet their needs. The funds for this training is provided in the Professional Development component and is not chargeable to the other components. There will be certain local training activities such as OJT and specialized training that will not be carried out under the Professional Development component or

by the Contractors. Such activities are funded by quarters by advances in amounts not exceeding the approved budgets for each Project Director. Advances are replenished upon the submission of quarterly certified reports by the MOI Project Director (Professional Development) to USAID/Cairo. The reports are presented in the form and manner established by the Mission for funding local currency costs. Senior level management training is and will be administered by the main contractors and funding handled accordingly.

Funds provided under the project for invitational travel are disbursed directly by USAID/Cairo upon requests from MOI using mechanisms established within the Mission for US Dollars and local currency financing. The contractors may assist with the invitational travel where appropriate.

F. Gray Amendment

Small business and minority firms have been and will continue to be encouraged to participate in this project in accordance with AID regulations. Every effort will be made to identify appropriate opportunities for minority firm involvement in project implementation. Currently a minority firm holds a \$3.4 million contract to install the telemetry system and another contractor is obligated to use small business firms for developing procurement plans. Similar size contracts are expected under this Amendment. In addition, the Project's evaluation services are suitable for performance by a minority firm and, as such, we intend to set aside this work for minority contracting as provided by the Agency's Gray Amendment guidelines.

G. Logistics

Office space for the work force members working on the project will be provided by the Ministry of Irrigation. Because MOI holdings of essential office equipment are less than adequate, limited amounts will be procured for use of project staff. To ensure that project staff are mobile a number of vehicles will also be procured. These will be assigned to the different operating organizations for use of both contractor and GOE staff. Professional equipment will also be procured for use of both GOE and TA staff.

VI. Monitoring Plan

The USAID Office Director of the Office of Irrigation and Land Development (ILD), or his designee, will have general AID management responsibilities for the IMS Project. Day to day monitoring will be performed by the appointed AID Project Officer.

The monitoring needs for the IMS Project are complex. The 10 defined project components can be considered as individual projects in their own rights with contract needs, training requirements, construction activities (in most cases) and commodity requirements. To further complicate matters the individual components have their own implementation schedules, varying starting and completion dates, and are managed by individual Project Directors from various departments within MOI. In recognition of the complex nature of the project and the need to analyze the monitoring requirements to assure that the project is monitored in accordance to USAID regulations and to assure that AID funds are properly expended, a comprehensive "Work Force Projection" was carried out.^{1/} The analysis analyzed each component with its individual implementation characteristics and derived the following total aggregated person/year requirement to adequately monitor the project:

<u>Fiscal Years (US)</u>	<u>87</u>	<u>88</u>	<u>89</u>	<u>90</u>	<u>91</u>
<u>Person/Years</u>	4.5	4.9	4.2	3.9	4.0

Currently ILD is providing approximately three person years of monitoring effort in the form of a full time USDH Project Officer, a direct hire FSN Program Specialist, a full time Senior Irrigation Specialist (PASA) funded by the IMS project, and a portion of the office director's time to monitor the IMS project. To meet the future monitoring needs, the ILD staff will be expanded by one full time and one part time FSN contract civil engineer (PSC) supported by the project funds. The funding for the above specialists (PASA and PSC) is included in the miscellaneous component of the (IMS) project. The monitoring staff will be supervised by the project officer who will maintain financial control and signatory power for all vouchers and commitments of (AID) funds. In addition to these monitoring staff, others will be provided throughout the AID mission to provide services related to preparation and approval of contracts, processing vouchers, processing US training, carrying out evaluations, developing and amending grant agreements for required obligations, and overall AID fund management.

Past experience has shown that one of the more serious constraints to the timely and smooth implementation of each of the complex project components is the ability to track all of the individual day-to-day, week-by-week and month-by-month tasks that must be performed to keep the component on schedule. The implementation plan provided in Section V of this PP gives a simplified listing of the major tasks to be carried out during the life of the project. Each of the forty tasks shown to be in implementation or to be implemented under this Project Paper Amendment have approximately 50 to 100 sub-tasks that must be carried out to assure timely completion of the components. In recognition of this complexity, a special effort will be provided to improve the management capabilities of the responsible Project Directors of the IMS project. Project funds have been allocated to provide 12

^{1/} Work Force Projection, Office of Irrigation and Land Development, 16 December 1985.

specialized computers and management software for the use of the project directors and the USAID project management staff. The AID project management staff will be responsible for assisting each of the project directors to develop his management tracking plan, update the plan on a monthly basis, and report the results to the Coordinating Committee on a quarterly basis. Each management plan will include: (1) a comprehensive task chart showing all individual activities, starting date, ending date, individual responsible for actions, and resources required; (2) a time line chart of all activities and another for all individuals responsible for input to the various activities; and (3) summary tables of resource requirements. The management plans developed will also include field monitoring schedules of all key MOI officials and of the ILD monitoring staff. Three of the 12 computers will be temporarily located at the AID offices and the ILD staff will assist in providing the training necessary for the project directors to master their management techniques. When the testing program development, and training phase is complete, the three computers being used at the AID offices will be turned over to the MOI.

VII. Project Analyses Summaries

A. Administrative Analysis

1. Key Organizations Involved

Since its beginning the IMS Project has been a complex project involving some ten different components that interact with the many organizations within the Ministry of Irrigation. The MOI is the responsible agency of the Government of Egypt for all irrigation activities. It manages Egypt's portion of the water of the Nile and controls storage, release, use, drainage and disposal. Because of the integrated nature of its responsibilities the MOI is not a decentralized Ministry. The MOI is responsible for all work under this Project.

The Ministry of Irrigation is a large and complex organization, consistent with the wide scope of its responsibilities. It is composed of planning; operational, including field level; financial and other support units. This whole structure is augmented by a number of semi-autonomous authorities responsible to the Minister (For a chart showing the organization of the MOI see Annex H Figure 3). The units involved in the IMS Project are:

a. The Planning Sector with responsibility for planning, feasibility studies, and statistics; it consists of the Project Planning Department (PPD), the Water Planning Group (WPG), a Statistics Unit, and a Planning Follow-up Unit. The PPD was formed as part of a joint effort by IBRD and USAID and is supported by the IMS Project. The WPG has been transferred from the Water Research Center to the Planning Sector since initiation of IMS and will be responsible for execution of two critical components of the Project--Studies and Model Development and Main System Management (Telemetry).

b. The Irrigation Department with responsibility for all Nile River activities within Egypt, including the Upper Nile is the operational wing of the MOI and provides technical guidance to and supervision of the field organization of this centralized Ministry. Within the Department, the Irrigation Sector and the Horizontal Expansion and Projects Sector, both under the direction of a Senior Undersecretary, are the organizations central to major portions of the Irrigation Management Systems Project (SR, RIIP, and Preventive Maintenance).

The Senior Undersecretary for the Irrigation Sector has jurisdiction with regard to water delivery and technical guidance to field activities at and below the Directorate level. In other spheres the Directorates receive technical guidance from others, for example the Horizontal Expansion and Projects Sector for Major Projects, eg., SR and RIIP. Lines of authority are defined to reflect the complex structure and the system appears to function satisfactorily.

In actuality, staffing at the Directorate and District levels varies considerably. Since the Ministry has not had competitive salary levels and engineers have not been compulsorily assigned to various Ministries since 1976, there have been few new junior engineers entering the service. The result is a significant shortage of lower level professional engineering staff. There is only one engineer, for example, in each District. The situation is similar with respect to technicians. District Engineers are often unable to give as close attention to the various aspects of their routine duties as would be desirable. At the more senior levels of the Irrigation Department, including positions in the Directorates, virtually all posts are filled by qualified engineers with 15 or more years experience.

c. The Water Research Center has responsibility for all aspects of research related to the utilization of Egypt's water resources, executed through eleven institutes. These institutes cover all aspects of irrigation and water resource utilization in Egypt, from side effects of the High Aswan Dam to water distribution and irrigation research at the mesqa and on-farm levels. The WRC is headed by a Senior Undersecretary who is supported by four departments to handle budgeting, personnel matters, and other research support activities. One of the departments is responsible for Training and Manpower Development (TMD) activities which will be expanded into the Professional Development component of the IMS Project.

The Project will provide support for all eleven institutes and the departments of WRC. The WRC operates under a total annual budget of LE 43 million which is sufficient to carry out the IMS Project activities. WRC has the core staff to carry out the Project and will utilize the private sector and Universities for special studies that are staff intensive.

d. The Egypt General Survey Authority, which is responsible for establishing geodetic control, producing topographic maps, and maintaining cadastral records is one of six semi-autonomous authorities responsible to the Minister of Irrigation.

EGSA is administered by a Board of Directors made up of the Chairman of EGSA, the First Undersecretary of the Egyptian Military Survey Department, the First Undersecretary of the Ministry of Irrigation, the Undersecretary of Finance, a consultant to the Council of State, three Vice Chairman from EGSA, and others. EGSA is managed by three Vice Chairman and several support department heads. IMS Project activities will be focused in the five departments of the Office of Mapping Affairs: (1) Department of Maintenance; (2) Department of Geodesy; (3) Department of Topographic Map and Photogrammetry; (4) Department of Cadastral Surveys; and (5) Department of Drafting, Photography, and Printing.

2. Experience to Date

Recognizing the interrelationship of the various activities within the IMS Project, yet wishing to execute them within the existing units of the MOI organization, the Ministry has created a formal IMS Coordinating Committee. This group chaired by the head of the Irrigation Department, includes key people of the Senior Undersecretaries, Undersecretary, and Project Director level with responsibilities in the areas where IMS activities will be, or are being, carried out. Operational responsibility lies in the respective units but the committee provides a means of developing coordinated policies which can be recommended to the Minister. In this way coordination is achieved while keeping normal lines of authority and responsibility intact.

The Coordination Committee identifies priority needs for training, advises the Minister on budget and staff deployment priorities in relation to the needs of the project, and facilitates communication among those engaged in the various activities. It facilitates more effective project operations.

This coordination effort, however, does not have strong linkages outside the Ministry and between MOI and MOA, which play an important role in any irrigation policy. These linkages need to be strengthened.

The administrative system, and those who operate within in it, tend to pass needed decisions to higher levels more often than might be desirable for efficient and effective administration. While this is not expected to seriously impact on IMS Project operations, it could be a factor in the timeliness of approvals and decisions for training, procurement, and other implementation actions.

Some units of the MOI are inadequately or inappropriately staffed to carry out assigned responsibilities. The Project Planning Department had serious staffing problems in recent years whereas the Water Planning Group is considered adequately staffed for carrying out its responsibilities during the project period. The PPD staffing situation and proposed remedial measures which are currently being carried out are discussed in Annex F. There has also been a significant shortage of lower level professional engineering staff and technicians, particularly at the field level as is the case in the Irrigation Department. In addition, Project Directors and their unit managers are severely handicapped by incentive arrangements that are insufficient in amount and untimely in distribution.

Despite such problems, the mid-term evaluation found that project inputs had generally been provided in an adequate manner. With the exception of the Preventive Maintenance Component, technical assistance has been well received, and commodities provided under the original agreement are mostly in-country and in use. The GOE has provided key project counterpart staff to direct the various project components. However, the MOI's difficulty in acquiring and retaining qualified engineering staff, primarily owing to low levels of remuneration and incentives, has had a negative impact on implementation, particularly in the case of the PPD and telemetry components, which require high levels of skilled technical personnel.

The evaluation further noted that, overall, the IMS Project is contributing to a more functional institutional structure within the MOI. However, progress has been slower than planned because the Project did not make adequate allowance for the lengthy processes of institutional development, AID approvals, and contracting procedures. The Evaluation Report recommended that the Project be extended to provide adequate time to achieve its planned outputs. It also recommended that USAID and the MOI explore ways to resolve the MOI's difficulty in attracting qualified engineering staff (see Annex G for a summary and status of Evaluation Recommendations). Finally it recommended that more explicit attention needs to be given at the project design and negotiation stages to determine how project components, which require highly skilled manpower for successful implementation, can be adequately staffed, given the MOI's institutional constraints.

3. The Present Project

This Project Amendment addresses the above mentioned problems in different manners. It will start from the existing units in the MOI, use the existing committee structure and supplement it to increase coordination. It will augment this support with training, technical assistance and use of a trust fund account to increase the MOI's management capability.

Three levels of effort will be undertaken to improve coordination and cooperation between the MOI and the MOA under RIIP through the following committees:

a. National Irrigation Improvement Committee (NIIC).

The NIIC was formed in 1984 by Ministerial decree and is a high level committee within the MOI to recommend policy changes to the Minister and provide coordination of overall irrigation improvement activities.

b. Technical Advisory Committee (TAC).

The TAC will be formed under this project to advise the Director of the National Irrigation Improvement Program (part of which is RIIP). Its membership will consist of specialists from the MOA, MOI, consultants, USAID, UNDP, and Universities. The TAC will provide the breadth of technical scope and integration needed to implement a national program of this magnitude.

c. Coordination Committee (Governorate).

In each Governorate a coordinating committee will be formed as part of this Project to facilitate the implementation of RIIP at the field level. The committee will consist of the Undersecretary of Irrigation, Undersecretary of Agriculture, Director General of RIIP, District Engineers, and others to assure full understanding and full coordination of all RIIP implementation activities.

The integration and coordination of MOI and MOA efforts has been assured by a decision of the Council of Ministers in 1984.

To limit the impact of delays caused by the tendency to avoid decision-making at the appropriate level, each project component includes a detailed computerized management work planning process. It is expected that such a system will give the MOI adequate advance knowledge of the decisions that must be taken, giving enough time to work on them. This will be coupled with management courses to be provided to the MOI staff through the USAID-funded Agricultural Training Center. In addition, the technical assistance team at the MOI headquarters will continue to provide advice and training to the MOI staff on organizational and management issues. It is hoped that such efforts will have a measurable effect on improving the decision-making process at the MOI.

To combat deficiencies in the quality of staff, the Professional Development component of the Project and NITI will provide training to improve the skills of MOI staff to carry out higher technical level assignments, as in the case of PPD and telemetry. This training, which would include some time outside of Egypt, would be considered as part of the incentive package used to attract and keep qualified employees.

In another attempt to keep qualified employees, the project will endeavor to provide a good working environment for the staff through an improved operating fund management capability. This will be done by utilizing a trust fund to facilitate provision of GOE local currency requirements to each Project Director and thus alleviate some of the problems that plague the MOI. Short of providing direct incentives to employees, it would be used for prompt and adequate payment for office supplies, per diem and other operation costs.

These reforms may not be radical enough to completely change the performance of the MOI. Obviously, some units need less attention than others. For example, delegated authorities for the Planning Sector are fully adequate to discharge its Project responsibilities. With the proposed staffing and training for PPD, the Planning Sector will be adequately staffed. Also, the current numbers of engineers and technicians employed in the surveying and mapping departments are sufficient to carry out the activities planned under this Project. Key personnel will be provided observational training to assist them in assimilating the new technologies to be introduced. It can thus be concluded that, with assistance to be provided under the Project and with a continuation of administrative reforms regarding staffing, the MOI has the administrative capacity to administer and execute the IMS Project.

B. Technical Analysis

1. Overview

Egypt faces a growing food gap with increases in consumption outpacing increases in agriculture production. The greatest potential for rapid increases in agricultural production lies in improvement in total agronomic management of the "old lands". The old lands are those areas of the Nile Valley and Delta that have been in irrigated agriculture since before the 1950's. These lands are cropped at intensities of 190 to 195 percent and currently account for about 98 percent of Egypt's total agricultural production ^{8/}.

Egypt currently imports approximately 50 percent of its food needs which amounts to 3.9 billion dollars per year in foreign exchange. As Egypt approaches the year 2000, based on its current population growth rate, there appear to be only two main alternatives to meet its food needs. One would be to improve water use efficiency to save sufficient water to meet the municipal, industrial and agricultural needs of the country. This alternative is to take the combination of measures necessary to gradually increase use and delivery efficiencies, especially in the agricultural sector. The other alternative is not to make an effort to improve water use efficiency and accompanying agricultural production, but for the GOE to undertake a program of building its industrial base high enough to generate sufficient foreign exchange to cover the costs of importing the additional required food and fiber for the country ^{9/}.

Although AID has a series of programs directed toward private sector development which would strengthen Egypt's industrial base, the sheer magnitude of investment required to "generate sufficient foreign exchange" within a limited time frame is far beyond the resources available. Therefore, the later alternative has not been seriously considered.

The principal areas of project impact from major mesqa improvements and structure rehabilitation in the irrigation system are: a. increased irrigation efficiency through enhanced control of water discharges and greater efficiency of the canal system which leads to increased agricultural production; b. water saved and over time made available for alternative uses; c. budgetary savings resulting from correcting minor maintenance problems at a lower cost before they develop into major problems; and d. village-to-field and farm-to-market transportation cost savings resulting from the replacement of unsafe or unusable bridges.

8/ North Zifta Feasibility Investigation Office, Redesign of North Zifta Irrigation System Vol 5 pp I-1 (1985).

9/ Staff, Concept Paper-Amendment to the Irrigation Management Systems Project, pp 7, (May 1986).

2. Previous Technical Analyses

The IMS Project was first approved in 1981 and a technical feasibility analysis covering the initial program was prepared. This analysis centered on the GOE/MOI's capability to implement a nationwide structure replacement program. A number of constraints to the successful completion of the SR program were identified. Foremost was the lack of an adequately funded comprehensive maintenance program, closely followed by a scarcity of skilled professional and technical staff. These identified constraints led to the inclusion of an O&M planning study and an intensive training program in the first phase of the IMS project.

The above coupled with the North Zifta Redesign and Feasibility Study made up the first phase or tranche of the IMS project. The North Zifta study was included to determine the feasibility and economic consequences of additional irrigation improvements, primarily at the mesqa level, "as a means of helping increase agricultural production and productivity".

The original technical analysis concluded that this phase of the IMS project was technically feasible and within the capacity of the MOI to implement.

In 1984 the IMS Project was amended to provide a second tranche of funding for the SR program and to further develop selected activities from the Egyptian Water Use and Management Project (EWUP). These activities included support to the Water Research Center, an initial Regional Irrigation Improvement Program in the Minya Directorate and a Main System Management (telemetry) component.

The Technical Feasibility analysis for this first amendment to the IMS Project was limited to the following:

"As shown in the Appraisal Report and by the EWUP experience to date, the MOI has the capacity effectively to implement this Amendment. The Ministry has demonstrated its ability to make good use of technical and financial resources provided under the grant. There is considerable experience worldwide with the monitoring of irrigation systems. Adequate provisions are made in this Amendment for TA and training of Egyptian staff. Goods and services under this Amendment will be obtained in conformance with AID regulations, according to the guidelines of Handbook 11."

3. Alternatives:

The only viable alternative to the overall project would appear to be a massive support program designed to broaden the GOE's industrial base to a point where it would be physically able and economically advantageous to export industrial or surplus agricultural products and use the proceeds from such exports to purchase and import needed agricultural commodities. As previously discussed, the magnitude of investment for such an alternative is far beyond the resources of our program in Egypt and this alternative has not been seriously considered.

The IMS project, specifically the RIIP component, can be expected to improve agricultural production on 337,000 feddans simply by providing an efficiently managed year round supply of water for irrigation. This in itself could lead to an increase in cropping intensity from approximately 200 percent to somewhere in the range of 225 to 250 percent. The IMS Project also provides indirect benefits to all 19 Directorates or six million feddans of irrigated agricultural lands. A properly managed, reliable supply of irrigation water made available through the Structure Replacement, Water Research Center, Professional Development, and Main System Management components of the IMS Project might logically be expected to improve production by increasing cropping intensity on the remaining 5.6 million feddans of irrigated lands.

Four IMS activities or subprojects contain capital cost components. One of these, the SR subproject was approved and partially funded in 1981. Full funding was approved in 1984. This activity is substantially complete and was subjected to a technical analysis in both the original PP and Amendment No. 1 thereto. It was evaluated in 1983 and judged to be eminently successful. Several alternatives to this activity and its relationship to the IMS are worthy of mention.

a. Exclude SR in its entirety. The MOI with IBRD assistance had embarked on a major structure rehabilitation program involving barrages, major diversions, etc. This type of program would have little or no effect on agriculture production without a complementary downstream improvement program. This coupled with a recognized budget deficiency prompted the GOE/MOI to request USAID assistance. Thus, the urgency of a SR program was established. Had USAID declined to participate, the result would have been a negative, although non-quantifiable effect on agricultural production and the indefinite postponement of any beneficial effects from the MOI/IBRD program. Therefore, no further consideration was given to this alternative.

b. Fund only those structures that were demonstrably essential to the system. Under circumstances where hundreds of separate structures are involved with complex linkages not only within the overall system but below, at the mesqa and the farm level, such an effort would clearly be impractical.

c. Fund only the professional development aspects of the project. This course would enable the MOI to theoretically carry out the SR program in an efficient manner at minimal cost to USAID. However, given the budgetary constraints within the MOI, it would not lead to the accelerated program required to capitalize on the MOI/IBRD major structure rehabilitation project and its intended positive effect on agricultural production.

The SR activity is primarily an O&M effort and the precursor to IMS Project interventions in this area. Over the preceding years budget limitations and an emphasis on major canal maintenance and recently, increasing expenditures on tile drainage in farmers fields have reduced the amount of funds available for SR to a point where many structures were either completely or only partially functional. The SR component of the IMS Project directly addresses this problem.

The Preventative Maintenance and RIIP components also have a substantial capital cost component. These components began with two complementary studies, O&M Planning for the Gharbia Directorate and the North Zifta System Redesign and Feasibility Study. The intention of the O&M study was to formulate and test an O&M system that would be replicable in all of Egypt's irrigation directorates. The study was completed in 1984 and led to the Preventive Maintenance subproject.

The North Zifta study was concluded in late 1985. This study examined the physical system (water distribution, land leveling, on farm delivery system, etc.); cropping systems, including planting sequences, plant variations, soil, climate and related factors; the existing economic system with its components of capital, land, labor cooperatives, banks and government institutions; and the social-organizational aspects of the study area. The scale of benefits attributable to irrigation improvements precluded many structural alternatives that appeared to be desirable. In most cases, the obvious magnitude of costs involved allowed the rejection of alternatives without detailed analysis. Six alternatives were considered for improving the irrigation system of North Zifta.

A first-round analysis to select alternatives for more detailed study, was considered adequate to compare alternatives on the basis of cost. It was judged that implementation of one of the alternatives, rather than another, would not result in a major difference in the benefits obtained. Thus, where cost estimates were substantially different, a judgement was made regarding the least cost alternative that would be economically preferable. Alternatives included:

- (1) Mechanical Irrigation System
- (2) Raising Main and Branch Canals and Mesqas
- (3) Raising Mesqa Only
- (4) Concrete-Lined Low-Level Mesqas
- (5) Low-Pressure Pipeline and Mesqa/Pipeline Alternatives
- (6) Low-Pressure Buried Pipeline

The recommended alternative for improvement of the mesqa system in North Zifta was the Mesqa/Pipeline Alternative based on the results shown in Table VII.1.

Mesqa channels would remain below field level and not be lined. Each mesqa would be provided with a gated inlet so that mesqas may be rotated while water remains in the branch canal. Farmers would continue to pump from mesqas to their marwas but pumping turnouts (sagia points) would be improved.

The end of mesqas would be replaced by buried pipelines. The mesqa gradients are so flat that it would be very difficult to provide adequate water supply to tail-end farmers by open channel.

The benefits of the recommended alternative attributable to irrigation alone would come primarily from improved operation and maintenance and improved delivery of water to tail ends of branch canals and mesqas. The largest incremental yield increases (18 percent) would occur on the ten percent of land at the tail ends of mesqas that suffer water shortages during periods of peak requirements. The largest overall benefit (five percent yield increase for all crops) would result from improved operations that enable water scheduling on demand during the rest of the year.

The recommended alternative does not propose major changes in the concept of the main irrigation system, the irrigation practices of the farmers, the institutional structure of the Ministries of Irrigation and Agriculture, or the land use and tenure in the project area. The planned improvements are essentially of an evolutionary nature. Therefore, there should be no serious social or institutional impediments to project implementation.

The North Zifta System Redesign and Feasibility Study component is representative of the work currently planned for RIIP in 11 additional major irrigation commands in Egypt. This component also includes funds to construct and implement those irrigation system improvements that are found to be feasible in all 11 major commands.

It should be emphasized that the RIIP program is a phased activity that begins with a feasibility study in selected commands. This study would include all aspects of the planned irrigation improvement program, including environmental, social, and economic aspects. No construction would proceed until both the MOI and USAID were convinced that the best and most cost-effective alternative had been chosen and that adequate design/construction plans were complete and in compliance with all FAA Section 611(b) requirements.

The Professional Development Component of the IMS Project includes Technical Assistance, training of trainers and commodities to partially equip a National Irrigation Training Institute (NITI). The IMS Project evaluation, conducted in September 1985, recognized that an expanded IMS program would call for increasing numbers of trained MOI and MOA staff to meet the objectives of various regional and national programs. Of particular importance in expanding the interdisciplinary approach under the RIIP program is the preparation of greater numbers of staff to work at the mesqa level.

Table VII.1

ANNUAL COST COMPARISON OF ALTERNATIVES
FOR THE RIIP PROJECT COMPONENT

(Based on the North Zifta Irrigation System)

<u>ALTERNATIVE</u>	<u>COST PER FEDDAN</u>			
	<u>CONSTRUCTION COSTS</u>		<u>ANNUAL O&M</u>	<u>TOTAL</u>
	<u>Total</u>	<u>Annual</u>	<u>COSTS</u>	<u>ANNUAL</u>
Raised Canal System	LE 1952.6	LE 241.5	LE 29.1	LE 270.6
Concrete Lined Low Level Mesqa	LE 984.4	LE 158.2	LE 47.1	LE 205.3
Raised Mesqa -Earth Only	LE 1329.8	LE 165.5	LE 30.6	LE 196.1
Raised Rectangular Concrete Lined Mesqa	LE 714.2	LE 98.8	LE 36.0	LE 134.8
Low-Pressure Pipeline System	LE 670.2	LE 84.5	LE 31.6	LE 116.1
Mesqa/Pipeline	LE 288.2	LE 35.9	LE 50.3	LE 86.2

NOTES: This table is based on information contained in Redesign of North Zifta Irrigation System, Volume 1, Main Report, prepared by North Zifta Feasibility Investigation Office, dated December 1985.

An interest rate of 12 percent has been used in this table. Life of structures varies from 15 to 40 years.

A Training Needs Assessment Team analyzed a number of alternatives to a NITI, including the use of existing training facilities such as principal and regional universities, other existing national training institutes, regional and local training centers and other training resources in Egypt and concluded that the advantages of a specialized NITI were sufficient to fully justify such an institution.

The Main Systems Management component also contains a capital cost component. The IMS Project will provide construction funding for the MOI's Salheya Canal pilot automation project in the Eastern Delta area. The Ministry is making a feasibility study under the IMS project for operating this canal automatically in association with NRIDCS. Three of four alternatives have been preliminarily evaluated. This study is nearing completion and, after the selection of an alternative, a definite plan, design, and tender documents will be prepared.

USAID will closely examine the study and its conclusions and, also all plans, specifications and tender documents for compliance with applicable AID and FAA Section 611(b) requirements, prior to the release of construction funding.

In the event the MOI's feasibility study and supporting documents are deemed inadequate or ineligible for construction funding, project funds may be utilized for other project activities contingent upon prior USAID approval.

Additional analyses of IMS components and of the overall IMS Project are contained in the Project Components section of this PP and in Annex F. A more detailed technical analysis prepared by the Mission is on file in the Office of Irrigation and Land Development (AGR/ILD).

4. Conclusion

a. Summary

Numerous evaluations, assessments, feasibility studies, reports, and analyses have been prepared for the project and its components. USAID has concluded that the existing documentation has adequately demonstrated the technical feasibility of the overall project as well as its major components. In addition, the proposed project implementation plan provides for sufficient additional feasibility studies to ensure the technical feasibility of the individual activities to be implemented within each major component.

b. 611 (a) Considerations

Section 611 (a) of the Foreign Assistance Act requires that no agreement or grant which constitutes an obligation of over \$100,000 of US funds shall be made "if such agreement or grant requires substantive technical technical or financial planning" until (1) "engineering, financial, and other plans necessary to carry out such assistance, and a reasonably firm estimate of the cost" to the US Government have been completed and (2) any necessary "legislative action within the recipient country" has occurred or can be expected to occur in a timely manner.

The considerations of adequacy of planning required by Section 611 (a) have been met. The technical and financial analyses presented in the Amended Project Paper, along with the revised Implementation Plan, have identified the specific interventions required in the irrigation subsector, have costed out these interventions, and have addressed the question of what interventions can be financed, at what level, with available resources. Each unit responsible for component activities and their technical staff have proven to be fully competent to review designs, award contracts, and monitor contract performance. However, TA will continue to be provided to help guide positive adjustments in the review process. Independent evaluations will also continue to be carried out to provide an assessment of project progress. No legislative action on the part of the GOE is required for Project implementation. However, policy dialogue will continue to be carried out between USAID and the GOE regarding broader Agricultural Policy reforms (Section II).

c. 611 (b) Considerations

Section 611 (b) of the Foreign Assistance Act specifies that:

"Plans required under subsection (a) for any water or related land resource construction project or program shall include a computation of benefits and costs made insofar as practical in accordance with the principles, standards and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.) or acts amendatory or supplementary thereto."

The project has gone to exhaustive lengths to review the economic benefits and costs of the project. These analyses have been rigorously reviewed by the AID project committee and have been found to meet 611 (b) considerations.

C. Agricultural Analysis

1. General

Egypt's favorable conditions for agriculture are widely acclaimed: flat, fertile soils, favorable climate, an extensive irrigation system with continuous access to water, closeness to markets. Output per unit area is high by international standards due in part to a cropping intensity approaching 200 percent. While these are noteworthy accomplishments, output under irrigated conditions has not approached its potential. Agricultural production growth slowed to an annual rate of two percent during the 1970's compared with the current population growth rate of 2.8 percent.

Cultivated area in Egypt totalling about 6 million feddans is small relative to the country's population. The arable land (feddans) to population ratio of 0.12 is among the lowest in the world. The loss of agricultural lands to urbanization, the difficulties of land expansion, and the rapidly growing population have helped create an increasing food importation problem. Land redistribution initiated after the 1952 revolution has contributed to the small size of holding that averages 2.8 feddans in the Delta and 2.1 feddans in Upper and Middle Egypt. Of the total holdings, 95 percent comprise less than five feddans. Inheritance customs have resulted in even these small farms often being divided into

several plots that are served by different mesqas. The farms are predominately owner-operated, amounting to 63 percent. Only 13 percent of the farm labor force is permanently landless.

Contrary to what one might expect, labor has become scarce during periods of peak farming activity. This can be explained by such factors as rural-to-urban migration favored by subsidized urban living, easy access to the cities, relatively homogeneous ethnic backgrounds, high paying job opportunities in Middle East oil fields, and ample educational opportunities. Widespread use of tractors for plowing and pumps for lifting water have eased the labor shortage somewhat. However, many of the advantages of mechanization remain to be selectively introduced, undoubtedly because of the fractionalized land holdings and low farmer incomes.

Adding to such production obstacles are Government imposed penalties on farmers. These penalties, which amount to a "tax" on farmers' income, show up through cropping quotas for cotton, wheat, and rice together with the below-market prices farmers receive for these commodities. An IBRD study in 1982 showed that economic to financial price ratios (i.e., real versus market prices) for these three crops are on the order of 2:1 ⁹/₁₀. Farm input subsidies do not sufficiently offset such disadvantages to the farmers. Farmer reaction to these Government impositions has been to shift emphasis to more profitable, uncontrolled crops.

Other farmer problems include their dependency on government supplied inputs, which frequently are not available at the appropriate times or in the types and quantities needed. The State controls inputs such as fertilizers (through the Cooperatives) and seeds (through the Central Administration for Seeds); and the Principal Bank for Development and Agricultural Credit dominates the supply of agricultural credit.

Adding further to the problem has been the Extension Service's historical function as a regulatory agency. Extension's job was to ensure that farmers conformed with the law, rather than pursue its customary functions of teaching and advising. However, the MOA has begun separating its regulatory and administrative activities from its truly extension activities.

Two well funded experiments have successfully combined applied research with extension, resulting in increased production. For example, the USAID-funded Egyptian Major Cereals Improvement Project (EMCIP) and the Egyptian Rice Research and Training Project produced substantial yield increases over large areas. These results demonstrate the potential for broad-scaled improvements to Egyptian agriculture should technical expertise be combined with adequate funding.

2. Links Between MOI and MOA

Before each irrigation season, the MOA estimates the cropping patterns and the MOI estimates the farmers' irrigation requirements based on the proposed cropping pattern and climatic conditions. The derived quantities of water are then scheduled for delivery according to the standard rotation for the cropping zone and season. Once water is delivered to the head of each mesqa, the MOI has performed its function. The MOA picks up its responsibilities to the farmer, not in advising on irrigation practices, but on other aspects of farming.

Theoretically, these responsibilities include advising and teaching farmers about appropriate agricultural practices. Their advice concerns such items as varieties, planting dates, fertilizer and pesticide requirements, and so on.

The foregoing arrangement suffers on several accounts. For instance, the MOI may disrupt the schedule when farmers petition the District Engineer or even the Governor for additional irrigating time. Or, scheduled deliveries may not conform to plant requirements either because of weather conditions or because cropping patterns are different from those assumed in the planning process.

As implied, these links at the mesqa level have provided neither the means for conveying farmers' scheduling needs to MOI nor the procedures whereby MOI could respond even were it to learn of farmers' needs.

Because the Extension Service does not have agents versed in irrigation management, farmers receive virtually no help on this important topic. Farmers are left to their own devices in irrigating their fields. If irrigation conditions were stable over considerable periods of time, farmers through trial and error would have probably "honed in" on appropriate technologies. But this process does not handle environmental changes efficiently, nor does it take full advantage of technological improvements.

This project will build the required links between MOI and MOA and provide the necessary information to the farmers utilizing the Water Users Associations and the Irrigation Advisory Service discussed elsewhere in this paper.

D. Economic Analysis

1. Summary

The basic methodology used in the overall economic analysis of the IMS project was to first estimate the value of additional agricultural production that could be obtained from improving the irrigation system. Then the specific benefits expected from AID's investment in the IMS Project were estimated and the rate of return calculated.

Studies indicated that improvements in the irrigation system, as a result of the project, could potentially lead to a 15 percent increase in cropped area on currently cultivated lands and result in a 10 percent increase in yield per feddan. No expansion to new lands is assumed. The value of increased agricultural production was calculated to be about \$756 million annually. To achieve this increment in production an investment of approximately three billion dollars over a period of ten or more years would be required. The IMS project, which would invest up to \$340 million of USAID funds over a ten year period, is estimated to have a rate of return slightly above 20 percent. Sensitivity analysis indicates that the rate of return would increase if proposed agricultural policy reforms were enacted.

The project has gone to exhaustive lengths to review the economic benefits and costs of the project. These analyses have been reviewed by the AID project committee and have been found to meet 611 (b) considerations of FAA 1961 as amended. In addition, the specific concerns of Policy Determination 15 have been examined. The increases in production as a result of this project will have a positive impact on reducing agricultural commodity imports while at the same time, considering its scope, is not expected to result in significant increases in the export of agricultural products.

The economic analysis is described in four parts. The first section deals with the potential benefits to be obtained from improving the irrigation system. The second section discusses the relationships between

irrigation improvement and the outputs of the IMS Project. The third section presents the analytical methodology for computing the rate of return for the IMS project and the results of the baseline calculations. Finally, the sensitivity of results to changes in assumptions is explored.

2. Potential Benefits of Improved Irrigation

The benefits of improved irrigation in Egypt will be obtained mainly through increased agricultural production. Savings in the cost of pumping water through the canal and drainage systems also may be significant. Non-agricultural benefits, however, will be ignored in this analysis since the agricultural benefits seem to be sufficient to justify the IMS project.

Investment in irrigation results in better water control, which, in turn, leads to both increases in yield and area harvested. A good deal of ordinarily productive land in Egypt has been rendered unproductive by high water tables. This land can be brought back into production by lowering the water table through a combination of improved drainage and tighter control in the delivery of water.

Yields can be increased by getting the right amount of water to the farmer's field at the right time. Because of inadequacies in the delivery system, crops often receive inadequate water at critical stages of plant growth and too much water at other times. The overall effect will be a reduction in the amount of water per unit of land irrigated.

In estimating potential yield increases, this analysis draws upon the more intensive analysis conducted for the RIIP component (Consortium for International Development and USAID/Cairo, "National Irrigation Improvement Program," November 1986). Their literature review found that: cotton yields have been increased more than 90 percent by improvement in water quality; lack of water during various growth stages of wheat reduced yields from 9 to 22 percent; rice yields were reduced 18 percent and more by saline water; lack of timely water supplies has been shown to drop maize yields 30 percent more. In any analysis it is always problematic to apply experimental results such as these to actual farm conditions, but they are the most relevant information available. Therefore, based on this analysis and discussions with local experts, it was decided that national average yields could be increased at least 10 percent by irrigation improvements. To be on the conservative side, this analysis assumes a potential yield increase of only 10 percent.

An important issue, particularly in Egypt, is how to value agricultural production, and in turn the value of the benefits. The valuation is accomplished by estimating the quantities of farm outputs and inputs per feddan and applying "shadow" or "economic" prices to get a meaningful value added figure per feddan. First, the value of crop production per feddan is calculated; then the value of labor and other inputs is calculated and subtracted from the value of production to obtain value added per feddan. The resulting figure is a measure of the "real" returns to land, i.e., the value of agricultural output after netting out the cost of resources from other factors of production.

The value added per feddan applied to the 5.0 million feddans in the winter and summer yields a base estimate of total national agricultural value added. Then the per feddan value added figures with 10 percent yield increases are applied to the 5.75 million feddans to estimate national agricultural value added after the irrigation improvements. The difference between the two totals, LE 1.4 billion, is the estimate of the potential increase in value added due to irrigation improvements. The LE 1.4 billion

is an annual figure; given the long life of assets in the irrigation system, the annual benefits would be expected to recur over a period of many years. The actual benefits, of course, depend upon the level and timing of investment, with the maximum benefit in any one year being LE 1.4 billion.

Separate calculations were made for winter and summer seasons. The value added per feddan is estimated to be LE 234 in the winter and LE 668 in the summer, or LE 902 per year. These are considered to be conservative estimates because they are weighted averages of wheat and berseem in the winter, and cotton, rice and maize in the summer. If higher valued fruit and vegetable crops had been included in the calculations, the value added per feddan would have been somewhat higher.

The "Agricultural Data Base" compiled by USAID/Cairo shows a "cultivated area" of 5,907 thousand feddans in 1984, area of "major crops" of 9,665 thousand feddans, and area of "major fruits" of 433 thousand feddans. The accuracy of these statistics is questionable. After consultation with local experts, a decision was made to assume 5.0 million feddans for both winter and summer crops for purposes of this analysis, and to ignore the relatively unimportant "nili" crop. Thus, the assumed annual cropped area of 10 million feddans is slightly less than the reported area of major crops and major fruits. This is in keeping with the general approach of erring on the low side in estimating benefits.

There is no data on the amount of land idled by high water tables. The consensus of experts consulted in Cairo is that cropped area could be increased at least 15 percent if water tables were lowered by improved water control. This analysis assumes that both winter and summer cropped area could be increased 15 percent to 5.75 million feddans. Again, this is a conservative estimate; note that it is less than the reported cultivated area.

3. IMS Project Activities

The \$340 million budgeted for the IMS Project will be used to purchase a wide range of goods and services. As shown in Table VII-2, about one-half of the total is devoted to construction and another 20 percent to commodities. The remaining 30 percent is budgeted for services and contingencies, including 21 percent for technical assistance and training.

A breakdown of expenditures by Project component (Table VII-3) shows that four of the components utilize primarily services, while five involve mostly construction and procurement of commodities. The two largest components, Regional Irrigation Improvement and Structural Replacement, together account for 87 percent of construction. The third largest component, Preventive Maintenance, is heavily weighted toward commodity procurement and amounts for 42 percent of commodity expenditures.

These inputs will result in Project outputs consisting of both physical and human capital. Physical capital includes water control structures and bridges dispersed throughout the Nile Valley, equipment of various types and some buildings. Human capital is embodied in the managers, professionals, technicians, and laborers responsible for operating the highly complex irrigation system. The stock of human capital is built up through a variety of formal and informal training activities and technical assistance. Investments in physical and human capital under the IMS Project are complementary; new or improved structures and equipment will be more effectively utilized by a more knowledgeable and skilled work force.

Table VII-2 - IMS Project Expenditures by Expenditure Category

Expenditure Category (\$ 1,000)	Expenditure Expenditure	Percent of
Consulting Services	52,434	15.4
Training	18,810	5.5
Construction	154,160	45.3
Commodities	80,420	23.7
Local Services	17,842	5.3
Other	2,188	0.6
Contingencies	<u>14,146</u>	<u>4.2</u>
T O T A L	340,000	100.0

Table VII-3 - Percentage Distribution of Expenditures by Component

Component	Services/	Construction	Total
		and	
		Commodities	
Planning Studies and Models	77	23	100
Main System Management (Telemetry)	35	65	100
Water Research Center	73	27	100
Project Preparation Department	93	7	100
Structure Replacement	3	97	100
Preventive Maintenance	27	73	100
Professional Development	60	20	100
Regional Irrigation Improvement	17	83	100
Mapping and Survey	47	53	100
Miscellaneous TA & Commodities	77	23	100

1/ Sum of Consulting Services, Training, Local Services and Other Inputs

Three of the Project Components contribute primarily to the stock of physical capital. Structural Replacement mainly funds construction, although it includes a small amount of technical assistance; some on-the-job training benefits will accrue to the staff involved in executing the program. Regional Irrigation Improvement is similar in terms of the types of construction, but is different in that activities will be focused in selected geographical areas and more emphasis given to technical assistance and training. Preventive Maintenance provides mainly commodities but also a good deal of technical assistance and training to improve maintenance operations.

Six components contribute primarily to human capital development. The planning Studies and Models and Miscellaneous TA & Commodities components will result in better information and more skilled personnel, leading to better management of the irrigation system. By improving the Water Research Center, the IMS Project strengthens the research and development function, which is crucial to the long run effectiveness of any large organization.

The Project Preparation Department will be strengthened mainly through technical assistance and will result in better design and selection of projects. The Professional Development component will help produce better trained managers, professionals, technicians and skilled laborers by funding development of training facilities, training materials, and services. The Mapping and Survey component will produce information in the form of maps and other data needed for effective planning. The Main System Management component involves procurement of commodities, technical assistance, other services, and some construction to put in place and information system which will enable managers to more efficiently control the flow of water from the Dam through the extensive canal system.

All the IMS Project components contribute to the stock of capital, physical and human, in the Ministry of Irrigation. Although many of the components may seem far removed from the farmer's fields, they ultimately have a beneficial impact on the delivery of irrigation water and thereby on agricultural production.

4. Rate of Return

To put a numerical value on the IMS investments, a relationship between the potential benefits, discussed in the first section, and the amount of investment required to attain full development must be established. The analysis of the RIIP component estimates a cost of LE 329 per feddan to obtain the benefits envisioned for the areas selected for RIIP funding. The cost of attaining the full potential of LE 1.4 billion, however, probably requires considerably more investment per feddan for two reasons. First, the RIIP analysis assumes that while the single main canal in a command area will be improved, only selected subsidiary canals will be improved. Second, it deals only with the direct costs of RIIP and not with the other types of investments needed to improve the overall irrigation system.

For purposes of this analysis, it is assumed that an average of LE 1,000 per feddan must be invested on the 5.75 million feddans discussed above over the life of the project. This investment will come from budgetary and private resources. This implies LE 5.75 billion for the entire system. That would be the investment required to increase cropped area 15 percent and yield 10 percent, valued at LE 1.4 billion per year.

A second consideration is the timing of benefits. The structures funded by the IMS project generally have a very long useful life, some perhaps more than 50 years. Benefits of training and skill improvement will accrue during the remaining career of the employee, and may average from 10 to 20 years. Equipment may have a somewhat shorter life but generally will be at least several years. On the other hand, the knowledge generated by research and development may yield benefits indefinitely. For purposes of this analysis, we assume that the benefits of IMS investments accrue over a 30 year period. No salvage value is assumed. The precise period is unimportant because benefits occurring 20 or 30 years after the investment cost is incurred have little impact on discounted cash flows and the IRR.

It is also assumed that the benefits do not start immediately. Rather, it is assumed that the flow of benefits starts two years after the expenditure of Project funds because of inevitable lags in getting equipment set up and working, adjusting operations to new structures, and generally adapting new skills to job requirements. Therefore, an investment made today will yield benefits for 30 years starting two years from now.

IMS Project expenditures started in FY 1982 and are planned to extend through FY 1991. Thus, in these calculations, the flow of benefits start in 1984 and extend to 2022, the end of the analysis period. The benefits gradually build up until in 1993 they reach a maximum of 11 percent of potential benefits, or LE 156 million, continue at this level through 2013, and then phase down. The benefits are never greater than 11 percent of potential because total IMS expenditure of \$325,890 thousand (which excludes budgeted "contingencies" of \$14,110 thousand) is 11 percent of the \$3.0 billion (LE 5.75 billion at an exchange rate of 1.91) investment required to attain the full potential benefits. (The economic analysis uses the current market oriented exchange rate of LE 1.91 per U.S. dollar.)

Total benefits accruing to the \$325,890 thousand IMS project investment amount to \$2.46 billion. This works out to \$7.54 per dollar invested. Another way to look at it is that \$100 invested today will yield \$25 annually for 30 years starting two years from now.

The internal rate of return (IRR) of the Project is 20.7 percent. The benefit-cost ratio, calculated by dividing the sum of benefits discounted at 15 percent by the sum of investments also discounted at 15 percent, is 1.42.

5. Sensitivity Analysis

The purpose of sensitivity analysis is to gauge the effect on the rate of return of changes in various assumptions. One important assumption is the length of the benefit accrual period, assumed to be 30 years in the baseline solution discussed above. Since the annual benefit is 25 percent of the investment, the pay-back period is four years; costs would be just recovered and the IRR would be zero if benefits accrued for only four years. As the accrual period is extended, the IRR increases and reaches 20.7 percent at 30 years, as indicated in the baseline solution. Further extension of the benefit accrual period would add little to the IRR; it cannot exceed the 25 percent annual return.

Thus far, the analysis has assumed no change in agricultural policies. Policy changes that would encourage farmers to move toward a more efficient crop mix (from a national perspective) would result in a higher IRR for the IMS project. Assuming relative prices are changed so that the area planted to wheat increases at the expense of berseem in the winter, and cotton and rice expand at the expense of maize in the summer, the IRR would increase to 26.5 percent (see Table VII-4). In fact, policy changes may have an even more favorable impact if they lead to substantial yield increases of even a few major crops, not an unrealistic expectation.

There has been considerable controversy regarding the economic value of berseem. The economic analysis of the RIIP component assumed that the economic price of berseem is 80 percent of the nominal price. The same assumption was adopted for the baseline analysis reported herein. A 1983 World Bank report proposes valuing berseem at only 26 percent of the nominal price. This appears to be an unrealistically low valuation, but if it is used in our calculations, the IRR of the IMS Project is reduced to 18.8 percent.

Finally, Table VII-3 shows what would happen to the Project's rate of return if we arbitrarily change the benefit stream. The results graphically illustrate the robustness of the conclusion that the IMS project has a good rate of return.

Table VII-4 - Results of Baseline Solution and Sensitivity Analyses

	IRR	B/C Ratio/
Baseline Solution	20.7	1.42
Policy Induced Cropping Pattern Shifts ^{2/}	26.5	1.90
Berseem Accounting Ratio @0.26 ^{3/}	18.8	1.27
Benefit Stream Doubled	36.7	2.84
Benefit Stream Halved	10.8	0.71

1/ Ratio of benefit and cost streams discounted at 15%

2/ The weight for wheat is changed from 0.40 to 0.80, and the weight for berseem is changed from 0.60 to 0.20 in the winter. In the summer, the weights for both cotton and rice are increased from 0.25 to 0.40, while the weight for maize is reduced from 0.50 to 0.20.

3/ See text.

E. Social Soundness Analysis

1. Purpose

The purpose of the social soundness analysis presented in Annex J and summarized here is threefold: first, assess the compatibility of the IMS project with the sociocultural environment into which it is to be introduced; second, examine the institutional relationships between local irrigation communities and the MOI, and third, highlight some of the differences among beneficiary groups, especially those along the three distinct ecological locations of the irrigation waterway in Egypt.

2. Sociocultural Feasibility

a. Compatibility of Project's Strategy with Sociocultural Environment

The sociocultural environment into which this project is being introduced is compatible with project objectives. The project's primary justification for more efficient water management is to increase on-farm production. Water use per-se as articulated in the project is an equal justification because of the increasing demands that will be made on Egypt's water supply. In the future, with a growing population and increased urban, industrial and agricultural demands and stricter quality standards that would limit re-use, per capita supply of water will no doubt be reduced and wasteful practices will have to be curtailed and replaced by more efficient water allocation.

In each of the three distinct ecological locations along the irrigation waterway, farmers already break mesqa intakes, install underground pipes from canals, or illegally pump water from a "near by" canal or drain to their mesqa in order to assure their water supply. One can only assume that such acts would increase in frequency in a water-short future. An increase of illegal and destructive acts to get water would greatly undermine the planning of the Ministry of Irrigation (MOI) resulting in loss of control over water delivery. Local regulating tasks would be impossible for the MOI without organized cooperation from below, hence, existing water user groups should be more effectively mobilized to assume greater responsibility for efficient water delivery.

One of the start-up activities under the RIIP component of the project will be experimentation with different types of local relationships between irrigation communities and the MOI. Such relationships would involve the formalization of irrigation community organizations (Water Users Associations) and the expansion of local responsibility over the local delivery system. For example, rather than building new tertiary structures and then attempting to organize farmers around them; first, farmers should be organized, then their participation should be solicited in the design and construction process. The proposed Irrigation Advisory service will be tested to accomplish this goal.

b. Existing Varieties of Local Social Organization

There is considerable variety in the structure of local water allocation in Egypt from the unitary organization of an entire mesqa (hundreds of farmers) in Fayoum, to the small, separate, and in a sense, competing saqia rings along the mesqa of the Delta, to the individualistic and ad hoc arrangements in Middle Egypt.

This variety has direct implications for policies of irrigation development. The majority of farmers have to lift water onto their fields and some of the most important decisions in this project are focused around proposed changes in the lifting technology. Such decisions will have several, rather than just one, result. Farmers have found ways, individually and often collectively, legally and often not so legally, to get the water to their crops even under unfavorable irrigation circumstances. An improvement of on-farm water management will require focused attention on how proposed changes will affect the variety of ways that farmers get water to their crops.

3. Spread Effects: The Diffusion of Innovation

a. Farmer Participation and Policy Issues

Farmer participation in more efficient water management is closely tied to pricing and marketing policy reform. Replication and institutionalization of project activities will be responsive to policy changes. This is because of production constraints that farmers currently face, namely, fixed prices; procurement quotas; and imposed crop rotations that have limited their production options, their ability to accumulate reserves, and their access to credit.

b. Farmer Receptivity and Extension

Technical adoption of new practices is also limited by factors beyond farmers's control. The farmer will adopt practices which are financially attainable. However, the availability and supply of a new technology may be beyond his control.

This raises the question of the role and efficiency of the current extension program which, if operating optimally, would provide the farmer with necessary technical information on new practices. If extension work is weak, adoption and dissemination of new techniques will be questionable.

c. Staffing Problems in the MOI

One of the obstacles to diffusion of new technology at the local level is the shortage of engineers in Egypt, and especially a shortage of those trained in water management. The clear implication is that proposed project activities that would rely heavily on local MOI personnel or that would increase the workload or responsibilities of the district engineer would probably not be very feasible. Yet, the third element of the strategy for this project is to involve MOI staff in activities that focus on the total irrigation system rather than just the water delivery system. This implies an increased workload.

The Project will have to be tailored to the realities of the MOI staffing capability. During the initial stages of the RIIP activities special incentive packages will be developed for the MOI staff and special training provided in working with farmers to help evolve new or strengthen old irrigation groups. In most cases, simply adding this critical task to the schedule of busy irrigation engineers or agricultural extension workers will fail and must be avoided.

d. Lack of Collaboration Between the MOI and the MOA

Another obstacle to diffusion in this project could be the current lack of collaboration between the MOI and the MOA. When clearly allocated project funds are provided for collaborative tasks, common effort occurs. As soon as outside funding is removed, each Ministry seeks to guard its resources for its own activities and personnel.

4. Social Consequences and Benefit Incidence

a. Differential Access and Benefits From Irrigation

Benefits from irrigation affect different groups in different ways. The design recognizes that under a rotation system 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.

The Project's efforts to provide equal access of water to farmers all along the mesqa will disrupt the status quo. Farmers who feel that they "lose" by the changes will resist them. For this reason, this project should establish a research activity within WRC for the (1) identification of existing rights, (2) recognition of the changes in these rights that are implicit in the anticipated design, and (3) adaptation of these changes to increase acceptance by the affected parties.

One of the on-going data collection activities of this project should be socio-economic base line surveys for determination of the economic benefits accruing to farmers from an equitable water distribution. Actual estimates should be calculated to assess returns against costs incurred.

b. Beneficiary Groups

The purpose of this project is to improve the entire water management system so that new practices will be replicable and sustainable on a significantly wider scale. One of the groups to whom permanent and direct benefits of the project will accrue will be the numerous MOI technical personnel who will receive substantial formal and on-the-job upgrading of their professional skills.

Another group of beneficiaries will be those farmers directly affected by farm trials.

A causal relationship between improved water efficiency and yield will have to be established at the field level. It is preferable to design sample farm budgets for three reaches of the watercourse: (1) head; (2) middle; and (3) tail.

A number of working models are proposed for this project. One of these models is the "individual farm model" which will be designed to project major changes in cropping patterns in response to changed water availability. It is possible that the data suggested above could be gathered under this model.

The development of an additional model, a water response model, to identify the relative contribution of improved irrigation practices should be taken under consideration as a useful management tool under this project. Again, it may be possible to gather data along these lines under the individual farm models already proposed for the project.

c. Water User Groups

The project should work with the MOI in obtaining official recognition for Egyptian water user groups as they exist along the different locations of the irrigation waterway. Official recognition would include the application of new procedures that clearly define the rights and obligations of both the water users and the local MOI officials vis-a-vis each other. The ultimate goal would be to establish a direct working relation between water user groups and MOI engineers. Effective water user groups are very critical to the application and institutionalization of an improved water management system.

F. Environmental Analysis

1. Background

The basic elements of the RIIP component of the IMS Project are very similar to those studied in the "Plan and Feasibility Study for Redesign of the North Zifta Irrigation System" which was issued in December of 1985. That study was prepared under the Project Preparation Department component of the Irrigation Management Systems Project (IMS) financed by USAID.

Volume 5 of the study is an Environmental Report prepared in general compliance with those sections of the AID Environmental Procedures covering the preparation of Environmental Assessments.

In addition another USAID financed report titled "Strategies for Irrigation Development in Egypt" was issued in January 1986 which identifies many issues related to the environment. All issues and related discussions are provided in Annex Q and summarized here.

2. Anticipated Benefits from the Project

a. Direct Benefits

Increased efficiency of water use, increases in agricultural output and reduced costs of system operation are the primary benefits anticipated from the proposed Project. Increased efficiency is expected to result in more effective use of existing agricultural lands and eventual reclamation of some lands which are currently undeveloped. However, land reclamation is not a part of the IMS Project.

b. Indirect Benefits

Among the indirect benefits likely to result are reductions in mosquito populations and a reduction in the incidence of schistosomiasis.

Improved drainage should also affect the control of snails. Snails survive in the mesqas during winter because most mesqas do not fully drain at this time. The weed control proposed under this project should impact on snails as it will reduce their food supply.

3. Environmental Issues

There are a number of environmental issues which will need follow-up during implementation of the proposed IMS Project Amendment.

a. Over-Irrigation

In irrigated areas in Egypt, over-irrigation is an engrained practice. The project will increase the availability of water to many of the farmers at the ends of the mesqas systems. There may be a tendency for these farmers to over-irrigate as a result of the availability of more water than

usual. Other than pumping costs, there is no direct cost to the farmer associated with the use of the irrigation water; therefore, there is no severe cost constraint in the use of said water. Overall there will be a more balanced use of available water throughout the system.

However, historic over-irrigation, and general lack of control of the water distribution system, have created problems that are to be faced as part of the IMS Project.

High water tables have resulted from over-irrigation and poor drainage. This has resulted in water logging which has taken areas of farm land out of production and caused salinization of some lands which, in turn, has reduced their productivity.

These issues are recognized by MOI and AID staff as part of the problem set to be addressed by the various components of the IMS Project.

The project will involve improved drainage to many areas and the reduction of over-irrigation, thus substantially reducing potential breeding areas of mosquitos. In those mesqas where buried pipelines are used, the slow moving waters in the mesqas which are breeding grounds for mosquitos will be eliminated.

The project will involve the reuse of irrigation waters. It is anticipated that water from the drains will be blended with canal water and that the blended water will be applied to downstream agricultural lands. Typically, the drain waters have higher salinity than the canal waters but throughout most of the system the drain water is of high enough quality for irrigation. As the efficiency of the system increases salinity of drain water will become more of a problem. It will have to be monitored more carefully.

b. Sophistication of Proposed Irrigation System

The IMS Project involves the introduction of automatic controls for controlling flows, flow measuring devices, and other modern techniques for managing an irrigation system. Such sophistication is likely to increase the operation and maintenance cost of the irrigation system; but also increase its efficiency and effectiveness for a net plus to the MOI. There is concern that the GOE may not commit sufficient future resources to ensure the continued efficient operation and continued maintenance of the irrigation network.

c. Lack of Maintenance of Existing System

Sufficient resources have not been budgeted on an annual basis to enable the irrigation system to be properly maintained; accordingly, the efficiency of the system has suffered. Two IMS Project components (Structural Replacement and Preventive Maintenance) are in response to a history of deferred maintenance within the MOI. Correcting the maintenance situation will contribute to alleviating several of the environmental problems discussed above.

4. Recommended Environmental Plan of Action

It is the opinion of the Mission that a considerable amount of historical data exists regarding the environmental impacts of irrigation projects within Egypt. General indications are that the overall impact of the project upon the environment will be positive. However, many environmental issues have been identified which, to date, have not been adequately addressed in existing studies.

It is proposed that the existing environmental report for the North Zifta Irrigation System serve as the basis for an expanded report which would encompass the entire project area. This expanded report would be in the form of an environmental assessment to be prepared in accordance with AID environmental procedures. The environmental assessment would address those issues identified herein as well as any other significant issues that may be identified as a result of the scoping sessions to be conducted within sample commands for this project.

As the exact nature of many of the proposed improvements have not been clearly defined at this stage, it is imperative that the environmental assessment be performed in conjunction with, or immediately following, the final design of the project. The proposed plan of development for NIIP comprises a two-year pilot effort followed by a year of trial expansion and then the introduction of the first regular program in the fourth year. Should significant amendments to the design occur during implementation as a result of experience gained in the pilot effort, it may be necessary to revise and update the environmental assessment. The pilot areas are defined as the first 20,000 fa of the Serry canal plus 5,000 fa of each of the other 10 canal commands.

No construction activities will be initiated, except in the pilot areas, until after the approval of the environmental assessment.

5. USAID Washington Approval

AID Environmental Procedures require that an Environmental Assessment or Environmental Impact Statement, as appropriate, be prepared for all irrigation or water management projects. The Bureau Environmental Officer is responsible for the review and clearance of Environmental Assessments even when, as in this case, project approval authority is delegated to the field.

The Environmental Procedures as presented in this Section and in Annex Q have been reviewed and approved by AID/W. The approval cable is provided in Annex P.

VIII. Conditions and Covenants

The original grant agreement will be amended to include the following additional conditions and covenants.

Article 4 is amended by amending Section 4.5 and 4.7 and adding Sections 4.8 and 4.9 as follows:

SECTION 4.5. Initial Disbursement for New Project Components. Prior to any disbursement, or the issuance of any document pursuant to which disbursement will be made for new project components the Grantee shall, except as the Parties otherwise agree in writing, furnish to A.I.D. in satisfactory form and substance, the names and specimen signatures of persons authorized to act as representatives of the Grantee for these components.

SECTION 4.7. Terminal Date for Condition Precedent. If the conditions specified in Section 4.5 have not been met within ninety (90) days from the date of the Amendment providing funding for such new Project components, or such later date as the Parties may agree to in writing, AID may at its option terminate this Agreement by written notice to the Grantee.

SECTION 4.8. Additional Disbursements.

(a) Prior to any disbursement for construction under the RIIP component, the Grantee shall, except as the parties may otherwise agree in writing, issue a Ministerial Decree establishing a multi-disciplinary organizational structure for the RIIP component.

(b) Prior to disbursement for construction on individual selected RIIP areas, the Grantee shall, except as the parties may otherwise agree in writing, provide a feasibility report describing the problems in the area, proposed solutions, and the project's economic, social, and political feasibility.

Article 5 is amended by adding the following Special Covenants:

SECTION 5.12. Staffing. In addition to the agreement in SECTION 5.3 regarding staffing patterns and recruitment efforts, the Grantee agrees (1) to appropriately strengthen the multidisciplinary staff required for RIIP implementation; (2) to increase maintenance staffing in appropriate units of the MOI, including (a) strengthening the Office of Undersecretary, Irrigation Sector, Maintenance to have the capability to plan and execute a preventive maintenance program throughout Egypt; (b) adding a staff level Chief Engineer for maintenance in the office of U/S for Irrigation in each Governorate to coordinate maintenance activities in the three units in the Governorate responsible for maintenance; and (c) adding an additional engineer to the staff of each irrigation district to be responsible for managing maintenance activities in the District; and (3) to make a special effort to recruit and maintain the highly technical staff required for successful implementation of the Project Planning Department and Main System Management (Telemetry) components.

SECTION 5.13. Cost Recovery. The Grantee agrees to develop and implement a cost recovery program, mutually acceptable to the parties, by December 1988 to collect all or part of the operation and maintenance costs of the irrigation system and 100 percent of the site specific costs of mesqa and on-farm improvements. The development and implementation of such a program will include, but not be limited to; (1) the technical aspects of a cost recovery program; (2) preparation and proposal of necessary legislation to the Assembly; and (3) issuances of the necessary decrees and other relevant documentation for implementation of a cost recovery program.

SECTION 5.14. MOI/MOA Collaboration. The Grantee agrees (1) to develop and issue appropriate decrees defining the roles of MOI and MOA in mesqa improvement and on-farm development related to irrigated farming, and (2) to establish technical, local coordination, and other committees required for project implementation.

SECTION 5.15. Water Users Associations. The Grantee agrees to develop the necessary procedural and legal requirements, propose necessary laws to the Assembly; and issue the necessary decrees for establishing Water Users Associations.

SECTION 5.16. Planning and Operational Models. The Grantee agrees to supply to USAID on an annual basis, a report that compares irrigation system operation under present procedures with various models that have been developed and tested over the last several years by the Water Planning Group. This report will provide recommendations on how to facilitate the acceptance of utilizing the improved models.

SECTION 5.17 Authority for NIIP. The Grantee agrees to establish an authority to carry out the activities of NIIP by 1990. The authority will be of the same status of the present Drainage Authority and be created with a multi-disciplinary technical staff including engineers, economists, sociologists, and agricultural scientists, as well as essential support staff.

SECTION 5.18. Public Sector Companies. The Grantee agrees that no claims for reimbursement will be made for construction activities carried out by public sector companies. This agreement affects all new contracts let after the approval of the amendment.

IX. Evaluation Plan

Due to the complex nature and length of the IMS Project, three full evaluations of all of the project components are required along with several special evaluations of individual components. The evaluations have or will be carried out jointly by USAID and MOI and the evaluation costs are budgeted as part of the Project costs under the Miscellaneous component. In addition, to fully measure the impact of the major components of the project, socio-economic base line surveys will be carried out. The evaluations and studies are summarized below:

A. Full Evaluations

The first full evaluation was carried out during August-September 1985 by a team of two MOI and three expatriate specialists. Annex G summarizes the team's recommendations and provides the status of their implementation. The status of the recommendations are reviewed with the MOI on a quarterly basis and to date all but two of the recommendations requiring MOI action have been completed or are in progress. This first full evaluation and the EWUE evaluation, along with a special joint study by USAID and MOI of "Strategies for Irrigation Development in Egypt" became the basis for this second amendment to the IMS Project.

A second full evaluation will be conducted during the first or second quarters of USFY 1989. All components initiated with this Amendment will have been underway for approximately two years. This will be sufficient time to see some progress but also to assess problems and redesign/redirect those activities if necessary.

In addition, several components initiated early in the life of the project will be nearing scheduled completion--SR, PPD, Main System Management (Telemetry), and NITI construction. Depending on circumstances at the time, this evaluation could serve as the final evaluation for these components.

This second full evaluation would be scheduled for six weeks. The project will finance five expatriate consultants--an Irrigation engineer, Systems Planner, O & M specialist, Irrigation research specialist, and economist/Team Co-leader. The GOE will provide other necessary specialists and a Team Co-Leader.

A third final full evaluation would be conducted in the spring of 1991, about six months prior to the PACD. The evaluation team would be composed of the same kind of talent as the second team. The team would focus on the Project Purpose and the extent to which the various statements of end-of-project-status have been achieved.

B. Special Evaluation

Several special evaluations of individual project components will be required during the life of the project to confirm project assumptions and redirect components as appropriate to maximize the effectiveness of USAID's investments.

An evaluation of the Structural Replacement component was carried out in June 1983 confirming its economic viability and resulting in the first amendment to the IMS Project expanding the SR component from five to nineteen Directorates.

In September 1984, an additional evaluation of the SR component was carried out and its findings and status of implementation of recommendations are summarized in Annex G.

In October 1985, a "Training Needs Assessment" was carried out for the Ministry of Irrigation. The Professional Development component will follow the guidelines laid down by the Assessment Team.

Other special evaluations will be required. It appears possible that the UNDP/IBRD involvement in Planning Studies and Models will provide any special evaluation that may be needed, since both organizations are particularly concerned about the operational use of the models, as is USAID. If not, the second full evaluation could serve this purpose, but at a more aggregated level. Another possibility would be a special evaluation could include Main Systems Management (Telemetry), scheduled for late FY 88, as well as Planning Studies and Models. The evaluation would focus on MOI's operational use of the models as well as the technical structure and adequacy of the model set. The evaluation of the telemetry activity will be used to make a final determination in FY 88 on the viability of proceeding with the expanded version of the telemetry system.

A special evaluation of the Gharbia maintenance effort will be required before a decision can be taken regarding the replicability of the preventive maintenance approach and the number and location of Directorates in which to expand.

A special evaluation of the RIIP component will be required after approximately two years experience with the pilot efforts in the Serry canal command for the purpose of (1) firming up the improvement program to be used in other canal commands, (2) assessing the organizational viability of RIIP, (3) effectiveness of the IAS and the linkages and involvement of MOA, and (4) other factors.

An evaluation of the PPD component is planned for one year prior to the PACD. This evaluation will assess the degree of success in developing PPD self-sufficiency and determine whether, and what, further assistance may be required.

C. Social Economic Base Line Survey

To provide an accurate evaluation of the full impacts of irrigation improvements, three socio-economic studies will be carried out on selected areas of RIIP. An initial base line survey will be conducted on the selected areas prior to initiation of the farmer organization effort and construction activities to collect key information. Immediately after the renovation of the areas, a second survey will be conducted to collect data to evaluate the impact of the planning and construction activities on the area. After approximately five years time has elapsed to allow the agricultural production to stabilize, a third survey will be conducted to define the total impacts resulting from the irrigation system improvements. The costs for the surveys are included in the TA activity of the RIIP component.

IRRIGATION MANAGEMENT SYSTEMS
PROJECT PAPER 263-0132

VOLUME II

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ANNEX III

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SUBJECT: 263-0132 NEAC REVIEW OF IRRIGATION MANAGEMENT

REF: CAIRO 04633

1. THE NEAC REVIEWED THE PID, MARCH 5, 1981, AND GAVE APPROVAL TO DEVELOP THE PP. A NUMBER OF ISSUES FOLLOW WHICH SHOULD BE ADDRESSED WHILE PREPARING THE PP.
2. DEFERRED MAINTENANCE. THE NEAC FOUND THIS TO BE A MOST CRUCIAL ISSUE. THE PP SHOULD EXAMINE THE CONSTRAINTS (SUCH AS BUDGETING, PERSONNEL, ORGANIZATIONAL STRUCTURE, EQUIPMENT TRAINING, AND OTHER) WITHIN THE EXISTING SYSTEM WHICH HAVE LED TO THE CURRENT STATE OF SYSTEM DISREPAIR. THE PP MUST SERIOUSLY ADDRESS THE QUESTION OF SUSTAINING THE SYSTEM ONCE THE PROJECT IS COMPLETED. STRENGTHENING MOI'S CAPACITY TO PLAN, FINANCE AND MANAGE MAINTENANCE OF THE IRRIGATION SYSTEM MUST BE AN ESSENTIAL PART OF THE PROJECT.
3. BRIDGES - NEAC RECOGNIZES THE IMPORTANCE OF BRIDGES TO THE IRRIGATION SYSTEM YET IS CONCERNED ABOUT THE PROPORTION OF FUNDING DESIGNATED FOR THIS ACTIVITY. IF BRIDGES ARE TO BE SUCH A LARGE PART OF THE PROJECT, A FULLY DEVELOPED RATIONALE/JUSTIFICATION (REFTEL IS A GOOD STARTING POINT) SHOULD APPEAR IN THE PP.

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THIS RATIONALE SHOULD INCLUDE A FIX ON THE CONDITION OF EXISTING BRIDGES, AND THE FACTORS WHICH HAVE LED TO THE NEED FOR REPLACEMENT. AN ANALYSIS OF THE RANKING OF POSSIBLE ALTERNATIVES (L.E. BRIDGES B.S. REPLACING HEADGATES OR BUILDING A SPARE PARTS CAPABILITY) SHOULD ACCOMPANY THE BRIDGES DISCUSSION. IF BRIDGES ARE TO BE A MAJOR PART OF THE PROJECT, IT SHOULD BE INDICATED IN THE LOGFRAME. DEVELOPING THE MOI'S CAPACITY TO SUSTAIN O & M OF BRIDGES ON COMPLETION OF THE PROJECT SHOULD ALSO BE ADDRESSED IN THE PP.

4. ECONOMIC ANALYSIS - NEAC RECOGNIZES THE DIFFICULTIES/COMPLEXITIES OF CONDUCTING A STANDARD BENEFIT/COST ANALYSIS ON A PROJECT OF THIS NATURE. BUT EXPECTS THE PP TO CONTAIN A FULLY DEVELOPED ECONOMIC RATIONALE FOR THE PROJECT. PERHAPS BASED ON A LEAST COST ANALYSIS. HOWEVER FOR THE PROPOSED OR POTENTIAL REDESIGN EFFORT FOR NORTH ZIFTA A TRADITIONAL BENEFIT/COST. ANALYSIS IS ESSENTIAL AND THUS IS EXPECTED.

5. FARMER PARTICIPATION - ALTHOUGH NOT CRUCIAL AT THIS TIME NEAC RECOGNIZES THE NEED FOR ACTIVE FARMER PARTICIPATION IN THE WATER DELIVERY SYSTEM, PRIMARILY AT THE MESKA LEVEL. THE QUESTION OF WHETHER MOI OR MOA OR FARMERS ORGANIZATIONS SHOULD HAVE JURISDICTION AT THE MESKA LEVEL NEEDS TO BE RESOLVED BEFORE THE TOTAL SYSTEM WILL OPERATE EFFICIENTLY. FARMER PARTICIPATION IS ESPECIALLY IMPORTANT AND NEEDS CAREFUL ATTENTION IN ANY FINAL (NORTH ZIFTA) DESIGN EFFORT. IN THIS CONTEXT; THE RELATIONSHIP OF THIS PROJECT TO THE WATER USE AND MANAGEMENT PROJECT SHOULD BE THOROUGHLY EXPLAINED.

6. COMMITMENT - THE LEVEL OF COMMITMENT (MOI AND GOE BUDGET ALLOCATION FOR O & M) WILL NEED TO BE IMPROVED, THROUGH THE PROJECT OF OTHERWISE IF THE PROJECT IS TO BE IMPLEMENTED SUCCESSFULLY. A CP OR COVENANT CONCERNED WITH THE NEED FOR ADDITIONAL COMMITMENT OF PEOPLE AND FUNDS IS ONE POSSIBLE WAY OF DEALING WITH THIS ISSUE. ANOTHER WAY TO ENCOURAGE A GREATER COMMITMENT IS BY INVOLVING MOI IN ALL ASPECTS OF PP PREPARATION. THESE POINTS RELATE TO THE MOI'S CAPACITY TO SUSTAIN THE SYSTEM AND SHOULD BE ADDRESSED IN THAT CONTEXT.

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7. PURPOSE - NEAC FOUND THE PURPOSE, AS STATED IN THE PID, TO BE SOMEWHAT RESTRICTIVE WITH RESPECT TO ACTIVITIES TO BE INCLUDED IN THE PROJECT. GIVEN THE DUAL OR EVEN THIPARTITE PURPOSES ASSOCIATED WITH INSTITUTIONAL AND SYSTEM IMPROVEMENT INCLUDING THE ON-FARM USE OF WATER.

A MORE INCLUSIVE PURPOSE STATEMENT MIGHT BE: IMPROVE OPERATIONAL EFFICIENCY OF THE TOTAL IRRIGATION SYSTEM AND STRENGTHEN THE MINISTRY OF IRRIGATION'S OPERATION, MAINTENANCE, AND PLANNING CAPABILITIES.

8. TRAINING - GIVEN STAFF CONSTRAINTS WITHIN MOI AND AID AND DESIGN CONTRACTORS LIMITED EXPERIENCE IN DESIGNING TRAINING PROGRAMS FOR IRRIGATION MINISTRIES, NEAC ESPECIALLY ENCOURAGES MAXIMUM MOI PARTICIPATION IN DESIGN OF THIS PROJECT COMPONENT. NEAC RECOGNIZES TIME CONSTRAINT PLACED ON DESIGN TEAM AND SUGGESTS THAT DETAILS OF THE TRAINING COMPONENT BE DEVELOPED WITH PROFESSIONAL ASSISTANCE FROM OTHER MINISTRIES - DURING EARLY PHASES OF PROJECT IMPLEMENTATION.

9. DISBURSEMENT MECHANISM - THE PP SHOULD CONTAIN A THOROUGH DISCUSSION OF THE DISBURSEMENT MECHANISM TO BE USED INCLUDING A DESCRIPTION OF THE RATIONALE LEADING TO SELECTION OF THAT MECHANISM.

10. ENVIRONMENTAL - NEAC SUGGESTS THAT THE SCOPE OF WORK FOR THE ENVIRONMENTAL ASSESMENT OF ANY NORTH ZIFTA REDESIGN EFFORT BE DONE AS A PART OF THE PROJECT RATHER THAN NECESSARILY BEING SUBMITTED WITH THE PP. HAIG

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PROJECT AUTHORIZATION

Name of Country: Arab Republic
of Egypt

Name of Project: Irrigation
Management
Systems

Number of Project: 263-0132

1. Pursuant to Section 532 of the Foreign Assistance Act of 1961, as amended, (the "Act") I hereby authorize the Irrigation Management Systems Project for the Arab Republic of Egypt (Cooperating Country) involving a planned obligation of not to exceed \$42,000,000 in grant funds over a five-year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. Operating Year Budget allotment process, to help in financing foreign exchange and local currency costs of the Project.

2. The project consists of technical and capital assistance for the improvement of the medium and small structures of the Nile River Irrigation System in the old lands of Egypt and for the development of the institutional capacity of the Ministry of Irrigation to plan for and develop improved systems of water control and management. The project includes the financing of technical advisory services, commodities, training, evaluation and other costs. In addition, it will finance the construction of replacement structures in the irrigation system which are over age and beyond their span of useful life.

3. The project agreement (s) which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and delegations of authority shall be subject to the following essential terms, covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Procurement

(1) Except as A.I.D. may otherwise agree in writing or as provided in paragraph (2) below, goods and services financed by A.I.D. under the Project shall have their source and origin in the United States or in the Cooperating Country.

(2) Ocean shipping financed by A.I.D. under the Project, except as A.I.D. may otherwise agree in writing, shall be financed only on flag vessels of the United States.

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b. Conditions Precedent to Disbursement

(1) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, except with respect to goods and services to be procured directly by A.I.D., the Cooperating Country shall furnish, except as the parties may otherwise agree in writing, in form and substance satisfactory to A.I.D., a statement of the names of persons authorized to act as the representatives of the Cooperating Country, together with a specimen signature of each person specified in such statement.

(2) Prior to any disbursement of funds by A.I.D. for the purpose of reimbursing structure replacement (SR) the Cooperating Country shall furnish, except as the parties may otherwise agree in writing, in form and substance satisfactory to A.I.D.:

(a) Assurance that all structure replacement initiated in Directorates for which A.I.D. funding will be sought will be adequately funded in advance by the Grantee;

(b) Evidence of criteria indicating that Project Funding will meet the highest priority needs for improved water control consistent with reasonable costs;

(c) Assurance that Grantee will use standard Government of Egypt procurement procedures and Grantee's standard building designs and specifications for the procurement and construction of all replacement structures.

c. Covenants

The Grantee shall covenant as follows:

(1) The Grantee shall annually survey structural requirements in accordance with criteria agreed upon by A.I.D. to ensure that work is undertaken to meet the highest priority needs for improved water control consistent with reasonable costs.

(2) The Grantee shall annually analyze staffing patterns and recruitment efforts to ensure availability and deployment of personnel to the highest priority needs within the Ministry of irrigation.

(3) The Grantee shall expeditiously institute a manpower and training program, with appointed Director, which will, among other duties, select and present for review by the Ministry of Irrigation Coordinating Committee not later than December 1, 1981 a list of individuals needed to conduct short training courses. The Grantee further covenants to make such selected individuals available for necessary training, including overseas training, for project purposes.

(4) The Grantee shall introduce a performance-based incentive payments system for Ministry of Irrigation project staff.

(5) The Grantee shall in its annual budget requests include sufficient funds to adopt and apply the upgraded planning/execution system for operations and maintenance;

(6) The Grantee shall take the necessary reasonable steps in accordance with budget processes to assure that deferred structural replacement of non-major structures will be substantially eliminated by 1990.

(7) The Grantee covenants that, prior to the first disbursement by A.I.D., during each Egyptian fiscal year, the Grantee and A.I.D. will agree on the maximum amount of A.I.D. reimbursement for structure replacement for that fiscal year.

4. Section 612(b) Determination

Based on the justification set forth in the Project Paper, I hereby determine, in accordance with Section 612(b) of the Act, that the expenditure of United States dollars for the procurement of goods and services in Egypt is required to fulfill the purposes of this project the purposes of this project cannot be met effectively through the expenditure of U.S. - owned local currencies for such procurement; and the administrative official approving local cost support vouchers may use this determination as the basis for his or her certification as required by Section 612 (b) of the Act.

5. Based upon justification contained in Annex IX C of the Project Paper, I hereby waive the Code 000 nationality of supplier requirements set forth in A.I.D. Handbook 1, Supp. B., Chapter 5C for the dollar purchase of commodities in order to permit three U.S. manufactured vehicles to be procured in Egypt from an Egyptian dealer.

6. Based upon the justification set forth in the Project Paper, I hereby waive the limitation on the per unit price and the total amount of shelf items that may be procured in accordance with A.I.D. Handbook 1, Supplement B, Chapter 5B, Chapter 5B 4b (7) for the purposes of carrying out activities under the Project.

KLPID 08/27/86

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LOGICAL FRAMEWORK

I. GOAL

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

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

II. PROJECT PURPOSE

To strengthen MOI capabilities for:

A. PLANNING AND DESIGN

B. OPERATION

C. MAINTENANCE

MEASURES OF GOAL ACHIEVEMENT

Agricultural production and productivity increases. Farmers have adequate water supplies and are experiencing productivity increases.

Farmers have adequate and predictable water supplies required for crops; support structures in the irrigation system facilitate agricultural production; and water is freed up for agricultural and other uses.

END OF PROJECT STATUS

MOI implementing projects and programs that are well designed, carefully analyzed, and adequately financed by international donors and/or GOE.

Improved operation of HAD/Lake Nasser and improved control of the water distribution system resulting in the timely distribution of the proper amounts of water to end users on an equitable basis.

The irrigation and drainage system is maintained to prolong the infrastructure investment and so that maintenance is a positive factor in the performance of the canals, drains, and their control structures.

MEANS OF VERIFICATION

Production and yield statistics; Data on water logging and salinity.

MOI statistics on water flows and allocations and on condition of structures; observation.

Evaluation Review of Studies produced
Monitoring reports
External funding related to PPD studies.

Evaluation
Monitoring Reports

Evaluations
Monitoring Reports

ASSUMPTIONS

Farmers cooperate in the maintenance and appropriate use of the irrigation system.

Subgoal to Goal: Factors affecting agricultural production other than water stay the same or improve. Agricultural policies improved to free up production and markets.

The MOI will be successful in working out incentive pay arrangements to improve productivity of present staff and prospects for recruitment.

Engineering-oriented management leadership will accept the important role of other disciplines in reaching feasibility decisions. Well prepared studies will lead to early financing of needed irrigation and enhancing the status of the PPD group in the MOI.

PURPOSE (CONT.)	END OF PROJECT STATUS	MEANS OF VERIFICATION	ASSUMPTIONS
D. ALL PRIMARY FUNCTIONS (Planning, design, operation and Maintenance).	Research results applicable to MOI primary functions of Planning Design operation and maintenance of the irrigation system are being used by MOI managers and administra- tors. A continuous flow of MOI staff from the NITI, upgraded in capability and effectiveness, to carry out MOI pri- mary functions. RIIP program providing an integrated systems approach to carry out MOI primary functions.	Monitoring Reports Evaluation	MOI/MOA Collaboration is work- able.
III. OUTPUTS	MAGNITUDE OF OUTPUTS	MEANS OF VERIFICATION	ASSUMPTION
A.1. PPD capable of analyzing and developing alternative solutions for complex prob- lems; preparing high quality feasibility studies analyzing major investments alternatives open to MOI, and of providing staff level economic and techni- cal analysis for MOI mana- gers.	A.1. An average of four high quality feasibility studies produced each year. Half of these submitted to inter- national donors for financing. Consultation provided as re- quested for MOI managers on current developmental pro- blems.	Review of studies produced. Special Evaluation in Summer 1988. Monitoring Reports.	MOI units will turn to the PPD for assistance.
2. Planning models developed, calibrated, and in use, primarily for analyzing agricultural policy vari- ables and factors affecting the distribution system.	2. Three planning models avail- able for use by MOI and MOA managers and administrators.	Evaluations Monitoring Reports	

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OUTPUTS	MAGNITUDE OF OUTPUTS	MEANS OF VERIFICATION	ASSUMPTIONS
3. EGSA staff capable of updating and keeping current the essential mapping services and the cadastral survey system. High quality topographic, cadastral, and other mapping products produced and available to MOI, MOA, and other users for planning design and implementation of developmental measures and for operation of the irrigation system.	3. Topographic maps (1:10,000) for entire Nile Valley and environs (12.5 million feddans), new cadastral maps for four million feddans and revised/updated cadastral maps for four and a half million feddans at a scale of 1:2,500. New large scale maps (1:500) for the 4,000 towns and villages in Egypt. Aerial photography for the Nile Valley @ 1:10,000 scale and larger scales for cities and towns.		
B.1. Operationally useful models developed, calibrated, and used for the High Aswan Dam/Lake Nasser operations and for control and management of the irrigation system.	B.1. Four models operational for Upper Nile/Lake Nasser and for High Aswan Dam operation. Six models operational for management of the water delivery system in all of its aspects.	Monitoring Reports UNDP/IBRD reports Evaluations	
2. MOI managers/decision makers using model outputs to manage the irrigation system.	2. Operating instructions sent to field.		
3. Telemetry system fully installed and generating operational data on an hourly/daily basis which are being inputted into operational models.	3. 555 DCP's, two computers, 18 data receiving stations, and required models and other software installed.	Monitoring Reports Evaluations	

OUTPUTS

4. Main System automation investigations to include pilot installation and study, and reconnaissance level and feasibility level studies.
- C.1. Private contractors provided access to new equipment especially designed for channel maintenance. PEC's and MOI staff are capable of implementing new maintenance procedures. PEC's and private contractors are fully capable of providing high quality channel maintenance services throughout the irrigated area.
2. Weed research capability developed to a sufficient degree of competence to provide necessary research support to the Preventive Maintenance program.
3. A preventive maintenance program for irrigation structures, canals, and drains planned, designed, tested in Gharbia Directorate, and accepted by MOI. Basis established for installing modernized preventive maintenance systems throughout the irrigated area.

MAGNITUDE OF OUTPUTS

4. Pilot canal automation installed and tested for replication. Six automation feasibility studies completed.
- C.1. PEC's and private contractors equipped, 104 person months of training provided, and new procedures adopted.
2. Specific weed control methods evaluated from weed control, channel performance, and economic aspects resulting in recommendations for Preventive Maintenance techniques.
3. A preventive maintenance system tested in Gharbia Directorate, and installed in at least five additional Directorates.

MEANS OF VERIFICATION

- Special Reports on Salheya Canal
Reconnaissance Studies
Monitoring Reports
Evaluation
- Evaluation
Monitoring Reports
- Evaluation
Monitoring reports
Technical review of research results
- Evaluation
Monitoring Reports

ASSUMPTIONS

PEC's and private contractors are able to adopt and adapt to the new maintenance procedures.

OUTPUTS	MAGNITUDE OF OUTPUTS	MEANS OF VERIFICATION	ASSUMPTIONS
4. Backlog of SR eliminated and MOI funding for SR exceeds depreciation rate.	4. 9,500 irrigation structures replaced or rehabilitated. Structure replacement budget in excess of LE 11 million in 1991.	MOI status reports MOI budget	
D.1. Research capability of the 11 WRC institutes improved and useful results being supplied to operational programs of the MOI. Specific problems being tackled and solved.	D.1. Non-quantifiable	Evaluation Monitoring Reports Technical review of research reports	
2. NITI buildings constructed and equipped; staff recruited and trained, and NITI fully operational by PACD.	2. One set of buildings constructed, 150 person months of training provided and \$2.2 million of equipment procured and put to use.	Evaluations Monitoring Reports	
3. A system improvement approach developed and tested for improved planning, design, operation, maintenance, and management of on farm water management and canal delivery systems through actual field experience in RIIP areas. Staff capability developed to handle a national program of canal command,	3. 14 canal commands planned and designed for more efficient water utilization. Six of these canal commands with improvement programs constructed and having moved into operation; maintenance, and management phase.	Evaluations Monitoring Reports	MOI/MOA collaboration is workable.

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IV. INPUTS
AID

1. Technical assistance advisors and consultants (long and short term).
2. Equipment, supplies, vehicles to support TA and field activities.
3. Support costs (partial) in-country training and some local support staff.
4. Participant Training abroad
5. Dollar financing of local costs of the SR and RIIP Programs.

GOE

1. MOI staff time, salaries, per diem.
2. Office space, laboratory and other facilities, furniture, operating costs and other local costs.
3. Expanding investment in SR and RIIP.
4. Access to all available data and information for planning.

MAGNITUDE OF INPUTS
AID

(See IV. Financial Plan)

GOE

(See IV. Financial Plan).

MEANS OF VERIFICATION
AID

1. Project Accounts
2. AID and Contractor records
3. Evaluation reports
4. Contractor reports

GOE

1. MOI budget
2. MOI reports
3. Evaluation reports

ASSUMPTIONS

(Assumptions for providing inputs are made explicit in the text of the project description).

5C (2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only:
 B.1. applies to all projects funded with Development Assistance loans, and
 B.3. applies to projects funded from ESF.

CROSS REFERENCES: IS COUNTRY CHECK-LIST UP TO DATE?
 HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT1. FY 1986 Continuing Resolution Sec. 524; FAA Sec. 634A.

Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project.

AID will notify the Congressional Committees in accordance with the regular CN procedures.

2. FAA Sec. 611 (a) (1). Prior to obligation in excess of \$500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

(a) Yes.

(b) Yes

3. FAA Sec. 611 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

In the past, the People's Assembly has ratified all grant agreements in a timely manner.

4. FAA Sec. 611 (b); FY 1986 Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See AID Handbook 3 for new guidelines.)

Yes.

5. FAA Sec. 611 (e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project? Yes.
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multi-lateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. AID will coordinate with other donors in the irrigation sector.
7. FAA Sec. 601 (a). Information and conclusions whether projects will encourage efforts of the country to:
 (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of co-operatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions. The project will promote the private agricultural sector.
8. FAA Sec. 601 (b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs including use of private trade channels and the services of U.S. private enterprises). The project will be Code 000.
9. FAA Sec. 612 (b), 636 (h); FY 1986 Continuing Resolution Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other currencies owned by the U.S. are utilized in lieu of dollars. Egypt is not an excess currency country.

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10. FAA Sec. 612 (d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? Egypt is not an excess foreign currency country.
11. FAA Sec. 601 (e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes.
12. FY 1986 Continuing Resolution Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same similar or competing commodity? N.A.
13. FAA 118 (c) and (d). Does the project comply with the environment procedures set forth in AID Regulation 16. Does the project or program take into consideration the problem of the destruction of tropical forests? Yes.
14. FAA 121 (d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? N.A.
15. FY 1986 Continuing Resolution Sec. 533. Is disbursement of assistance conditioned solely on the basis of the policies of any multilateral institution. No.
16. ISDCA of 1985 Sec. 310. For development assistance projects, how much of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, and private and voluntary organizations? N.A.

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which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)?

3. Economic Support Fund Project Criteria

- | | |
|---|------|
| a. <u>FAA Sec. 531 (a)</u> . Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of part I of the FAA? | Yes. |
| b. <u>FAA Sec. 531 (c)</u> . Will assistance under this chapter be used for military, or paramilitary activities? | No. |
| c. <u>ISDCA of 1985 Sec. 207</u> . Will ESF funds be used to finance the construction of, or the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such country is a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin America (the "Treaty of Tlatelolco"), cooperates fully with the IAEA, and pursues nonproliferation policies consistent with those of the United States? | No. |
| d. <u>FAA Sec. 609</u> . If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? | N.A. |

5C (3) - STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? Yes.
2. FAA Sec. 604 (a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him? Yes.
3. FAA Sec. 604 (d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company? Yes.
4. FAA Sec. 604 (e); ISDCA of 1980 Sec. 705 (a). If off-shore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.) Yes.
5. FAA Sec. 604 (g). Will construction or engineering services be procured from firms of countries which receive direct economic assistance under the FAA and are otherwise eligible under Code 941, but which have No.

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attained a competitive capability in international markets in one of these areas? Do these countries permit United States firms to compete for construction or engineering services financed from assistance of these countries?

6. FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901 (b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates? No.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? Yes.
8. International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will the U.S. carriers be used to the extent such service is available? Yes.
9. FY 1986 Continuing Resolution Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? Yes.

B. Construction

1. FAA Sec. 601 (d). If capital (e.g., construction) project, will the U.S. engineering and professional services be used? Yes, to the extent feasible.
2. FAA Sec. 610 (c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practical? Yes.
3. FAA Sec. 620 (k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million (except for productive enterprises in Egypt that were described in the CP)? Yes.

C. Other Restrictions

1. FAA Sec. 122 (b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? N.A.
2. FAA Sec. 301 (d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? N.A.
3. FAA Sec. 620 (h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes.

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4. Will arrangement preclude use of financing:
- a. FAA Sec. 104 (f); FY 1986 Continuing Resolution Sec. 526. (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion? Yes.
 - b. FAA Sec. 488. To reimburse persons, in the form of cash payments, whose illicit drug crops are eradicated? Yes.
 - c. FAA Sec. 620 (g). To compensate owners for expropriated nationalized property? Yes.
 - d. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes.
 - e. FAA Sec. 662. For CIA activities? Yes.

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- :
- f. FAA Sec. 636 (i). For purchase, sale, long-term lease, exchange or guarantee of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? Yes.
- g. FY 1986 Continuing Resolution, Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel? Yes.
- h. FY 1986 Continuing Resolution, Sec. 505. To pay U.N. assessments, arrearages or dues? Yes.
- i. FY 1986 Continuing Resolution, Sec. 506. To carry out provisions of FAA section 209 (d) (Transfer of FAA funds to multilateral organizations for lending)? Yes.
- j. FY 1986 Continuing Resolution, Sec. 510. To finance the export of nuclear equipment, fuel, or technology? Yes.
- k. FY 1986 Continuing Resolution, Sec. 511. For the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? The Project will not repress human rights.
- l. FY 1986 Continuing Resolution, Sec. 516. To be used for publicity or propaganda purposes within U.S. not authorized by Congress? Yes.

Ministry of Irrigation
Office of Senior
Undersecretary
Head of Irrigation
Development

Mr. Frank B. Kimball
Director
U.S.A.I.D
Cairo

Dear Sir:

Thank you so much for your continuous help in the field of irrigation development. As you are aware, some of AID staff together with their counterparts from the Ministry of Irrigation have been holding discussions on ways to improve and expand AID support for our irrigation development activities.

As a result of this effort, a project paper amendment to the Irrigation Management Systems Project was developed. We now request that AID support the enlarged effort as projected in the project paper amendment to the Irrigation Management Systems Project.

The purpose of the project, as we know, is to strengthen the capabilities of the Ministry of Irrigation in operating, maintaining, and planning for the irrigation network.

It is suggested that the project provides up to \$340 million to implement the ten project components:

1. Regional Irrigation Improvement;
2. Structural Replacement;
3. Preventive Maintenance;
4. Main Systems Management;
5. Planning Studies and Models;
6. Professional Development;
7. Water Research Center;
8. Project Preparation Department;
9. Survey and Mapping;
10. Miscellaneous TA and Commodity Procurement.

These Project components will be supported by technical assistance commodities, construction, and participant training.

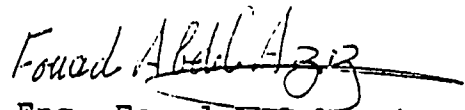
The Ministry of Irrigation strongly supports the project. The MOI, to the best of its ability, will provide its contribution both in cash and in kind to effectively implement the project. In addition, we will also provide offices, furniture, besides using the Ministry's existing facilities -whenever possible- for project activities. Therefore, I wish to assure you that the Ministry has both the human resources and financial capability to effectively install, maintain, and utilize the capital assistance to be provided for the successful implementation of the IMS Project and its ten components.

Although we support the project, there are two issues that must be reviewed by other Governmental Authorities. Those related to the use of Public Sector firms and the implementation of the cost recovery program. These issues will be fully reviewed by those Governmental Authorities prior to the signing of the amendment to the grant agreement.

Also to implement the disbursement of the GOE's local currency contribution through the FT-800 Trust Account, approval of other Government Agencies such as Ministry of Planning and Ministry of Finance is needed, however we already started contacts with these Government Agencies.

We hope that you will act favourably on this request so that we will be able to initiate the amended project as soon as possible.

Sincerely,



Eng. Fouad Abdel Aziz
Senior Undersecretary
Head of Irrigation
Department

Waivers

The Irrigation Management Systems Project requires a source and origin waiver on motorcycles and a revised waiver on shelf-item commodities.

The following two sections provide the detailed justification for the two waivers.

Waiver No. 1Request for Waiver of Source and Origin Requirements for Procurement of Commodities

Background: The Project plans to provide about 100 motorcycles to selected directorate construction supervisors. This will improve their mobility and ability to better supervise a number of construction activities in the same locality.

No U.S. manufacturer offers the lightweight motorcycles required for the Project. Chapter 4 of Handbook 1 B specifically lists lightweight motorcycles as an example of a commodity for which a motor vehicle waiver is justified because of the inability of U.S. manufacturers to supply the needed commodity.

Recognizing this need AID/W prepared a blanket waiver for the procurement of motorcycles. However, the current waiver expires March 6, 1987 and if it is not renewed the implementation of the IMS project will be adversely effected.

Authority: Under Paragraph 11 of Redlegation of Authority No. 113.8 and Section 4C2 (d) (1) (A) of Handbook 1 B the Mission Director has the authority to waive the requirement that motor vehicles be manufactured in the United States in cases where U.S. manufacturers are unable to provide a particular type of needed vehicle.

Recommendation: The Project authorization be signed containing a waiver of the requirement that motor vehicles be manufactured in the United States and authorize the procurement of about \$150,000 of lightweight motorcycles from Geographic Code 935 countries. Signature of such authorization will certify that, "exclusion of procurement from Free World countries other than the cooperating country and countries included in code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program."

Waiver No. 2

The Irrigation Management Systems Project requires a revised waiver on shelf-item commodities.

The following section provides the detailed justification for the waiver.

Subject: Irrigation Management Systems Project (Egypt Program) Shelf-Item Commodities and Request for Blanket Waiver of Origin Requirements

Reference: IMS Project Authorization by the Administrator dated August 27, 1981 and Action Memo for the Administrator dated 3 May 1982.

Problem: Approval is required to waive the restriction in Section 18A 4C of Handbook 1B Chapter 18 of existing origin requirements for AID financed local currency procurement of Egyptian source commodities from normal commercial inventories in those circumstances where items of non-free world or other origin cannot reasonable be distinguished, segregated or otherwise prohibited.

Background: The IMS Project (263-0132) has a total value of \$139.48 million and is being increased to \$340 million. A major element under this Project is the construction activity (approximately \$60 million which will be increased to about \$165 million).

The Project Authorizations to the original PP and the First Amendment state that "the Grantee will use standard GOE procurement procedures and Grantee's standard building designs and specifications for the procurement and construction of all replacement structures." Procuring construction materials such as cement and reinforcing bars represents the main problem that any builder in Egypt faces. These materials are produced in Egypt but the local production is not adequate to cover the local needs.

Since the circumstances of the shelf item commodities of this project are identical with those of the referenced action memo (Attachment #1), the following is quoted:

"As these materials are purchased in bulk from local sources, frequently, these bulk quantities contain individual items of non-free world origin. Insofar as bulk items such as cement and reinforcing bars are concerned, purchase is normally affected by the government of Egypt by international tender with price the exclusive determining criterion for the successful tender. At any one time supplies may include stock from free world and non-free countries. Construction contractors draw their needs by purchase from government stores. As cement and reinforcing bars are commodities in short supply, it is difficult for contractors to refuse shipments which are of non-free world origin, as refusal would result in a delay of months. In other cases, the contractors may be unaware of the origin of commodities purchased since purchase lists are likely to contain commodities of mixed origin.

Procurement of cement and reinforcing bars from the U.S. or free world is not an economically viable alternative. In the case of U.S. procurement, this possibility was studied for the Egyptian Grain Silos Project (263-K-028). The same rationale was cited in a recently approved waiver for the Basic Education Project (263-0139), which has similar construction material requirements as the IMS Project. As there were large amounts of reinforcing bars and cement used on that project, the optimum case for import was presented. The cost was found to be prohibitive, i.e., more than 50 percent above the cost of other

sources. The problem of cost is compounded by availability, storage equipment and supplier-enforced requirement of tendering for extremely large amounts."

It is standing practice in construction to obtain cement and reinforcing bars from government stores at low prices. This means that the chances of getting imported cement or reinforcing bars are limited, as the imported cement or reinforcing bars usually go to luxurious housing and joint venture projects. Nevertheless, it is difficult to have any guarantees in that regard. Therefore, acquiring a waiver is essential.

As explained earlier, there are some options that could be used to substitute for the current process but none of them looks reasonable:^{1/}

Option 1: It could be stipulated in the different tenders that Egyptian cement, reinforcing bars and wood only are to be used.

This option seems reasonable but it can cause delays for several months, depending on the availability of Egyptian cement, bars and wood.

Option 2: The Project could import its needs directly from the U.S.

This option would be at least 50 percent more expensive than the cost resulting from the current practice and be very time consuming (Ref. action memo page 2).

The value of bloc imports purchased under the Project has been unofficially estimated to be less than two percent of total project costs or \$2.0 million. Also it has been estimated that total imported shelf items from all sources will not constitute more than 25 percent of the commodity element of any project. However, since Egypt is making efforts to reach self sufficiency in the production of cement and steel reinforcing bars, the local production of cement and steel is increasing. As such the value of bloc imports will most likely drop to less than one percent of total project costs.

Authority: The Mission Director is authorized by Redelegation of Authority 113.8 to approve a blanket waiver of origin requirements for nonsegregable bloc country origin items.

Recommendation: Pursuant to the foregoing discussion and based on prior approvals to similar projects, it is recommended that the Mission Director find that it would seriously impede attainment of U.S. foreign policy objectives and objectives of the Foreign Assistance Program to require following of requirements which apply to off-shelf procurement in Egypt, and the Mission Director approve a blanket waiver of such requirement for AID financed local currency procurement of Egyptian source commodities from normal commercial inventories in these circumstances where items of non-free world or other origin cannot reasonably be distinguished, segregated or otherwise prohibited.

This waiver applies only to the Irrigation Management Systems Project (263-0132).

The Mission Director's signature on the Project Authorization signifies his approval.

Attachment: Action memo for the Administrator (May 1982)

^{1/} The same argument mentioned above can also be used regarding the procurement of wood which is used for doors, windows and furniture.

23 MAY 1982

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU: ES

FROM: AA/NE, W. Antoinette Ford

SUBJECT: Egypt Program Shelf-Item Commodities; Request for Blanket Waiver of Origin Requirements and Concurrent Redellegation of Authority to AA/NE and USAID/Cairo for Project Specific Determinations

Problem: Your approval is required to waive existing origin requirements for A.I.D.-financed local currency procurement of Egyptian source commodities from normal commercial inventories in those circumstances where items of non-free world or other origin cannot reasonably be distinguished, segregated or otherwise prohibited. Your approval is also required to effect an ad hoc redellegation of authority to AA/NE and USAID/Cairo for project specific determinations under this blanket waiver.

Background: As the Egypt program proceeds with decentralization projects and employs, inter alia, fixed-amount reimbursement (FAR) financing, greater amounts of off-shelf procurement are occurring which do not reasonably permit USAID control and monitoring to assure compliance with origin requirements for local source items. Additionally, under all project activities employing off-shelf procurement, circumstances may exist on a case-by-case basis in which the segregation and prohibition of non-free world origin items does not appear to be feasible. (Attachment 2).

In the case of decentralized activities, procurement is often characterized by numerous relatively low value purchases of off-shelf items by village-level officials. The normal commercial inventory available includes items such as small pumps, which are frequently of non-free world origin. These items are familiar to the users, readily available and inexpensive. With 1,617 sub-projects in the Basic Village Services Project (263-0103) alone, with the availability and low price of the items, and with the relative level of sophistication of the village procuring entities, it is virtually impossible for USAID to monitor and control the origin of these purchases.

The same circumstances exist regarding off-shelf procurement under the FAR method of local cost financing. Under the FAR method, however, A.I.D. reimburses the government only for a finished product. While commodities are essential to completion

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of each unit, A.I.D. is not financing commodities, per se, and A.I.D. control over individual purchases is even more attenuated.

Even in those projects where A.I.D. control is more direct and realistic monitoring is possible, certain circumstances can arise on a case-by-case basis which frustrate such efforts. This occurs in Egypt when, for example, reinforcing bar and cement are purchased in bulk from local sources. Frequently, these bulk quantities contain individual items of non-free world origin. Insofar as bulk items such as cement and reinforcing bar (re-bar) are concerned, purchase is normally effected by the government of Egypt by international tender with price the exclusive determining criterion for the successful tender. At any one time supplies may include stock from free world and non-free world countries. Both private and public sector contractors draw their needs by purchase from Government stores. As cement and re-bar are commodities in short supply, it is difficult for contractors to refuse shipments which are of non-free world origin, as refusal often results in a delay of months. In other cases, the contractor may be unaware of the origin of the commodities purchased since purchase lots are likely to contain commodities of mixed origin.

Procurement of cement and re-bar from the U.S. or free world is not an economically viable alternative. In the case of U.S. procurement, this possibility was studied for the Egyptian Grain Silos Project (263-K-028). As there were large amounts of re-bar and cement used on that project, the optimum case for import was presented. The cost was found to be prohibitive, i.e. more than 50 percent above the cost of other sources. The problem of cost is compounded by availability, storage requirements, and the supplier-enforced requirement of tendering for extremely large amounts.

Discussion: Agency rules for local-cost financing permit the procurement of unlimited amounts of goods of local source and origin, or of goods imported to meet a general demand ("shelf items") which have their origin in the United States or other eligible source countries. Shelf items having their origin in free world countries not included in A.I.D. Geographic Code 941, however, are restricted to purchases which do not exceed the local currency equivalent of \$5,000 per transaction. In the case of FAR financing, imported shelf items may be financed by A.I.D. regardless of origin, so long as they do not account for more than 25 percent of the total estimated commodity element of

The conclusion provided by the General Counsel indicates, at least tentatively, that the basis is one required by policy, and therefore subject to waiver:

Given present program structures as we understand them, that is emphasis on FAR techniques which involve small projects usually with large service components, and no projects comprised largely or exclusively of commodity financing, we are prepared to affirm the view that statutory requirements are met with respect to items imported to meet a general demand in the country if located therein at the time of purchase.

This conclusion would appear to be supported by precedent within the Agency. In the 1960's, under A.I.D.-Manual Order 1323.1.1, A.I.D. waived commodity and services contract source requirements for the Special Development Activity Authority (SDAA). This waiver was construed to extend to non-free world procurement.^{1/} In 1975, the Deputy Administrator found it inappropriate to impose origin or componentry tests to the 750 jointly-funded FAR subprojects under the loan-financed Indonesia Rural Works program. The discussion leading to this conclusion, included at attachment 4, found no clearly applicable origin test in A.I.D.'s regulations when commodities of local source were obtained for numerous subprojects. This discussion also found that securing certificates of free-world origin for all components of each subproject would be unduly costly in terms of administrative effort required, in relation to any benefits gained. The circumstances of the Indonesian program appear analogous to current activities in Egypt, as described above, and the conclusions reached would seem applicable. Additionally, in 1976, the Administrator approved a blanket waiver allowing A.I.D. to finance projects in Afghanistan using FAR financing to pay for shelf items, many of which were of non-free world origin. (Attachment 5.)

Also supporting the requested waiver in this case is the argument of attribution, in that the Egyptian contribution to the projects at issue would appear significantly larger than the value of any bloc-origin items that may be purchased. Egyptian, rather than U.S., funds could therefore be attributed to these items, obviating application of requirements associated with the expenditure of U.S. funds. Bloc imports account for about 15 percent of total Egyptian imports (approximately 15.5 percent in 1979 and 14.9 percent in 1980). The value of bloc imports purchased under project activities has been unofficially estimated to be substantially less than 1 percent of total project costs. At the same time, Egyptian project contributions have averaged

^{1/} GC/AFR, Hager to GC/AFR Phippard memo of June 30, 1969

the FAR project or subproject (unless a higher percentage is approved). When FAR financing is not employed, normal A.I.D. policy precludes procurement of commodities having their origin or having components with origin in non-free world countries. Specifically, A.I.D. Handbook 1, Supplement B, Section 18A4c, states that imported shelf items produced in, or imported from, countries not included in Geographic Code 899 are ineligible for A.I.D. financing. While the chapter containing this provision provides for appropriate waivers, whether such waivers may extend to items of non-free world origin depends upon underlying statutory and executive mandates.

The Agency policy prohibiting, as a usual matter, the financing of all shelf items of non-free world origin stems from Section 604 of the Foreign Assistance Act of 1961, as amended (the Act), and Presidential Determinations of October 11, 1961, and August 1, 1962. These provisions restrict the source of procurement outside the United States unless certain determinations are made. The first Presidential Determination prohibits procurement from developed countries except when waived in specific cases to achieve foreign policy objectives, and states that "Procurement outside the United States shall be from free world sources, in any case." Under the Agency's definition of source, (and we are informed that the word "source" in the Executive Order was included at A.I.D.'s suggestion as a term of art) procurement is of local source if the item is located in normal inventories in the cooperating country at the time of sale. Thus Egyptian source procurement would be from free world sources, even though the origin of a particular item were not.

While the impact of these statutory provisions and determinations is considered minimal in the context of local currency financing for shelf items, appropriate caution was raised in a General Counsel Memorandum of Law, dated August 6, 1975. (Attachment 3, page 9):

Until recently, the amount of local currency procurement was strictly limited under the 'shelf item rule' and 'origin' and 'componentry' rules were applied. Accordingly, the validity of A.I.D.'s definition of source, in effect that procurement is 'from' the cooperating country if located therein at the time of sale, was not difficult to defend. The great relaxation of the policy restraints, however, resulting in the financing of large amounts of goods identifiable as having been produced in developed or communist countries would call that definition into question and, in view of the rules creating A.I.D.'s geographic codes, raise the difficult issue of what is a 'legal' requirement and what is a 'policy' one.

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about 25 percent of total project costs. In the case of the Basic Village Services Project, this contribution has included a cash element of 10 percent of total project costs. While this additional argument is supportive, it is believed that the requested waiver is supportable as a policy decision, and that attribution should not be relied on exclusively without further documentation. While the present request is for a blanket waiver, the requested delegation of authority will permit project specific waivers on a case-by-case basis. The normal \$5,000 ceiling for individual off-shelf purchases will continue to apply except in the case of FAR-financed items, as discussed above. Detailed guidance on use of the waiver, included at Attachment 1, is intended to present A.I.D.'s concern that the waiver be used sparingly, following examination of all other reasonable alternatives.

Conclusion

Free-world origin requirements for local source off-shelf procurement are not statutorily mandated, but are an Agency policy which is subject to waiver. Insistence upon usual Agency origin rules for the Egyptian program under decentralized activities, FAR-financed activities or in other circumstances where items of non-free world or other origin cannot reasonably be distinguished, segregated or otherwise prohibited, would greatly hinder operation of the program. In accordance with A.I.D. Handbook 1 Supplement B, Sections 5B4C and 12D, blanket waivers having a cumulative value in excess of \$500,000 must be made by the Administrator.

Recommendation: Pursuant to the foregoing discussion, it is recommended that you find that it would seriously impede attainment of U.S. foreign policy objectives and objectives of the Foreign Assistance Program to require that existing A.I.D. geographic code origin requirements apply to off-shelf procurement in Egypt, and that you approve a blanket waiver of such requirements for A.I.D.-financed local currency procurement of Egyptian source commodities from normal commercial inventories in those circumstances where items of non-free world or other origin cannot reasonably be distinguished, segregated or otherwise prohibited. This waiver applies to decentralized activities, projects employing FAR financing and such other project or subproject activities as determined on a case-by-case

basis. It is further recommended that you delegate concurrent authority for such use-by-case determinations to the Assistant Administrator, Bureau for Near East, and to the Mission Director, USAID/Cairo.

Approved: [Signature]

Disapproved: _____

Date: 4 JUN 1982

Attachments:

1. Proposed Guidance Memorandum
2. Cable - Cable 01512
3. General Counsel Memorandum of Law dated August 6, 1975
4. Approved Action Memorandum to the Deputy Administrator dated January 24, 1975
5. Blanket Waiver for FAR-financed Activities in Afghanistan

Clearances:

GC/NE: JLKessler _____ Date 5/1/82
 NE/PD/Egypt: TSternor _____ Date _____
 NE/EI/C: GGower _____ Date _____
 NE/PD: STaubenhalt _____ Date _____
 DAA/NE: Biangmaid _____ Date _____
 DGC: KKammerer _____ Date 5/18/82
 PPC: JRBolton _____ Date 5/21/82
 SER/COM/PP: K.O'Hara _____ Date 5/21/82

Drafted by: GC/NE: BJanigian: paj: 4/23/82

M/DAA/SER: JFOwens [Signature] Date 5/26/82

DESCRIPTION OF PROJECT COMPONENTS
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Irrigation Management System Project
Description of Project Components

The following sections provide a detailed description of the ten IMS components summarized in Section III. B of the Project Paper. Under each component a background statement describing the events that led up to inclusion of the component in the IMS project (new items) or the status of existing components, followed by sections on the objectives of the component, proposed activities to be undertaken, and, last, a section defining those activities or portions of activities that will be AID funded. In addition, a detailed year-wise budget (USAID and GOE) is provided for each component which in turn is summarized in the Financial Plan (Section IV) of the Project Paper and training plans that are summarized in the Implementation Plan. The GOE budget figures are subject to adjustments after finalization of the GOE Five Year Plan.

1. Planning Studies and Model Development

a. Background

In October 1977, a Master Water Plan project for Water Resources Development and Use (MWP) in Egypt was set up within the Ministry of Irrigation (MOI), assisted by the United Nations Development Program (UNDP), with the International Bank for Reconstruction and Development (IBRD) as the executing agency. The scope of the MWP project is broad, with criteria for evaluating the effectiveness of alternative plans ranging from water efficiency to social and environmental effectiveness. The MWP project has been assigned to the Water Planning Group (WPG) of the newly established Planning Sector within the MOI. The WPG has placed considerable emphasis on the development of a set of reliable tools (mathematical models), and procedures that can be used for the investigation of the planning options facing policy and decision makers. These tools include a computerized Project Information System (PIS), and two groups of mathematical models. One group of models concerns the Nile River water supply system and involves the relationship of the Upper Nile Basin, Lake Nasser and the operation of the Aswan Dam complex. The other group of models concerns water demands in the service area from the Aswan Dam to the Mediterranean Sea.

The Project Information System (PIS) was established on the project's HP 3000/30 computer, to store and process data for serving three purposes: 1) preparation of an inventory of the physical components of the irrigation and drainage system; 2) calibration and application of the planning distribution model, including the computation of command area water balances; and 3) calibration and application of the agro-economic model.

The PIS consists of three main categories of data; the agro-economic data of the agricultural sector of Egypt; the canal system data, and the drainage system data. Each of these categories is referenced to a different set of geographical areas. The agro-economic data were drawn from administrative districts which are the building blocks of the Egyptian Governorates. The canal data are stored according to the 50 canal commands, 19 group canal commands and seven Nile reaches. The drainage data are filed according to 152 drain command areas, 113 group commands, and six terminal components.

The geographic boundaries for these three categories of data subdivisions do not coincide. All boundaries were mapped and planimetered, and coefficients were developed to record the extent to which areas overlapped each other.

(1) Upper Nile, Lake Nasser-Models

This group of models concerns inflow simulation and prediction to Lake Nasser, and operating rules of the High Aswan Dam. Following is a short description of the models:

--The Upper Nile Model

This model is operational and consists of six subsystems of the Nile River Basin upstream of the HAD. Two approaches were used to formulate models of the various reaches of the six subsystems. Straight forward linear regression techniques were employed for all cases in which flow records were not continuous, while the constrained linear systems approach was used when long continuous data was available. This model covers the River Nile system from the Lake Albert outlet to Lake Nasser. The prime objective of this model is to provide a tool for the evaluation of the impact of Upper Nile conservation projects such as Jonglei I on inflows to Lake Nasser.

--Operation of the High Aswan Dam

There are four models that have been developed for improving the High Aswan Dam operation. These models are operational but require refinement before they can be used to set overall operation policy. They include a "Steady State Stochastic Dynamic Program" that uses transitional probabilities derived from historic inflow data to establish optimal operating rules (long term performance) for the High Aswan Dam; an "Adaptive Closed Loop Operation Model of the High Aswan Dam," that operates on a real time basis and deals with short term performance using the results of the steady state dynamic programming as boundary conditions, and refines the obtained policy based on real time forecasts of reservoir inflows and their limit of confidence; the "Lake Nasser Simulation Model," which is a simple monthly water balance model which determines the hydrologic performance of the lake when subjected to either historic or synthetic inflows, a given demand pattern, and when operated in accordance with a specified policy; and a "Multi-Lead Forecasting Model" which is based on multivariate step-wise regression approach, to forecast the monthly natural streamflows at various key locations of the River Nile basin, and to generate multi-lead forecasts at Aswan by aggregating recursively the forecasting of the up-stream key locations.

(2) Service Area Models

This group of models concerns the service area between the High Aswan Dam and the Mediterranean Sea. Once fully developed, they will model the water delivery system, the economic agricultural sector and the water balance of the entire irrigation system. Following is a brief description of these models.

--Agro-Economic Model

This model is a large scale sectoral model for quantitatively evaluating alternative water allocation schedules to agriculture in terms of their impacts on cropping patterns, domestic consumption, foreign trade and employment. It will also be able to test the impacts of changes in agricultural policies on aggregate national economic parameters, analyze the investment in new land reclamation projects, and rank projects economically. The model is in the early stages of operation and testing.

--Planning Distribution Model

This model is still being developed and calibrated, and consists of two submodels. The first submodel uses observed flow data and cropped areas to carry out water balance calculations for the specified 50 canal command areas of Egypt. It also computes water demands and return flows at each major diversion point in the irrigation and drainage network. The second submodel, called the distribution model, is used to compute flows in major canals based on the calculated demands and other constraints in the irrigation system. The model will be useful in testing various water demand scenarios.

--Flow Distribution Model

This model is a real time operating tool to provide computer assistance in the decision making process for operating the Lower Nile River irrigation system. The first generation of this model will be calibrated by July 1987 under the "Nile River Irrigation Data Collection System" (Main System Management-Telemetry Project).

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It will provide a numerical model to simulate unsteady flow in the lower Nile and in first order canals; compute gate position at key locations in the distribution system in response to releases at Aswan and to prescribed irrigation deliveries at various stations along the system; allow engineers to study the actual operating and response characteristics of the complete system; and by using the model in a trial and error mode, various operating scenerios may be studied in order to find the most favorable mode of operation.

--National Water Balance Program

This program is fully operational and computes annual national gross water balances over any period of years selected. Input data includes water requirements over time for irrigation, municipal, industrial, power and navigation; beginning and ending years; annual loss rate of agricultural land for the first and last year; annual rate of new land reclamation; irrigation efficiencies for the first and final year; evaporation rate from the river and canals; crop intensity for the first and last year; crop consumptive use for the first year for Old and New lands; amount of Old Lands in the first year; and total supply. The program computes for each year, of the period selected, the demands and losses, and compares these to the total supply to show water remaining or water shortage.

b. Objectives

The primary objectives for the development and use of the models described above, and those to be supported under the Project Amendment, are improved operation of the High Aswan Dam/Lake Nasser complex and improved operation of the water delivery system from the Dam to the Mediterranean Sea. The descriptions of the models in the next section show how they are intended to contribute to improved operations.

c. Proposed Activities

The Ministry's program in the future consists of three basic elements--further implementation of existing models into the operations, planning and decision making process; improving and expanding existing models; and supplementing the existing array of models with additional ones that emphasize efficiency.

The Ministry has not yet incorporated the appropriate models into the routine management of the irrigation system and the Aswan Dam Complex. Each of the models discussed below will be fully developed and calibrated and available for operational use by MOI as a result of this Project. The MOI will provide to USAID on an annual basis a comparative analysis of the entire irrigation system operation under (1) current operational procedures and (2) with the use of the models. An outline and basic substance of the report to be submitted to USAID will be worked out during Project implementation.

(1) The High Aswan Dam (HAD) Models

Studies conducted to date by the WPG on the operation of the HAD, have comprised different models, as has been described before. The success of these models is measured by the fact that they have been successfully implemented and that the Egyptian personnel are now proficient in their use. However, to enhance the benefits of using these models, the following three areas have been identified where the models could be further developed:

- a--Risk evaluation of operating rules of HAD.
- b--Conjunctive-use of Lake Nasser with downstream groundwater storage.
- c--Conjunctive-use of over-year storage potential of Lake Nasser and the Plateau Lakes.

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So far, the operating rules being used for the HAD, have not been subjected to a formal risk analysis to quantify the risk of excessive releases leading to downstream degradation, or shortfalls in meeting the demands for irrigation and other water uses. The proposed studies given in (a) and (b) above, would carry out such a risk analysis using synthetic inflow data (generated in Phase I of MWP Project), and would employ dynamic programming to derive operating rules with acceptable levels of risk if necessary. The possibility of using the Nile Valley Alluvium conjunctively with Lake Nasser storage to increase the reliable yield of the overall system would also be explored.

The proposed study (c) represents the ultimate goal for Egypt in exploiting the Nile waters most efficiently. Until now, the way in which Plateau Lakes have been regulated has been of relatively little importance to Egypt because of the massive evaporation losses in the Sudd region. However, the completion of both phases of the Jonglei canal project may allow the benefits of the conjunctive use of the Plateau Lakes with Lake Nasser storage to be realized.

The various possibilities for operating the HAD would be studied in detail within the proposed study (c), to identify those of maximum benefit to Egypt. This will require a simulation model of the whole River Nile basin.

The Lake Nasser simulation model, the Upper Nile model and the model of the Plateau Lakes system, developed as part of the Hydrological survey of Lakes Victoria, Kyoga and Albert, will provide the necessary components of the total system.

(2) Agro-Economic Model

In 1986 this model is being introduced to key managers and staff in the Ministries of Agriculture, Land Reclamation and Planning by the Water Planning Group and IBRD personnel. This introduction includes a training program for technical staff from these agencies for operating the model. The goal is to encourage personnel in these agencies to use the model as a tool in examining alternative agricultural and new land reclamation policy scenerios, and thus assist them in the five year planning process. The Water Planning Group will continue to use the model to evaluate effects on water requirements from different agricultural programs and new land reclamation projects. Consultant's assistance through the UNDP will be provided to assist in analyzing results, reduce the number of assumed factors, and improve the model's capabilities as an agricultural policy tool.

(3) Planning distribution Model

This model is one of the most important and useful planning tools that MOI has developed. However, to date it has not been utilized because of lack of sufficient and accurate data for calibration of the model. The Development Research and Technological Planning Center, University of Cairo is under contract with the Water Planning Group to calibrate this model using data being collected from the Directorates. When the NRIDCS (Main Systems Management-Telemetry Project) is in place, considerable and more accurate data will be available for use in the model. Furthermore, the UNDP is providing, in 1987 and 1988, assistance for establishing a channel measurement work unit to collect discharge, channel geometry, and seepage loss data to be used in model calibration.

As more accurate data becomes available, the number of assumptions will be reduced, and operation experience gained from the basic model will require additional development and calibration. The further development of the model may include three additional activities as explained below.

New land reclamation-The model can be used to determine how the irrigation system will be affected when attempting to deliver water to proposed new land areas. Bottlenecks, additional capacity requirements, and new facility requirements will be identified.

Drainage Reuse-Reuse of drainage water is becoming more and more important for improving overall water use efficiencies in Egypt, because development of the water conservation projects in the Upper Nile basin in Sudan are being delayed. Furthermore, reuse of drainage water is much less expensive than development of the water supply projects in Sudan. The Drainage Research Institute with the help of the Dutch government is making a drainage reuse study. They are preparing a model for analyzing flow distribution and water quality. The Water Planning Group will coordinate with the Drainage Research Institute and utilize the Planning Distribution Model as needed to evaluate the ideal location for reuse of drainage water, its transport and exchange opportunities with fresh water. The model will evaluate the irrigation system's reaction to the various drainage reuse projects.

Rehabilitation Program-One of the key programs of the MOI is the RIIP, designed to remodel canal commands and rehabilitate structures and improve the irrigation system. Location of problems may be identified and their magnitudes can be estimated so that the rehabilitation program can focus on problem structures or canal reaches. The model will also have to be calibrated after each canal command is improved to model actual field conditions. This activity would occur throughout the RIIP and NIIP areas.

(4) Unit Command Model

Utah State University has developed a series of models which can be used for detailed study of all aspects of water demands and their optimal allocation in a specific canal command. These models are developed on micro-computers and have been used successfully in many countries. A demonstration of the uses of these models was carried out in July 1986, at the Cairo Water Research Center. The models can be used as complementary tools to the Planning Distribution and Flow Distribution models that have been developed by the WPG.

(5) Estimation of Runoff using Satellite Imagery

The Ministry would also like to investigate the feasibility of a complementary process for predicting the timing, duration and quantity of runoff from the upper Nile watershed. The process is one developed by the U.S. National Oceanographic and Atmospheric Administration (NOAA) and consists of using satellite photographic imagery of cloud cover and buildup over the watershed to estimate precipitation quantities and duration. The data developed by this process would be used in a model similar to the Sacramento mathematical model developed by the U.S. Weather Service. This type model has not yet been developed for the Upper Nile Basin. If this system proved satisfactory it can provide another means to estimate inflow to Lake Nasser and complement and act as a check for the Multi Lead Forecasting model. The estimated period of development of this process and the mathematical model to fit Ministry needs is three to five years with costs ranging from three to ten million dollars.

Prior to making a decision on whether to embark on such a large program a feasibility study to better define the incremental costs and benefits from improving MOI's runoff prediction capabilities will be undertaken.

(6) Monograph

The modeling work carried out by the Water Planning Group and supported by UNDP/USAID is reaching the point where the total integrated effort needs to be fully documented and where useful lessons can be offered to the managers of other major river based irrigation systems. The WPG has developed a set of modular models in a systems context. The ability to partition management decisions into relatively discrete problems related to releases from the High Dam, distribution to canal commands, and canal and farm level decisions, has allowed a corresponding simplification of the modeling effort. Tackling the several problems within the same systems concept has allowed key outputs to be fed between models. Not all the lessons are in; but sufficient experience has occurred to be of value to other agencies faced with similar river systems. As this USAID/UNDP program nears its end in 1991, provisions should be made for a monograph to fully document the development, design, and operation of the integrated set of models. It is assumed that an academic publisher can be found who will publish the manuscript without charge.

d. USAID Support

MOI is currently entering the crucial phase of implementing the various models that have been developed with the assistance of the UNDP. As the UNDP funding is being severely restricted, USAID has been requested to assist in this final stage of model development and to assure that the models become fully operational and are utilized in the GOE's decision making process. The required support for each individual modeling activity was described above, both UNDP and USAID supported.

The UNDP will provide assistance in 1987 and 1988 on the Agro Economic Model, the Planning Distribution Model and the High Aswan Dam Operating Models. The assistance includes:

- Menu driven, user friendly versions of these models.
- Improved user and program documentation, including Users Manuals and example problems.
- Training workshops in the use of the models.
- Transfer of all models and the Water Planning Group's Data Base to the IBM AT microcomputer.

To assist in the implementation of the UNDP effort, the MOI has issued Tender Document No. 1/1987 to obtain Egyptian Consultants to work on the High Aswan Dam and the Planning Distribution Models. The contract will be for 16 months to upgrade to a user friendly mode, install, and implement the two sets of models on the IBM-PC computer.

USAID will assist in the UNDP effort and support the remaining models which focus on the service area and will be used to improve the management and distribution of water below the High Aswan Dam. Both USAID and the UNDP will be supporting work on the Planning Distribution Model. USAID support for a new mathematical model to estimate River Nile runoff using satellite imagery would be limited to carrying out a feasibility study to better define the incremental costs and benefits from improving MOI's runoff prediction capabilities. In addition, USAID will provide support to the channel measurement work unit during 1989 and 1990 after its initial establishment with UNDP assistance.

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USAID will provide a total of \$5.4 million to support TA, training, commodities, and local support. 128 person months of technical assistance including two resident System Engineers will be provided for three years beginning in mid FY87 to assist in all activities and coordinate additional TDY assistance as required. This support will include 75 person months of nondegree training, commodities, and local support. Table F1 provides the phasing of activities and Tables F2 and F3 show the proposed financial support by USAID and GOE.

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Table Fl.

Phasing of Technical Assistance Requirements

Activity	1987	1988	1989	1990	1991	No. of person months
<u>1-HAD MODELS</u>						
a. Risk evaluation of operating rules*	<u>3</u>	<u>7</u>				10
b. Conjunctive use of D.S. groundwater storage**		<u>5</u>	<u>10</u>	<u>8</u>		23
c. Conjunctive use of overyear potential storage*			<u>10</u>	<u>6</u>		16
<u>2-Planning Distribution Model</u>						
a. New land reclamation*	<u>3</u>	<u>9</u>				12
b. Drainage reuse*		<u>3</u>	<u>10</u>			13
c. Rehabilitation*			<u>9</u>			9
<u>3-Utah Canal Command Models*</u>		<u>7</u>	<u>7</u>	<u>7</u>		21
<u>4-Runoff Estimation Using Satellite Imagery**</u>		<u>6</u>				6
<u>5-Monograph**</u>					<u>7</u>	7
<u>6-Miscellaneous</u>	2	3	3	3		11
Total	8	40	49	24	7	128

To be accomplished by two Hydrologist-Systems Engineers from mid 1987 to mid 1990--see Annex L for Scope of Work.

** To be accomplished by contract or TDY assistance.

PLANNING STUDIES AND MODLES

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

Table F 2

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand Total
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total
1 Consulting Services															
Resident (Long term)	0	0	10	0	397	0	417	0	252	0	0	0	1076	0	1076
Non Resident	0	0	0	0	232	0	336	0	438	0	203	0	1209	0	1209
Sub Total	0	0	10	0	629	0	753	0	690	0	203	0	2285	0	2285
2 Training															
Non Degree	0	0	30	0	110	0	116	0	122	0	139	0	517	0	517
Degree (MS, PhD, etc)													0	0	0
Local Training													0	0	0
Sub Total	0	0	30	0	110	0	116	0	122	0	139	0	517	0	517
3 Construction															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities															
Prof & Dfc Equipment	0	0	74	0	88	0	290	0	304	0	255	0	1011	0	1011
Discharge Equipment							200		242				442	0	442
Sub Total	0	0	74	0	88	0	490	0	546	0	255	0	1453	0	1453
5 Local Services															
Administration				50		100		120		140		160	0	570	570
Local Experts								160		180		200	0	540	540
Sub Total	0	0	0	50	0	100	0	280	0	320	0	360	0	1110	1110
6 Other															
Invitational Travel															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Annual Totals	0	0	114	50	827	100	1359	280	1358	320	597	360	4255	1110	5365
Cumulative Totals	0	0	114	50	941	150	2300	430	3658	750	4255	1110			
Project Obligation	0	2500	1665	1200	0	0	5365								

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TABLE F3

PLANNING STUDIES AND MODLES

Projected Expenditures - GOE Funds(000's)

Table F 3

Category		Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
		\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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	0	0	0	0	0	0
	Degree(MS,PhD,etc)							0
	Local Training							0
	Sub Total	0	0	0	0	0	0	0
3	Construction							
		0	0	0	0	0	0	0
								0
	Sub Total	0	0	0	0	0	0	0
4	Commodities							
								0
								0
								0
								0
								0
	Sub Total	0	0	0	0	0	0	0
5	Personnel							
	Salaries		80	94	110	128	150	562
	Incentives		30	35	41	48	56	210
	Travel & Misc.		6	7	8	9	10	40
	Sub Total	0	116	136	159	185	216	812
6	Other							
	Sub Total	0	0	0	0	0	0	0
	Combined Annual Totals	0	116	136	159	185	216	812
	Cumulative Totals	0	116	252	411	596	812	

2. Main System Management (Telemetry)

a. Background

The telemetry concept to measure water levels at key locations was originally tested in the small Menafia 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

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.

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(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) reconnaissance 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).

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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 reconnaissance 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 reconnaissance 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
<u>TELEMETRY</u>					
NRIDCS	Comp. Warranty present contract				
Communications	Install \$380,000				
Flow Meters	Pilot Proj. Install	Test	Expansion \$2,000,000		
Maintenance		5 years program \$750,000			
Software		Develop \$50,000			
Expansion		Installation \$4,000,000			
<u>AUTOMATION</u>					
Pilot Project Salheya	Specs, Bids Award		Installation	Test	
	\$300,000	\$2,000,000			
Studies		Reconnaissance		Initial Feasibility (6)	
		\$1,500,000		\$2,400,000	
Total (Thousands)	\$830	\$1,950	\$4,900	\$4,350	\$1,350

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Appendix A

Preliminary Cost Estimate - Salheya Canal Automation

<u>Item</u>	<u>24 hour Service</u>	<u>18 hour Service</u>
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	<u>20,000</u>	<u>100,000</u>
Subtotal	1,535,000	11,440,000
Contingencies (25%)	<u>385,000</u>	<u>2,860,000</u>
Total	1,920,000	14,300,000

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APPENDIX B

The reconnaissance 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.

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MAIN SYSTEM MANAGEMENT

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

Table F 5

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$
1 Consulting Services															
Resident (Long term)	70				802		700		1200		1300	0	4072	0	4072
Non Resident	0	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
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	158	0	2316	0	0	0	0	0	2474	0	2474
BCP'S	2500	0	580	0	350	0	2316	0	2432	0	581	0	8759	0	8759
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
Mainl. 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
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			
Project Obligation \$	4264	12000	12000	4008	0	0	32272								

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TABLE F6

MAIN SYSTEM MANAGEMENT

Projected Expenditures - GOE Funds (000's)

Table F 6

Category	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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
Sub Total	50	100	100	0	0	0	250

4 Commodities							
							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
Cummulative Totals	50	300	575	780	1020	1301	

3. Water Research Center

a. Background

Completion of the High Dam at Aswan in 1964 provided Egypt with opportunities to increase crop production through more intensive cultivation of its old alluvial soils (Nile valley and delta) and development of new lands. Although crop production increased in the old lands as the result of the High Dam these increases were not as large as could be expected given Egypt's favorable crop production conditions (year around cropping, good farmers, adequate fertilizers, good seeds, no frosts or rain, excellent, though tough to manage, soils, etc). Also, with more intensive land use and expansion into the desert areas problems such as water logging and salinization were increased. New problems such as increased aquatic weed growth in the irrigation canals and drains and erosion of the Nile River channel occurred.

In addition, the social-economic structure of Egypt's farming system, the poor physical condition of the water delivery system because of deferred maintenance, the antiquated farming system, an on-farm irrigation and delivery system based on late nineteenth and early twentieth century irrigation knowledge, the lack of control of water so that farmers at the head of the system have excess water and farmers at the downstream end suffer from inadequate water, a delivery system that is based on the elevation of the water in the ditch rather than on the quantity of water all prevent the farmers from adopting farming practices and recommendations given by the Ministry of Agriculture that would significantly increase crop production. In other words, on-farm irrigation management and the irrigation delivery system design, operation, management and maintenance as well as the social-economic conditions of the farmer prevents the use of new agriculture knowledge that would significantly increase crop production and save water and soil.

In recognition of these problems, the need for solutions and the opportunities for improvement, the USAID funded Egypt Water Use and Management Project (EWUP) was created in 1977 (to deal with research in old lands only) through action by the Ministry of Irrigation (MOI) and the Ministry of Agriculture (MOA). Leadership for implementation was assigned to the Water Distribution and Irrigation Systems Research Institute (WDISR) of the MOI Water Research Center (WRC), however, major inputs were provided by the MOA.

The EWUP was designed to determine the on-farm and irrigation delivery system problems that prevented the potential crop increases from occurring, determine solutions to these problems and to increase the institutional capacity of the MOI and MOA to develop and implement irrigation and farm research programs. By working in three representative field study areas, the project indentified social and economic as well as physical constraints and developed recommended solutions for a range of problems facing the small Egyptian farmer. In the process an interdisciplinary team approach was developed for conducting on farm water management and irrigation delivery system improvement research which is continuing.

The results of the EWUP studies and recommendations are currently being tested on a regional scale through the Regional Irrigation Improvement Project (RIIP) which is a component of the IMS Project (see Section III. E. 9 below). RIIP is a part of the Egyptian Government's National Irrigation Improvement Program (NIIP) with the MOI as lead Ministry but with the cooperation of the MOA.

The MOI is also undertaking many other projects and activities to meet its goal of control, use and development of Egypt's water resources for Egypt's social and economic welfare. Some of these in addition to NIIP and RIIP are protection of the north seacoast; protection of the Nile River channel from erosion caused by the High Dam changing the water flow regime; providing topographic maps, land surveys for property rights, and survey methods for the design and construction of irrigation improvements; the development of additional water resources from the Nile Basin, surface and ground water in the Sinai, Red Sea and Northern Coastal areas and ground water in the Western and eastern deserts; the construction of new and maintenance of the old drainage network (both open and buried drains); the maintenance, design and reconstruction where needed of the old dams, barrages and regulators, some of which are over 80 years old the conjunctive use of the surface and groundwater in the Nile valley and delta and the operation, maintenance and replacement of over 2,000 pumps for lifting irrigation and drainage water.

The above activities, if they are to be carried out in an effective and efficient manner, must be based on the best technology that will work under Egypt's physical, social and economic conditions. The MOI has long recognized this and its various departments have a long history of research to develop and adapt technology to solve its problems. In 1975 the MOI consolidated its research efforts into a Water Research Center in order to have a coordinated and will defined effort to meet its needs.

The research activities of the WRC are carried out by eleven Research Institutes. These are:

1. Water Distribution and Irrigation Systems Research Institute

It deals with researches relevant to water distribution, modern irrigation systems, assessment of plant water requirements, improvement of the irrigation delivery network, increasing irrigation efficiency and minimizing water losses.

2. Aquatic Weed Control and Channel Maintenance Research Institute

Its major concern is to safely control the growth of harmful aquatic weeds in water channels by manual, mechanical, chemical or biological means. It is also responsible for conducting researches on the maintenance of channels and drains and their redesign after construction of the High Dam.

3. Drainage Research Institute

It conducts researches on surface and subsurface drains, analysis of drainage water on a national scale, reuse of drainage water for irrigation, and salt balance studies for improvement of drainage systems in different regions.

4. Groundwater Research Institute

It is responsible for assessment of the capacity of the underground water reservoir in both Delta and Upper Egypt, determination of the extent of sea-water intrusion in coastal aquifers, developing a hydrological map for the Delta and Nile Valley regions, as well as the use of mathematical models and computer-assisted programs in the different groundwater researches.

5. Water Resources Development Research Institute

It works in the field of water resources development, conducting studies on the possible projects to be implemented in the upper tributaries of the Nile River and in Sinai region, in addition to the establishment of a complete network of recording devices to be used in designing dams and other control structures.

6. High Dam Side Effects Research Institute

It is responsible for studying the impact of the change in discharge regime resulting from the High Dam along the whole course of the Nile River and submission of proposals for control structures required for channel protection in regions subjected to degradation, bank erosion or sedimentation. The Institute regularly makes cross sections along the Nile River of its channel. It analyzes them and using computer and mathematical models it reports about overall degradation, bank erosion and sedimentation in the Nile River course.

7. Hydraulics and Sediment Research Institute

Work in this Institute is concentrated on the use of hydraulic models to solve problems of degradation and sedimentation in the Nile River channel. Hydraulic models are also used to arrive at the most appropriate design for canal intakes, power stations, barrages and other major irrigation structures.

8. Survey Research Institute

The Institute is involved with programs for determining the geodetic surface in Egypt and studying the movement of the earth crust in Asia, Africa and the earthquake region at Aswan. It also provides survey supporting services for the other institutes.

9. Mechanical and Electrical Research Institute

It is mainly concerned with mechanical and electrical activities associated with the operation of the gates at water control structures such as barrages and the operation of pumps and protection from corrosion.

10. Coastal Protection Research Institute

The Institutes's main activity is the hydrographic scanning of the shore line and measurement of the sea currents, wind and waves, as well as the recording of tides and changes of water level throughout the year. This helps planning for the necessary coastal protection measures.

11. Soil Mechanics and Foundations Research Institute

The work of this institute is to study the soil mechanics problems relevant to the foundations and seepage problems of the hydraulic structures and canals constructed and maintained by the MOI.

In addition to the research activities the WRC has the responsibility for manpower training and development for the MOI. This responsibility is carried out by a Training and Manpower Development Department. This department is responsible for administering appropriate training programs for upgrading the practical knowledge and engineering skills of the Ministry of Irrigation personnel in the different fields of water resources development and irrigation and drainage technologies. It covers the requirements of engineers, technicians and skilled workers. There are three other Departments in the Office of the Chairman, responsible for Planning and Follow-up, Technical Services, and Finance and Administration.

b. Objectives

The objectives of this component are:

1. To research to provide solutions to the problems facing the MOI in its activities for the control, use and development of Egypt's water resource for Egypt's economic and social development.

2. To research to provide answers to key policy issues in the irrigation sector.

3. To develop the long term capabilities of the WRC and its Research Institutes to provide the MOI and Egypt solutions to their irrigation and water resources problems.

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To accomplish these objectives the current support to the WDISR Institute within WRC will be expanded to all eleven institutes. And the current support to the TMD will be continued and expanded under the Professional Development Component of the IMS Project (See Section 7 of this Annex). As such this component will result in more effective and efficient allocations of water, resolution of a variety of issues impacting the economic and social well being of all Egyptians and will be essential to any major increase in agricultural production. The last statement is quite strong. But, unless there is a change and improvement in on-farm irrigation and the delivery of water to the farm, the results of other agricultural research can not be fully implemented.

c. Proposed Activities

The MOI and the WRC are facing a range of issues in addition to those which were addressed through EWUP. The MOI is faced with a major reconstruction effort and policy decisions to improve the on-farm irrigation and delivery system for increased agricultural production, to develop methods to maximize the use of currently available water, to determine new economical sources of water, to provide the necessary drainage system for the preservation of the soil resource, to control any adverse erosion or deposition of the Nile River channel, to control erosion of the Northern seacoast and to operate and maintain the water delivery system. The WRC and its eleven Institutes are addressing a broad range of complex research issues critical to the Mission of the MOI. Some examples of current or planned research activities are:

- (1) Evaluation of present methods to control waterlogging and salinization.
- (2) Evaluation of present design specification for open and buried drains and if needed development of new ones.
- (3) Determine the feasibility of reuse of drainage water and if feasible establish the criteria for its use.
- (4) To determine the extent that present operating rules for the operation of the water delivery system waste water and inhibit farmers from meeting crop water requirements and is to determine new rules.
- (5) To determine ways to communicate with farmers and help them schedule water use between themselves and to jointly maintain the water delivery system under their control.
- (6) Determine equitable methods of charging farmers for the cost of the operation and maintenance of the system.
- (7) Determine the feasibility and design considerations for the conjunctive use of ground and surface water.
- (8) Determine the most economical and environmentally safe method of weed control.
- (9) Development of low cost water control and measurement devices.
- (10) Monitor sea shore erosion and develop economical methods to control.
- (11) Evaluate and develop techniques for the control and recovery of water lost through seepage.
- (12) To evaluate the performance of pumping plants and determine methods to increase their operating life.
- (13) Determine through efficiency tests and economics when pumps should be replaced.
- (14) Conduct model studies on the design of new or replacement hydraulic structures such as barrages or regulators to obtain hydraulically sound and economical efficient designs.
- (15) Evaluate and develop mitigating measures for adverse impacts of the High Dam.

(16) Determine and evaluate additionally sources of water in the Nile basin, Sinai, Red Sea area, and Eastern and Western Deserts.

(17) Determine more economical methods of construction of all structures constructed by the MOI through research on soil mechanics.

(18) Develop modern methods of computer assisted surveying, map making, design, construction drawings and lay out.

(19) Adaptation of modern irrigation technology to irrigation in both the old and new lands.

(20) Development of "expert systems" for the design, operation, maintenance and improvement of the irrigation and drainage system.

d. USAID Support

The WRC has demonstrated through the EWUP and other activities its capability to develop solutions to complex problems involving the full range of disciplines related to irrigated agriculture. The eleven institutes contain core staffs who are actively involved in high priority research activities. These institutes, however, face a number of constraints, including inadequate equipment, insufficient number of trained researchers, inadequate library materials, insufficient office and laboratory space, lack of operating funds and inadequate funding for Egyptian and foreign technical assistance.

This component will provide funding to the 11 Institutes and other departments in the Chairman's Office which, together, comprise the WRC for technical assistance, support costs, international and local conferences, training, commodities and contracting with Egyptian universities and other Egyptian research organizations for research. These latter funds are to provide linkages between the WRC and other Egyptian research organizations.

The lack of sufficient laboratory and office space has been addressed by the MOI. An eight story office building has been constructed at the Delta Barrage Hydraulic Laboratory. This building, which will be occupied in 1987, will allow for the housing of all 11 institutes at one location. They are presently scattered around the greater Cairo area. Furthermore, it will provide for the consolidation of the several water quality and soils laboratories into one for water and one for soils, the consolidation of each institutes' library into one expanded library, the installation of a mini computer and establishment of a computer network for common use of data and for better interaction and communication by the research staff.

To accomplish the objectives of this component the current TA support to WRC (resident 4.5 py, TDY 24 pm) will be expanded to 10 person years of resident and 359 pm of TDY assistance to support the needs of all 11 Institutes, and other departments in the Chairman's Office. Training will be provided for 26 PHD and 44 M.Sc. candidates, 468 pm for non-degree training outside Egypt.

Funding for this component support to the WRC will be allocated to each of the 11 institutes and the Chairman's office. In addition, the Chairman's office will have the funds for the overall incountry long-term expatriate technical assistance (consisting of an administrator and one technical person), local Egyptian administrative support staff (consisting of an administrator, two secretaries, an accountant and three drivers) and home office support. Detailed activities, work plans and budgets for each of the 11 institutes, and the Chairman's office provided in Annex T. The total dollar budget and its distribution between activities by institutes and Chairman's office is given in the attached Table F8 and the MOI inputs are shown in Table F9.

The MOI will provide staffing, funds for salaries, incentives, laboratory facilities, office space, administrative support, etc. The value of this support is LE 43,446,000 (US\$ 32 million) and is given in Table F9.

To fully utilize available resources strong linkages must be developed between WRC and other national and international research institutes such as universities, private organizations, other ministries and the International Irrigation Management Institute (IIMI). Both this project and the USAID National Agricultural Research Project (NARP) with MOA provide mechanisms to strengthen cooperation between research agencies. This project will provide support for the following types of activities in this regard.

- (1) Annual conferences sponsored with MOA to review water related research activities.
- (2) Exchange of staff with ARC for research activities that are of mutual interest.
- (3) Contracts with universities and private organizations for research activities.
- (4) Quarterly meetings with Directors of other Research Institutes who are involved with water resource issues.
- (5) Preparation and presentation of technical research papers at national and international conferences.

The IIMI is an autonomous, nonprofit international organization that was established in 1984 to conduct research, provide opportunities for professional development, and communicate information about irrigation management. Irrigation management includes all aspects of the science and engineering of the on-farm application system and the water delivery and removal system. IIMI was formed because of the recognition of the need for developing and improving mechanisms to expand and coordinate, research and to disseminate the lessons learned regarding irrigation management.

Egypt with its long history of irrigation has much to contribute to the worldwide effort and much to gain from the lessons being learned in the many member countries such as India and Pakistan, which have large irrigation systems under similar climate and farmer ownership patterns. Linkages between WRC and IIMI would include, but not be limited to, carrying out joint research, study tours to other countries, to observe and assist in irrigation management research, hosting of IIMI and other irrigation management researchers in Egypt, preparation of reports to disseminate information, and funding appropriate IIMI research activities directly benefitting Egypt.

Training and consultant numberst

	DRI	WDRI	SERI	GWRI	HSRI	SRI	MERI	ORI	SMRI	WRRI	WORRI	CO	TOTAL
TRAINING													
Non-Degree													
Person/months	66	160	30	20	20	28	26	20	12	16	44	26	468
M. Sc.													
Candidates	4	9	2	4	3	4	3	3	3	4	2	3	44
Phd.													
Candidates	4	5	2	2	3	2	0	1	1	2	2	2	26
SRP Exchange													
SRP Persons												30	30
GOE Persons												30	30
Local													
Person/months	20	25	5	25	15	5	5	20	5	10	15	5	155
Invita. Travel													
Person/trips											10	15	25
CONSULTANTS													
In Country													
Expatriates													
Resident													
(py)												10	10
TDY													
(cm)	84	60	5	35	30	18	12	15	15	25	12	48	359
Local													
(cm)	20	60	0	20	20	0	0	0	10	30	10	0	170
TOTAL	104	120	5	55	50	18	12	15	25	55	22	58	539
DRI	DRAINAGE				CRI	COASTAL							
WDRI	WATER DEV. & IRR. SYSTEMS				SMR	SOIL MECHANICS							
SERI	HIGH DAM SIDE EFFECTS				WRR	WATER RESOURCES							
GWRI	GROUNDWATER				WCR	WEED CONTROL							
HSRI	HYDRAULICS & SEDIMENTATION				CO	CHAIRMAN'S OFFICE							
SRI	SURVEY				MER	MECHANICAL & ELECTRICAL							

WATER RESEARCH CENTER

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

Table F B

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand Total \$
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	
1 Consulting Services															
Resident (Long term)	280	0	100	87	358	94	383	101	410	110	439	118	1970	510	2480
Non Resident	70	0	133	0	2057	0	2079	0	2089	0	2071	0	8499	0	8499
Sub Total	350	0	233	87	2415	94	2462	101	2499	110	2510	118	10469	510	10979
2 Training															
Non Degree	15	0	200	0	700	0	700	0	700	0	719	0	3034	0	3034
Degree (MS, PhD, etc)	95	80	442	90	1289	90	1289	90	1290	90	1290	90	5695	530	6225
Local Training	0	0	0	68	0	68	0	68	0	68	0	68	0	340	340
Sub Total	110	80	642	158	1989	158	1989	158	1990	158	2009	158	8729	870	9599
3 Construction															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities															
Laboratories	0	0	200	0	354	0	518	0	412	0	406	0	1890	0	1890
Vehicles	60	0	283	0	380	0	507	0	135	0	75	0	1440	0	1440
Office	50	20	117	0	105	5	65	0	63	0	62	0	462	25	487
Computers	0	0	200	0	300	0	151	0	40	0	30	0	721	0	721
Field	0	0	200	0	885	40	1318	20	913	20	608	0	3924	80	4004
Sub Total	110	20	1000	0	2024	45	2559	20	1563	20	1181	0	8437	105	8542
5 Local Services															
Administration WRC	0	0	0	40	0	195	0	198	0	199	0	200	0	832	832
Contracts (local)	0	0	0	20	0	106	0	106	0	107	0	107	0	446	446
Administration TA	0	90	0	80	0	140	0	160	0	180	0	240	0	890	890
Sub Total	0	90	0	140	0	441	0	464	0	486	0	547	0	2168	2168
6 Other															
Invitational Travel	0	0	32	0	32	0	12	0	12	0	12	0	100	0	100
SRP Exchange	0	0	150	0	150	0	150	0	150	0	150	0	750	0	750
Sub Total	0	0	182	0	182	0	162	0	162	0	162	0	850	0	850
Combined Annual Totals	570	190	2057	385	6610	738	7172	743	6214	774	5862	823	28485	3653	32138
Cumulative Totals	570	190	2627	575	9237	1313	16409	2056	22623	2830	28485	3653			
Project Obligation \$	Thru FY 86	FY 87	FY 88	FY 89	FY 90	FY 91	Total								
	5507	9000	7100	7100	3431	0	32138								

TABLE F9

WATER RESEARCH CENTER

Projected Expenditures -- GDE Funds(000's)

Table F 9

Category	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C
1 Consulting Services							
Resident(Long term)	0	0	0	0	0	0	0
Non Resident	0	0	0	0	0	0	0
Sub Total	0	0	0	0	0	0	0
2 Training							
Non Degree	0	0	0	0	0	0	0
Degree(MS,PhD,etc)	0	0	0	0	0	0	0
Local Training	0	70	70	70	70	70	350
Sub Total	0	70	70	70	70	70	350
3 Construction		3000	3000	2700	2400	2300	
Sub Total	0	0	0	0	0	0	0
4 Commodities							
Laboratories	0	200	440	600	500	500	2240
Vehicles	0	463	300	400	270	246	1679
Office	0	500	300	159	100	100	1159
Computers	0	0	0	0	0	0	0
Field	0	26	26	26	22	22	122
Sub Total	0	1189	1066	1185	892	868	5200
5 Personnel							
Salaries	0	720	790	865	944	1037	4356
Incentives	0	710	775	845	919	1007	4256
Travel & Misc.	0	10	15	20	25	30	100
Sub Total	0	1440	1580	1730	1888	2074	8712
6 Other							
Operating	0	430	445	469	491	506	2341
Investment	0	0	0	0	0	0	0
Sub Total	0	430	445	469	491	506	2341
Combined Annual Totals	0	3129	3161	3454	3341	3518	16603
Cummulative Totals	0	3129	6290	9744	13085	16603	

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4. Project Preparation Department

a. Background

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

The current staffing of the PPD consists of a Project Director, five long-term expatriate advisors with planning expertise, and 17 MOI staff (five agronomists, ten engineers, and two economists). The number of MOI professionals is within the range of 10 to 20 envisioned in the Project Paper.

During the early period, with a very light workload, the PPD was able to concentrate on training, including provision of in-house courses, seminars and enrollment of staff in local and foreign courses. The PPD's approach to its combined responsibilities for project preparation and training is primarily through guided on-the-job experience in performing actual project planning assignments. This training is supplemented by in-house seminars, formal classes and seminars in Egypt, and by out-of-country academic courses and study tours. Important in these training programs are instructions in English and computer applications.

Concurrently with the above, the PPD is developing a capability for improved project analysis in the future. These efforts include the installation of a VAX 370 digital computer, establishing a reliable data base on agricultural commodity yields and prices and input prices, estimation of accounting values, and development of project preparation and analysis procedures for its training programs.

The North Zifta Feasibility Study prepared by a special MOI unit under the Project Director PPD, with three expatriate advisors, was intended as a pilot effort in determining what was required, and feasible, to improve the irrigation system in a specific canal command and be replicable in other canal commands. The study demonstrated the proper methodology to be used in carrying out such studies. The results indicated that major remodeling of the main and branch canal system is not warranted while improvement to the overall on-farm distribution system would have marginal economic feasibility. Because of the marginal feasibility, and probable greater use in other areas, it was decided to defer investments. However, there are a number of spin-offs and lessons from this study, yet to be capitalized on.

First, the results prompted the Mid-Term Evaluation Team to suggest adoption by PPD of a pre-feasibility analysis procedure before undertaking full scale studies. This has been done.

Second, it is not clear that improvements for all parts of the North Zifta area are uneconomic. When it comes the North Zifta area's turn for consideration for improvement under the RIIP program, a smaller set of improvement activities may prove highly feasible.

Third, the RIIP organization and its' expatriate consultants should study carefully the North Zifta methodology and procedures, as well as the findings, for use in the RIIP program.

The PPD staff and institution have gained considerable capability through their experience to date and have progressively taken more responsibility in the conception of planning approaches; liaison with other agencies, including international financing agencies; investigation and analyses; and report preparation. Routine operation of the computer center will be handled by PPD staff by the end of the present project. Although substantial progress has been made, there are still problems.

The PPD has been in the difficult position of having to respond to project assignments and completion deadlines set by the MOI, while also having responsibility for preparing an inexperienced Egyptian staff to eventually carry out feasibility studies acceptable to international donors. The current staff of PPD is not at a level, neither in staff numbers nor in training, and particularly, experience, to conduct PPD's assigned workload without expatriate assistance. To begin with, effective project preparation calls for mature staff with considerable experience in the planning process. Judgements are needed on a wide range of technical topics, critical decisions must be made concerning the level of detail required and when outside expertise is needed, proposed investments must be viewed critically concerning technical, economic, and financial feasibility, and so on. Most of the Egyptian staff are either Senior engineers who have spent much of their professional careers within their relatively narrow disciplines or young staff without practical experience. There is a major manpower constraint in the lack of mature Egyptians with substantial prior planning experience. Besides the Egyptian staff's technical limitations, they are even more limited in their ability to prepare reports in English--a requirement for most technical reports directed to international financing institutions.

b. Objectives

The objective of creating the Project Planning Department is to give MOI the capacity to analyze project proposals and prepare high quality reports with analytical, technical, and other substantive components completed to international standards.

In addition to analyzing problems and projects for the MOI, the PPD is responsible for documenting their analysis in English in reports prepared for the consideration of international financial donors.

At this point, due to staffing and other problems, this objective has not been achieved. Further assistance will be provided by USAID.

c. Activities

In order to cope with the staffing situation and to discharge PPD's analytical responsibilities, several actions will be taken. The Project Director, in consultation with his expatriate advisors, will take stock of the Egyptian staff's capacity to carry out PPD's assigned responsibilities and identify needed staff capabilities not presently being met. He will then make a concerted effort to identify and secure additional talent with the appropriate credentials. Such individuals should be brought into the organization quickly.

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Concurrently, the MOI will provide authority for PPD to contract out assignments to local or international consultants. Funds, both local and foreign exchange, will be earmarked under the Project Amendment for PPD to engage consulting assistance. International consultants will be required to arrange joint ventures with Egyptian private consulting firms as a pre-condition to bidding on feasibility study tenders. The details of such an arrangement will be developed by the Project Director.

The purpose of financing international consultants to do feasibility studies is to get the quality of work required as well as the quantity, i.e., help PPD respond effectively to assignments by MOI.

The purpose of requiring joint venture participation by Egyptian private consulting firms is to build a local capability for feasibility analysis that will eventually eliminate the need for international consulting firms except for the more complex projects. This is not intended as a substitute for capability in the PPD, but a complementary and auxiliary resource to help cope with the intractable staffing problems of MOI.

Current expatriate consultants would be required, in addition to assisting on current types of assignments, to assist PPD in developing a contract management capability.

Training of PPD staff will continue to be required even if part of the PPD's workload is contracted out. Professional competence in engineering, agriculture, economics, and so on by PPD staff will be required to develop and manage contract feasibility studies, as well as conducting in-house studies as at present.

It is expected that the PPD will provide computer system development and utilization assistance to the Ministry as a whole. Therefore, considerable emphasis will be put on developing the capability of the PPD Computer Center for services outside as well as within the PPD. This will be accomplished through continuing training in-house and in-country, with occasional short-term assistance and possible training abroad.

The MOI (WPG) has proposed that the PPD be given the responsibility for feasibility analysis of the automation of a large number (44) of canals. Funds for this activity are budgeted in Table F5. This would follow a period in which expatriate consultants would analyze the feasibility of automating six canals and train PPD staff in the process. In order to handle this magnitude of assignments, a special unit should probably be created within PPD to do the automation feasibility. The fact that the type of study is repetitious, even if the canals are not identical, may make it possible for PPD to turn out four studies per year as proposed, but not without additional staff with appropriate experience.

Also the MOI has proposed that the PPD participate in the RIIP studies, particularly the agronomic and economic aspects, because of its experience in evaluating economic and financial outputs of agriculture and in evaluation of economic and financial benefits and costs. The PPD has developed a substantial data base of agricultural production information which can be utilized for evaluation of RIIP projects. The PPD also has powerful computer facilities and software for performing project evaluation. Information developed by the PPD from work on North Zifta and Drainage Project 5 particularly has been made available to RIIP staff.

d. USAID Support

Training and guided experience in planning investigations, analyses, and report preparation will be continued. Training will be continued in-house, in-country (primarily English language and computer skills), and abroad (25 person months of nondegree and one person for degree training). Training abroad is intended to include more emphasis on academic work in planning-related subjects, especially project evaluation. Environmental and sociological subjects will be given increased emphasis in in-house training provided by consultants and abroad.

As before, the main emphasis in development of PPD capability and self-sufficiency will be guided on-the-job experience and training. In recognition of gains during the initial period, the consultant resident staff will be reduced from six to three persons. Two of the present six resident positions will expire with completion of the IDA financed component. Provision will be made for continued short-term assistance on a reduced basis.

The three resident technical advisors will be selected to have skills that cover the breadth of the PPD activities. They will consist of an irrigation/water resources planner/team leader for planning concepts, an agricultural economist for agricultural and economic subjects, and an irrigation systems analyst for irrigation engineering, water management, and computer systems advice. Special needs, including specialized training such as environmental impact and sociology will be met through short-term assignments. The additional TA for FY 87 to FY 90 will be the total Ta for the life of this activity will be approximately 300 person months (resident) and 100 person months TDY. Over 67 percent of these services have already been contracted for by the PPD with Harza Engineering Company. The additional TA will be provided by Harza through a contract amendment so as to maintain continuity.

A provision for commodity procurement is included in the extension. It is anticipated that about half of the motor vehicles and office equipment, in service since 1983, will require replacement, in addition to routine requirements, such as library materials, computer software, and accessory equipment.

It is proposed that a project financed external evaluation of the status and progress of the PPD toward its goal of self-sufficiency be made one year before the end of the extension. This evaluation would provide guidance for the last year of the extension and whether further assistance would be desirable.

USAID will also finance the foreign exchange costs of proposed contract feasibility studies by international consultants (Tables F5 and F10). GOE will finance all local costs of the studies, including local contractors involved (Table F11).

PROJECT PREPARATION DEPARTMENT

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

Table F 10

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand Total \$
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	
1 Consulting Services															
Resident (Long term)	2116	246	650	50	925	50	950	62	417	5	0	0	5058	413	5471
Non Resident	250	108	100	0	450	0	412	0	350	9	0	0	1562	108	1670
North Zifta	960	22											960	22	982
Sub Total	3326	376	750	50	1375	50	1362	62	767	5	0	0	7580	543	8123
2 Training															
Non Degree	70	0	70	0	40	0	20	0	0	0	0	0	200	0	200
Degree (MS, PhD, etc)					50								50	0	50
Local Training				10		10		10					0	30	30
Sub Total	70	0	70	10	90	10	20	10	0	0	0	0	250	30	280
3 Construction															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities															
Vehicles	139	0	100	0	100	0	0	0	0	0	0	0	339	0	339
Data Processing	130	0	50	0	20	0	0	0	0	0	0	0	200	0	200
Prof & Dfc Equipment	70	0	40	0	20	0	0	0	0	0	0	0	130	0	130
Technical Materials	30	0											30	0	30
Sub Total	369	0	190	0	140	0	0	0	0	0	0	0	699	0	699
5 Local Services															
Administration	0	460	0	150	0	200	0	230	0	20	0	0	0	1060	1060
Contracting				30		170		280		70			0	550	550
Sub Total	0	460	0	180	0	370	0	510	0	90	0	0	0	1610	1610
6 Other															
Invitational Travel	13												13	0	13
Sub Total	13	0	0	0	0	0	0	0	0	0	0	0	13	0	13
Combined Annual Totals	3778	836	1010	240	1605	430	1382	582	767	95	0	0	8542	2183	10725
Cumulative Totals	3778	836	4788	1076	6393	1506	7775	2088	8542	2183	8542	2183			
Project Obligation \$	7949	1400	1376	0	0	0	0	10725							

TABLE F11

PROJECT PREPARATION DEPARTMENT

Projected Expenditures - BOE Funds (000's)

Table F 11

Category	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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							
Sub Total	0	0	0	0	0	0	0
4 Commodities							
Sub Total	11	12	13	14	15	16	81
5 Personnel							
Salaries	26	28	31	34	36	38	193
Incentives	40	42	46	51	54	58	291
Travel & Misc.	3	4	5	5	6	6	29
Sub Total	69	74	82	90	96	102	513
6 Other							
Sub Total	23	24	25	27	27	28	154
Combined Annual Totals	103	110	120	131	138	146	748
Cumulative Totals	103	213	333	464	602	748	

5. Structure Replacement

a. Background

At the time the IMS project was formulated, one of the most pressing problems confronting Egypt's irrigation sector was the backlog of structures needing replacement or rehabilitation. The irrigation system was becoming steadily less able to meet the needs of farmers and posed a serious constraint to an improved growth rate in the agricultural sector. An accelerated program to replace and make major repairs to these structures (estimated at 9,500), while keeping the system operational at all times, was considered a high national priority by both GOE and USAID.

The Egyptian irrigation system includes many types of structures (Table 1) ranging from the Aswan Dam to small irrigation headgates. Deterioration and obsolescence of the system had resulted over a number of years primarily from severe GOE budgetary constraints. With funds limited, priority was given to the most urgent needs (large structures and major canals) where the negative impact of postponed maintenance would be greatest. Therefore, it was inevitable that the GOE would not keep pace with the needs of the system and many old structures were not replaced.

The MOI recognized the limits of its staff capacity and agreed to take measures to increase that capability through; accelerated recruitment, staff training, placement of qualified personnel in the highest priority assignments, and by seeking means to institute an incentive pay program. In recognition of the constraints within and to a lesser degree outside the MOI (contractors, etc.), the SR program was to be phased in at a moderate pace with Phase I initially covering the five Delta Directorates with the most severe SR problems. The program would then be expanded nationwide to all 19 Directorates in Phase II.

In addition, the MOI agreed to make every effort to meet design specifications and improve quality control throughout the system.

b. Objective

The objective of the SR component is to substantially reduce the dimensions of the SR backlog over the life of the Project with the expectation that the MOI would have the capacity to eliminate the SR backlog by the end of the decade. Structures are to be constructed to MOI standards and, with the reduction of the backlog the MOI will then be able to keep pace with ongoing structural replacement and maintenance requirements.

The structural replacement program is designed to replace and rehabilitate primarily the irrigation structures on lateral and branch canals such as; intake regulators, head regulators, weirs, tail escapes, spillways, bridges and crossing works. These structures vary in size and are constructed from reinforced concrete, masonry, pipe, steel and timber.

The objective is to be achieved by: (1) increasing budgetary allocations for SR; (2) bringing the standards of construction up to meet established MOI designs and specifications; (3) professional development (recruitment, training, proper staffing, pay incentives); (4) procurement of engineering advisory assistance; (5) establishing a system of construction performance progress certification; and (6) improving management to adequately carry out future structural replacement and maintenance.

c. Progress through FY86

The original PP and Project Agreement derived from it provided, within the overall framework of the project, for only Phase I funding of SR. The reason underlying this phasing was to test the capability of MOI to effectively mobilize financial and manpower resources required for a national SR program.

STRUCTURAL INVENTORY
Table 12
Characteristics Of
Irrigation Structure
Number Of Structures by Function, Hydraulic Area and Type of Construction

Type	Hydraulic Area less than 3 sq.m					Hydraulic Area 3 to 6 sq.m					Hydraulic Area 6 to 12 sq.m					Hydraulic Area 12 to 24 sq.m					Hydraulic Area greater than 24 sq.m				
	Construction					Construction					Construction					Construction					Construction				
	RC	M	P	S	T	RC	M	P	S	T	RC	M	P	S	T	RC	M	P	S	T	RC	M	P	S	T
INTAKE REG.	747	1759	1481	---	---	536	420	47	---	---	225	172	18	---	---	79	45	6	---	---	57	31	1	---	---
HEAD REG.	257	582	516	---	---	100	248	32	---	---	116	96	19	---	---	72	57	2	---	---	77	33	---	---	---
WEIR	9	46	10	---	---	15	17	---	---	---	6	19	---	---	---	2	16	---	---	---	15	7	---	---	---
TAIL ESCAPE	73	48	1616	---	---	3	9	4	---	---	2	2	---	---	---	2	---	---	---	---	2	---	---	---	---
SPILLWAY	3	2	126	---	---	2	2	---	---	---	2	2	---	---	---	2	1	---	---	---	6	5	---	---	---
BRIDGES	588	673	1569	8	212	1818	266	21	5	306	1775	129	8	5	532	1017	71	15	1	108	847	23	4	25	79
CROSSING WORKS	22	---	478	---	---	0	---	44	1	---	2	---	3	---	---	7	---	1	---	---	1	---	---	---	---
SUB TOTAL	1699	3110	5796	8	212	2570	962	148	6	306	2128	420	48	5	352	1181	190	24	1	108	1005	99	5	25	79

TOTAL 20,487

NOTES: RC = Reinforced Concrete H = Masonry P = Pipe S = Steel T = Timber

Source: Arab Republic Of Egypt, Water Master Plan, Technical Report 20, March 1981

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The MOI staff directed special efforts in Phase I to achieve an improved level of quality control and to ensure compliance with MOI specifications. The MOI implemented Phase I and demonstrated its capacity to manage and meet the budgetary requirements of the SR program. The first phase replaced approximately 3,000 structures in five Delta Directorates.

Based on performance during Phase I, USAID obligated additional funds to support Phase II which consists of replacing about 6,500 structures during the remainder of the project in all 19 Irrigation Directorates. As of June 30, 1986, approximately 5,500 structures have been replaced under Phase I and II, at a cost of LE 41 million. MOI also has certified that all structures for which they request AID reimbursement have been built to MOI specifications.

The MOI has, as agreed, accelerated recruitment, organized staff training, and placed qualified personnel in the highest priority assignments, but the incentive pay program has lagged. However, due to the decentralized nature of the SR program, activities have continued to progress since implementation is concentrated at the local level. Effort is being made to achieve a high level of quality control and to ensure full compliance with MOI specifications.

In December, 1984, an in-depth evaluation was carried out on Phase I of the SR sub-project. The recommendations of the evaluation team included: intensifying monitoring, upgrading specifications, and additional training. These recommendations, mutually approved by MOI and USAID, are being incorporated into the second phase of the project. An updated evaluation status report is included in Annex G.

The monitoring of project activities continues to improve. The USAID office responsible for this project has increased its staff by one, the consultant has also hired an additional engineering advisor, and the MOI Central Office is actively soliciting additional staff to monitor and report on field activities. At the field level, the primary responsibility for construction activities has been shifted from the Irrigation Sector to the more experienced construction oriented MOI Projects Sector. However, these two sectors continue to collaborate in implementing the program. This shift has also increased the number of engineers available for supervision and inspection of structures and each Directorate has received a set of "Construction Quality Control Manuals" for use by its staff. Field trip reports are prepared on a regular basis. The project is also in the process of acquiring motorcycles for its field supervision personnel to improve their mobility; and to improve communications, a radio system is being planned.

Specifications have been upgraded, concrete and soils lab testing equipment to serve all Directorates is in the process of being acquired and set up at the Central Headquarters and at five Directorates. Improvements in contract administration are being initiated. These improvements include instituting a system of bid and preconstruction conferences, and strengthening the system of prequalifying prospective construction contractors. The Minister of Irrigation has issued a decree (Attachment B) directing MOI construction supervisors to keep proper records regarding contractor performance and to prohibit poor performing contractors from bidding on MOI construction activities.

The projects staff continues to receive training, primarily incountry, through the MOI's Training and Manpower Development Program (TMD) and on-the job training (OJT). The following chart indicates the type of training courses related to construction and maintenance, being given during the calendar year 1986.

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<u>Course Title</u>	<u>Offerings</u>	<u>Total Number Participants</u>
- Execution of Irrigation Projects	3	75
- Operation and Maintenance of Pumping Stations	4	100
- Construction Management and Quality Control	2	50
- Water Measurement and Maintenance	2	40
- Design of Irrigation Structures	2	40
- Operation and Maintenance	2	50
	<u>15</u>	<u>355</u>

These types of courses will continue to be offered by TMD in the short run and by NITI in the future.

The MOI operation and maintenance budget, summarized below, reports actual expenditures for GOE FY 80/81 through 85/86 and for budgeted/projected expenditures through 90/91/

MOI Operation and Maintenance Budget
1980/81 - 1990/91 (LE 000's)

	GOE FY	Amount <u>LE 000'</u>
Actual Expenditures	80/81	21,284
" "	81/82	26,172
" "	82/83	34,601
" "	83/84	39,000
" "	84/85	44,094
" "	85/86	37,672
Budgeted Expenditures	86/87	56,500
Projected Expenditures	87/88	62,400
" "	88/89	68,300
" "	89/90	82,000
" "	90/91	98,300

As part of the agreement concerning the IMS project, MOI agreed to substantially increase their O&M budgets to provide adequate maintenance of the irrigation system. Since the IMS project was conceived, MOI has increased its overall O&M expenditures by over 100 percent from 1981 to 1985. The reduction for GOE FY 85/86 was generally reflected across all GOE sectors as an overall belt tightening exercise in the last year of the current Five-Year Plan. The MOI plans on returning to their projected budgets in the coming years.

In general the O&M of the system has improved over the past few years. The improvement is a direct result of MOI's concern and awareness, IMS training activities, World Bank training activities on the drainage system, and UNDP's work with the MOI Planning Sector.

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d. Proposed Activities

The continuation of the Phase II program, to be completed in three years (June 1989), will replace an additional 4,000 structures as requested by MOI (Attachment A) at a cost estimated at LE 52 million (LE 13,000/structure). This will bring the total number of structures completed to 9,500 at a total cost estimated of LE 93 million. The current status, budget, and future program for structure replacement/rehabilitation is shown in Attachment A.

The project will continue its efforts to improve the quality of construction and organization strengthening through staff development and resource allocation. The new areas of emphasis which will impact on construction quality are in the areas of improved contract administration.

A favorable impact on quality control should also be achieved through improved communications made possible upon installation of a radio system (Main System Management) and the increased mobility of supervisory staff through the use of motorcycles.

Staff development will continue to be coordinated through TMD which offers a wide range of training courses. Two engineering advisors will continue to provide technical assistance to support the SR program during the period of extension. They will continue to devote a substantial part of their time assisting field personnel in the Directorates and advising and assisting in TMD programs to train personnel as well as direct on-the-job training. Training focuses on analysis of alternate design options, use of new materials, quality control, improved reporting and contract administration, and developing the capacity for maintenance of structures. Short-term technical personnel for special needs are utilized as required.

e. Recurrent Costs

The SR component will have met the target of eliminating the backlog of structures during the decade of the eighties by June 1989. However, a concerted effort will be made throughout the remaining life of the project to assure that the MOI continues to follow-up on structural replacement and maintenance requirements after completion of the SR sub-project. The MOI has assured USAID that they will meet these requirements as detailed in MOI correspondence which is included as Attachment B. In summary, the MOI has committed itself to continuing the basic SR organization after June 1989. This organization will coordinate the continuation of SR activities no matter what the source of funding. The Irrigation Sector of the MOI continues to be responsible for coordinating regular maintenance in the Directorates. However, the organization being developed under the Preventive Maintenance subproject, as it is replicated in MOI's Directorates, will improve the efficiency of existing MOI maintenance performance through improved coordination between offices, reduced duplication of effort, and use of equipment better suited to current maintenance needs.

About 440 structures will need replacement annually at an initial replacement cost estimated at LE 15,000 each. This would then require the MOI to budget about LE 6.6 million annually for construction contracts with a yearly adjustment for inflation. It does remain possible, however, that donor support may offset some of this budgetary requirement (ie., other donor supported infrastructure activities).

The periodic maintenance of structures will be done by the Maintenance Organization within the MOI's Irrigation Sector. The shape of this maintenance organization is currently in a state of flux and will be eventually modeled after the organization being developed in the Preventive Maintenance component of this Project. The recurring maintenance cost of the system has been estimated at about one percent of the present value of the system (LE 310 million). The annual maintenance budget for structures should then be about LE 3.1 million with a yearly adjustment for inflation.

Therefore the initial total amount of recurrent cost would be about LE 6.6 million, plus 3.1 million and an additional 10 percent to administer the activities for a combined total of about LE 10.7 million to continue structure replacement activities and fund periodic maintenance.

The intent of the GOE is to increase steadily the MOI budget for structure replacement year by year so that by GOE FY 88/89 the MOI budget will sustain the system once the backlog has been eliminated. That estimated amount is based on all structure replacement and major rehabilitation being carried out in full compliance with existing MOI design standards and specifications.

Actual and Projected
MOI Funding for Structures &
Structural Maintenance (LE millions)

<u>GOE FY</u>	<u>Regular IMS,SR Contribution</u>	<u>Other SR Funding</u>	<u>Maintenance of Structures</u>	<u>Annual Total</u>
86/87	4.05	4.00	1.3	9.35
87/88	4.05	5.00	1.8	10.85
88/89	2.36	6.00	2.2	10.56
89/90	0.34	8.01	2.6	10.95
90/91	0.00	8.40	3.1	11.50

Therefore, using the above estimates, the MOI will be budgeting sufficient funds to meet the recurring costs for structure replacement and maintenance by the end of the project. The MOI's commitment to continuing these recurrent cost activities is included in Attachment B.

f. USAID Support

USAID will provide local currency support, primarily for reimbursing 80 percent of the agreed upon annual structural replacement program costs.

Staff classroom training will be primarily carried out through support given to the Professional Development component. The TA advisors will assist with on-the-job training. Approximately 25 person months of nondegree training will be provided.

Commodity support is being provided for transport, technical library, limited drafting and survey equipment, and construction materials testing equipment.

Technical assistance (approximately 70 person months resident and 8 person months TDY) will continue to be provided by two engineering advisors until the completion of this component.

Tables F13 and F14 provide the detailed annual budgets for USAID and GOE.

MINISTRY OF IRRIGATION
STRUCTURE REPLACEMENT PROJECT
IRRIGATION BUILDING FUM EL-ISMAILIA
SHOUBRA EL-MEZALAT
KHALFAWI POST No. 11614

وزارة الري
مشروع الاجلال والتجديد
مبنى الري بحوار فوم نيرة الاسماعيليه
شبرا المظلات - بريد الخلفاوى رقم 11614

September 3, 1986

Mr. Harry Proctor
Project Officer SR Project
Irrigation & Land Development
USAID
Cairo Center Building
Cairo, Egypt

Attachment A

Dear Mr. Proctor,

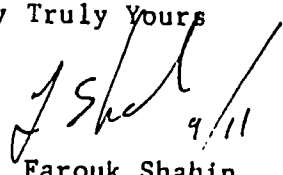
Reference is made to your letter of August 21, 1986 by which you requested us to review our future disbursements for FY 86/87, FY 87/88 and FY 88/89 of the SR Program.

We submit to you, for reference, two tables marked A and B. Table "A" which was submitted previously to you, represents estimates per year of works contracted to to be contracted.

Table "B" shows estimates of yearly disbursements for FY 86/87, FY 87/88 and FY 88/89.

The budgets for SR works, through June 1989, are based on estimates that approximately 9,500 structures would require replacement during the life of the project and to bring the system to a stable condition.

Very Truly Yours


Eng. Farouk Shahin
Project Director SR & RIIP

STRUCTURE REPLACEMENT PROGRAM
COMPREHENSIVE SCHEDULES OF ACCOMPLISHED WORKS (UNTIL JUNE 86)
& IMPLEMENTATION OF FUTURE WORKS (UNTIL JUNE 89)
(L.E. 1,000)

Directorate	No. Of Struc. built	Cost Of Completed works as of 30/6/86	1986/87		1987/88		1988/89		Total Of Struc. require replace	(Three) Total Est Cost
			No. Of Struc. require	Estimated Cost (1986 prices)	No. Of Struc. require	Estimated Cost (1987 prices)	No. Of Struc. replace	Estimated Cost (1988 prices)		
Kalubia	205	1,819*	100	1,300	80	1,000	30	400	210	2,700
Ismailia	827	1,226[]								
Sharkia	928	6,276[]	211	1,536@					211	1,536
West Dakahlia	426	4,001[]	26	687@					26	687
East Dakahlia	444	3,697[]	60	702@					60	702
Kafr El Sheikh	125	1,700*	220	2,800	75	1,000	65	900	360	4,700
Gharbia	722	1,890*	190	2,400	95	1,200	60	800	345	4,400
Menoufia	158	1,206*	140	1,800	120	1,300	85	1,200	345	4,500
Beheira	607	6,552[]	71	1,083@					71	1,083
Nubaria	93	570*	130	1,750	125	1,500	70	900	325	4,150
Giza	121	1,163*	80	1,000	100	1,250	45	600	225	2,850
Beni-Suef	117	1,190*	95	1,200	115	1,500	75	1,000	285	3,700
Fayoum	128	2,061*	85	1,000	75	1,000	40	500	200	2,500
East Minia	53	485*	450	7,000	60	750	50	700	560	8,450
West Minia	80	1,677*	100	1,300	60	750	45	600	205	2,650
Asuit	196	869*	80	900	35	400	20	250	135	1,550
Sohag	94	1,096*	70	800	45	600	30	400	145	1,800
Esna	60	1,080*	65	800	35	450	25	300	125	1,550
Aswan	141	1,785*	75	800	70	850	40	600	185	2,250
Total	5525	40,751	2248	28,858	1,090	13,750	680	9,150	4,018	51,758

[] Actual cost of SR works for each of the Phase I directorates as of June 30, 1985.
* Estimated cost of SR works of each of the phase II directorate as of June 30, 1986. Number of structures shown as built a number of structures in progress
! Additional works to Phase I directorates to complete SR program.
General Notes: I Yearly by directorates and total budgets are SR planned works. Quarterly advance payment to the project according to a yearly project implementation plan will help the timely completion of the SR program.
II Cost of technical assistance and training is included in Harza's budget.

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STRUCTURE REPLACEMENT PROGRAM

TBALE B

COMPREHENSIVE SCHEDULES OF ACCOMPLISHED WORKS (UNTIL JUNE 86)
AND ESTIMATES OF IMPLEMENTATION OF FUTURE WORKS (UNTIL JUNE 89)

Directorate	No. of struc. built	Cost of completed works as of 30/6/86	1986/87		1987/88		1988/89		Total of struc. require replacement	(Three year) Total Estimated
			No. of struc. require replace	Estimated Cost (1986prices)	No. of struc. require replace.	Estimated Cost (1987prices)	No. of struc. require replace.	Estimated Cost (1988prices)		
Kalubia	205	1,819,000	75	800,000	75	1,000,000	60	900,000	210	2,700,000
Ismailia	827	1,226,136								
Sharkia	928	6,276,095	211	1,536,000					211	1,536,000
East Dakahlia	426	4,000,511	26	687,000					26	687,000
West Dakahlia	444	3,696,777	60	702,000					60	702,000
Kafr El Sheikh	125	1,700,000	120	1,400,000	120	1,600,000	120	1,700,000	360	4,700,000
Gharbia	722	1,890,000	120	1,400,000	120	1,600,000	105	1,400,000	345	4,400,000
Menoufia	158	1,206,000	120	1,500,000	120	1,500,000	105	1,500,000	345	4,500,000
Behaira	607	6,551,930	71	1,083,000					71	1,083,000
Noubaria	93	570,000	110	1,250,000	105	1,300,000	110	1,600,000	325	4,150,000
Giza	121	1,163,000	75	900,000	75	950,000	75	1,000,000	225	2,850,000
Beni-Suef	117	1,190,000	95	1,200,000	95	1,200,000	95	1,300,000	285	3,700,000
Fayoum	128	2,061,000	70	800,000	70	900,000	60	800,000	200	2,500,000
West Minia	53	485,000	200	2,500,000	200	2,750,000	160	3,200,000	560	8,450,000
East Minia	80	1,677,000	70	800,000	70	900,000	65	950,000	205	2,650,000
Assuit	196	869,000	50	500,000	45	500,000	40	550,000	135	1,550,000
Sonag	94	1,096,000	50	550,000	50	600,000	45	650,000	145	1,800,000
Qena	60	1,080,000	45	500,000	40	450,000	40	600,000	125	1,550,000
Aswan	141	1,785,000	65	700,000	60	750,000	60	800,000	185	2,250,000
TOTAL	5525	40,751,449	1633	18,808,000	1245	16,000,000	1140	16,950,000	4018	51,758,000

- ▲ Actual cost of SR works for each of the Phase I Directorates as of June 30, 1985.
- * Estimated cost of SR works of each of the Phase II Directorates as of June 30, 1986. Number of structures shown as built include a number of structures in progress.
- Additional works to Phase I Directorates to complete SR Program.

General Notes: I Yearly by Directorate and total budgets are SR planned works. Quarterly advance payment to the project according to a yearly project implementation plan will help the timely completion of the SR Program.

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ANNEX F

MINISTRY OF IRRIGATION
STRUCTURE REPLACEMENT PROJECT
IRRIGATION BUILDING FUM EL-ISMAILIA
SHOUBRA EL-MEZALAT
KHALFAWI POST No. 11614

ANNEX F

وزارة الري
مشروع الاجتال والتجديد
مسئول الري حواره نزع الا سماعيه
شبرا المنظلات - بريد المتخاوى رقم 11614

September 10, 1986

Attachment B

Mr. Harry Proctor
Project Officer SR Project
Irrigation & Land Development
USAID

Dear Mr. Proctor,

With reference to your letter, dated August 21, 1986, by which you requested "an update of the contract Administration Improvements" of the SR program with regards to prequalifications of bidders, bid and post award conferences, we are happy to provide you with the following information.

One of the major difficulties in attracting large and/or experienced contractors to participate in the implementation of the SR program is the magnitude of the contract sites. Often a contract site is in excess of 250 square kilometers. Small local (District) contractors are attracted to bid in MOI construction works because although technical not very experienced, they know well the areas and the labor availability in every district in the provinces.

In order to attract local contractors to execute its construction programs MOI, in the past, had liberal prequalification requirements, especially when the cost of the majority of contracts awarded were less than 100,000 L.E./contract. For small contracts no prequalification of contractors was required and most of the time concrete was mixed by hand.

Parallel with the upgrading of construction methods an effort by MOI is made to select more suitable (qualified) contractors for its (SR) program.

MOI took two important steps in improving the selection of contractors allowed to bid:

- a) by a letter to the D.G.'s at the Directorates it was requested that contractors executing MOI work whose overall performance (rating) is below "Good" 60% or less be barred from participation to any future contract with MOI, and
- b) Pre-bid conferences are now being held for all future (SR) contracts.

The office of the Director of the (SR) program is now participating in prebid conferences in co-operation with MOI Directorate officials. During the prebid conferences, the nature extend and difficulties of each contract is explained to prospective contractors along verbal warnings that:

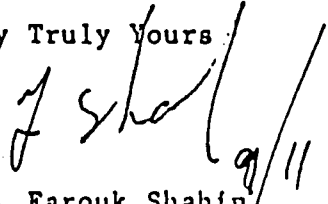
- a) strict compliance with the specifications will be enforced,
- b) what type of construction quality will not be acceptable and therefore payments will not be made for poor quality in construction, and
- c) contractors rated 60% or less in quality of construction will not be allowed to participate in any future contracts by MOI.

In order to attract qualified/experienced contractor, the monetary value of the contracts have been, whenever feasible increased to 250,000 L.E./contract and the sites of contracts have been reduced. (by releasing contracts which include more than one type of structure.

Additionally the office of the (SR) Director will issue (within 30 calendar days from this writing) to all Directorates guidelines in maintaining records and prequalifying contractors bidding in future (SR) works.

There is no question as to the importance of selecting qualified or prequalified contractors to execute MOI SR works. Another equal important point is that the prequalification process from what was practiced in the past to what is expected in the future requires time. Our office will make every effort required to improve the selection of contractors participating in the SR works in the shortest possible time.

Very Truly Yours


Eng. Farouk Shahin
Project Director SR & RIIP

Enclosures: Translation of

- 1) Ministerial Decree of 4/5/86 to Directorates about Quality Control.
- 2) Letter of Eng. Farouk advising Directorates about prequalifications of contractors.

Translation of
Decree No. 8 for Year 1986

It has been noticed that some of the construction works of the Ministry are not done in the appropriate technical level and are not given enough care nor accuracy which was the habitude of the Ministry.

In order to raise the performance level as before, we need to follow the following specifications and standards:

- 1) Apply the conditions and the general specifications concerning the construction works such as using the gradated aggregates, washing it before mixing, using the formworks for concrete according to the technical standards. Also has to use the mechanical mixers and vibrators, and the chemical and plastic materials in curing the concrete after casting and making the laboratory tests necessary for the concrete.
- 2) Has to make a diary for each structure:
 - a) The diary is numerated, putting into consideration to make every page in triplicate.
 - b) Note down in the diary the details and the processing of the job, the remarks on the structure and all what concerns the performance. Also what has been done concerning the instructions of the high level inspection.
 - c) The three copies are distributed as follows:
One copy in the operation's file, the 2nd in the Director General's file and the 3rd is kept in the diary.
 - d) This diary will be taken as a standard, when evaluating the word of the engineer and the contractor.
- 3) When we evaluate the performance of a job the following items are taken:
 - a) Not to give any job to a contractor whose technical performance is less than good and put a note in the operation report in order to notice him when he applies for any future contract.

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- b) Present to us the report of the engineer that his level in executing the projects and works is less than "good" in order to consider his case.

We request all the Ministry's authorities to carry on what has been mentioned in that decree precisely.

Minister of Irrigation
Eng. Essam Rady

Attachment B

(Translated)

To : All the Directors General
of all the Directorates

From : Eng. Farouk Shahin

In the occasion of bidding for new operations in the Projects and Irrigation Directorates and the IMS for year 1986/87, I would like to inform you that it has been noticed that many contractors did not achieve the required quality of work in addition to negligence in performance.

These works are continuously exposed to water, and so any failure in performance consequently leads to lowering the life expectancy of the structure.

As these projects are funded by the USAID who connects the funding procedures with the quality of works, so the following items are required:

- 1) Enclose the specifications of the concrete works and the paintings of all the steel works to all contracts which are under advertisement and that has been previously distributed to all the Directorates.
- 2) Invite the contractors even before they present their tenders, to a meeting attended by representatives of the Directorate and of the Central Office of the RIIP project to explain the requirements of performance according to the enclosed specifications.

Please consider the above mentioned items and inform us of the steps you have taken in that matter.

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TO : Mr. Harry G. Proctor
FROM : E. M. Krith
SUBJECT : "Paragraph describing procedures for SR works"

Structures to be replaced are selected on the basis of age and function. Priority is given to primary irrigation water delivery system, then to secondary and so forth. Bridges are sometimes the exemption of this rule.

Bridges built twenty five years ago and before have limited load capacity and are narrow. Rapid increases in vehicle size and capacity using the agricultural network dictates priorities in bridge construction.

Once a structure is identified for replacement the responsible directorate includes it to their planned yearly activity. Drawings for a selected structure to be replaced come from three sources:

- a) available standard drawings at the executing directorate,
- b) standard drawings available in other directorates which the executing directorate copies or uses, and
- c) drawings made by the executing directorate to suit, its particular needs (projects).

Standard MOI specs with additions/modifications to suit any particular job are used by the executing directorates.

Contracts containing several structures to be replaced are announced to interested parties through newspapers etc... . Public and private sector companies are allowed to bid. MOI began a prequalification of contractors procedure to be used in future contracts. Public sector companies participating in the (SR) program amount to less than 10% of the number of contractors participating in the program.

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The contract requirements are generally as follows:

- I) Bid Bond is 1% of the estimated contract price
- II) Always the lower bidder is selected to execute the works.
- III) Performance bond is 5% of the contract price.
- IV) Maintenance bond is 5% of the cost of the contract and is retained for one year past the acceptance of the contract.

Each structure has a supervising engineer in charge of the contract technical and often administrative requirements. The supervising engineer when a structure is completed certifies its acceptance.

Payments are made monthly to the contractors according to the progress of works. MOI has the right, and occasionally is used, to refuse payments for unacceptable works.

Ministry Of Irrigation
Irrigation Department

Eng. Edwin D. Stains
Director, Office of Irrigation
and Land Development.
ATD/Cairo.

September 14, 1986

Dear Mr. Stains.

With reference to your letter dated 21 August 1986, in response to the MOI's letter 2 July 1986, I would like to inform you that the MOI gives, all the time, more emphasis to improve the quality of structure replacement construction and their maintenance.

To improve the quality of ongoing construction, the MOI has already taken the process of supplying five quality control labs in the Irrigation Improvement Project Directorates. They contain the required equipment for testing concrete, cement, and soils. These labs are financed from Structure Replacement Project (SRP) funds.

The Ministry has also instructed the directorates to hold pre-bidding conferences for the contractors to explain the contract specifications and stress on the required quality of construction.

Instructions were given to the Directorates to reject every contractor whose level of work is rated less than satisfactory and consider him unqualified for future work.

The Irrigation Improvement Project Directorates will be the responsible organization for continuing the structure replacement program while the Irrigation directorates will be the responsible organization for the maintenance of structure. However, the organization being developed in Gharbia under the Preventive Maintenance subproject will be the model for future MOI maintenance. As this organization is replicated in the Irrigation directorates, it will improve the efficiency of maintenance

through improved coordination between offices, reduced duplication of effort, and use of equipment better suited to current maintenance needs.

The attached tables indicate; (1) the annual budgetary allocations for the overall MOI Operation and Maintenance Budget since GOE FY 1980/81. (2) annual budgetary allocations in the five year plan for continuing structure replacement and (3) maintenance. Therefore, I wish to assure you that the MOI has the financial capability and human resources to effectively install, maintain and utilize the structures being implemented under the project. The MOI will also continue to meet ongoing requirements for structure replacement and maintenance after completion of USAID assistance to the Irrigation Management Systems Project (IMS) component.

With my best regards.

Yours Sincerely,

f. Eng. Fouad Abdel Aziz
Senior Under-Secretary of State
Ministry of Irrigation

Fouad Abdel Aziz Taky
17-9-86.

Table 1

The MOI operation and maintenance budget, summarized below, reports actual expenditures for GOE FY 80/81 through 85/86 and for budgeted/projected expenditures through GOE FY 90/91.

MOI Operation and Maintenance Budget

1980/81 - 1990/91 (LE 000's)

	GOE FY	<u>Amount</u> LE 000'
Actual Expenditures	80/81	21,284
" "	81/82	26,172
" "	82/83	34,601
" "	83/84	39,000
" "	84/85	44,094
" "	85/86	37,672
Budgeted Expenditures	86/87	56,500
Projected Expenditures	87/88	62,400
" "	88/89	68,300
" "	89/90	82,000
" "	90/91	98,300

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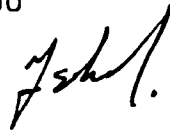
Table 2
Actual and Projected MOI Funding for
Structure Replacement
(in thousands L.E.)

	IMS, SR Contribution	Other SR funding	Annual Total
86/87	4050	4000	8050
87/88	4050	5000	9050
88/89	2360	6000	8360
89/90	340	8010	8360
90/91	0000	8400	8400

J. Kelly

Table 3
Actual and Projected MOI Funds for
Structural Maintenance
(in thousands L.E.)

80/81	650
81/82	700
82/83	750
83/84	800
84/85	900
85/86	1000
86/87	1300
87/88	1800
88/89	2300
89/90	2600
90/91	3100



STRUCTURAL REPLACEMENT

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

Table F 13

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand Total \$
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	
1 Consulting Services															
Resident (Long term)	460	80	190	40	200	50	208	44	0	0	0	0	1058	214	1272
Non Resident	4	2	40	0	42	0	45	0	0	0	0	0	131	2	133
Sub Total	464	82	230	40	242	50	253	44	0	0	0	0	1189	216	1405
2 Training															
Non Degree	76	0	50	0	50	0	24	0	0	0	0	0	200	0	200
Degree (MS, PhD, etc)													0	0	0
Local Training													0	0	0
Sub Total	76	0	50	0	50	0	24	0	0	0	0	0	200	0	200
3 Construction															
Phase I	0	20923	0	0	0	0	0	0	0	0	0	0	0	20923	20923
Phase II	0	20077	0	9500	0	12000	0	9500	0	950	0	0	0	52027	52027
Sub Total	0	41000	0	9500	0	12000	0	9500	0	950	0	0	0	72950	72950
4 Commodities															
Vehicles	57	0	0	143	0	0	0	0	0	0	0	0	57	143	200
Data Processing	11	0	4	0	0	0	0	0	0	0	0	0	15	0	15
Technical Library	228	0	0	22	0	0	0	0	0	0	0	0	228	22	250
Canal Gates	380	0	0	0	0	0	0	0	0	0	0	0	380	0	380
Lab Equipment	175	0	0	0	0	0	0	0	0	0	0	0	175	0	175
Sub Total	851	0	4	165	0	0	0	0	0	0	0	0	855	165	1020
5 Local Services															
Administration	0	270	0	70	0	90	0	50	0	0	0	0	0	480	480
Sub Total	0	270	0	70	0	90	0	50	0	0	0	0	0	480	480
6 Other															
Invitational Travel													0	0	0
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Annual Totals	1391	41352	284	9775	292	12140	277	9594	0	950	0	0	2244	73811	76055
Cumulative Totals	1391	41352	1675	51127	1967	63267	2244	72861	2244	73811	2244	73811			
Project Obligation \$	56039	14100	5916	0	0	0	0	76055							

TABLE F14

STRUCTURAL REPLACEMENT

Projected Expenditures - GOE Funds (000's)

Table F 14

Category		Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
		\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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							
	Phase I	5230	0	0	0	0	0	5230
	Phase II	5020	3000	3000	1750	240	0	13010
	Other Constructions	12000	4000	5000	6000	8010	8400	43410
	Sub Total	22250	7000	8000	7750	8250	8400	61650
4	Commodities							
	Off. equip+ Supplies	4000	1000	1200	1400	1700	2000	11300
	Vehicles			100	120	140	170	530
								0
								0
								0
								0
	Sub Total	4000	1000	1300	1520	1840	2170	11830
5	Personnel							
	Salaries	24000	7000	7000	4000	4000	4000	50000
	Incentives		200	200	120	120	120	760
	Travel & Misc.		100	100	70	70	70	410
	Sub Total	24000	7300	7300	4190	4190	4190	51170
6	Other							
			50	50	30	30	30	190
								0
								0
	Sub Total	0	50	50	30	30	30	190
Combined Annual Totals		50250	15350	16650	13490	14310	14790	124840
Cumulative Totals		50250	65600	82250	95740	110050	124840	

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6. Preventive Maintenance

a. Background

Maintenance planning in Gharbia Directorate is involving the full range of steps in a sustained maintenance process: budgeting; funds release and control; structure and canal maintenance needs; work scheduling, contracting, design, inspection quality control and survey; staffing and administration; communications; work control and management; reporting and follow-up, etc. When implemented, the new program will result in first echelon maintenance by units of the MOI with procedures to manage and control higher levels of maintenance and replacements. The project will result in coordinated maintenance throughout all maintenance levels.

Currently maintenance is being managed by three organizational units within the MOI. The Irrigation Department is responsible for the irrigation delivery system, the Drainage Authority is responsible for the drainage system and the Mechanical & Electrical Department is responsible for the pump stations (Figure 5.1). In theory, first echelon maintenance is performed by these units with major repairs, cleanouts, and so forth performed by public sector companies of the MOI. Private sector companies are also occasionally used. In reality, due to lack of equipment, etc., routine maintenance is frequently neglected until it becomes serious enough to require repairs by contract.

A one-year study of Gharbia Directorate was completed by MOI Gharbia Directorate Personnel with technical help from an expatriate engineer. The report, submitted to MOI and USAID in February 1984, covered many elements of maintenance operations and provided a detailed list of workshop equipment (estimated at \$1.8 million) needed to upgrade the Directorate, Inspectorate, and District levels of the Gharbia Directorate. However, the Maintenance Plan did not contain enough specific information about conditions as they exist in Gharbia, nor did it present a sufficiently detailed plan for implementation. At issue is the MOI's institutional commitment to effectively reorganize, staff, and fund maintenance so that irrigation structures and canals receive more timely preventive maintenance. That issue is still relevant.

Completion of the High Aswan Dam and the resulting retention of sediment in the reservoir has changed the problems of channel maintenance from sediment removal to weed control. The MOI has developed a comprehensive and coordinated 12-year program to accomplish a transition from the current status of overemphasis on mechanical excavation to an integrated system of mechanical, chemical, manual, and biological weed control. The integrated system will depend upon significantly improved institutions within the MOI to provide central planning and management, monitoring, research and development, and training.

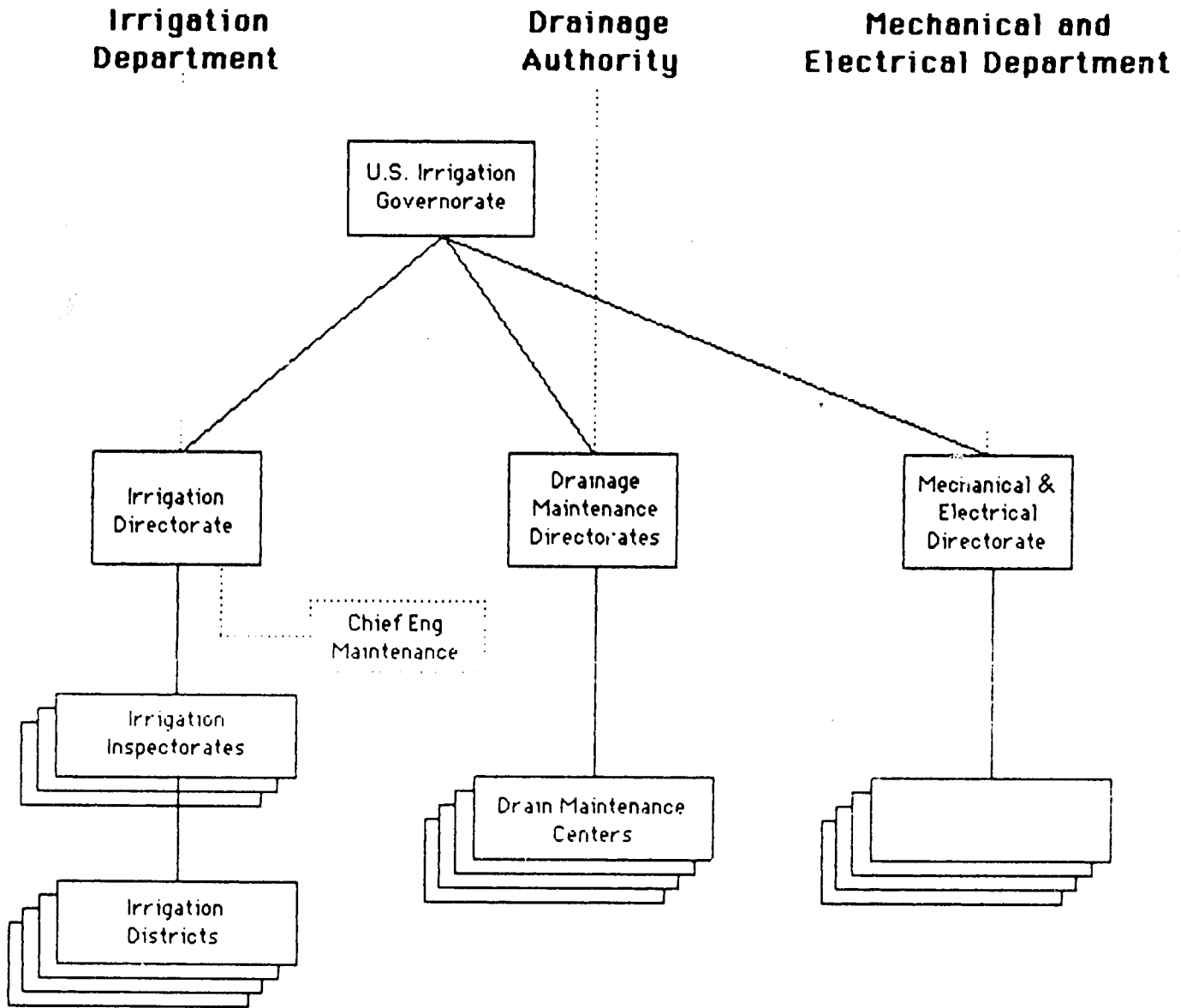
Implementation of the plan will provide direct benefits in two major ways: (1) maintenance costs will be reduced by using improved management and technology, and (2) agricultural production will be increased by means of improved water delivery and drainage. In addition, there will be a net foreign exchange savings related to both of the above major benefits.

b. Objectives

The objective of the Preventive Maintenance component is to develop and implement an integrated system for upgraded maintenance of the irrigation system, initially in Gharbia Directorate. This objective is not being fully met because organizational changes and procedural decisions necessary for implementation in both the delivery and drainage systems have not been made. Currently the system is being implemented in the Irrigation Department only. Whether or not the decisions will be

Organization Chart

MAINTENANCE ORGANIZATIONS AT THE GOVERNORATE LEVEL



Responsibility for Maintenance

Irrigation Department

1. All structures in the delivery system except pumping facilities.
2. All channel in the irrigation delivery system.
3. All open drains that do not serve tile drainage installed through WB project

Drainage Authority

- 1 All open drains that serve tile drains installed through the WB project.
- 2 All tile drains

Mechanical and Electrical Department

1. All irrigation and drainage pump stations.

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made permitting broader implementation is an open question. Organizational changes and/or special lines of communication to accomplish necessary coordination between the three major units responsible for maintenance will be worked out by MOI.

Another objective of this Component is to assist the MOI and IBRD in a channel maintenance effort. When a satisfactory system is developed in Gharbia, it will be replicated in the remaining irrigation directorates.

The IBRD component would: (1) assist MOI in introducing maintenance methods appropriate to current needs; strengthen the existing institutional capacity of the agencies concerned with project implementation, (3) increase the productivity of the staff and equipment of the PECs involved in channel maintenance, and (4) shift a portion of the maintenance from PECs to private sector firms.

c. Proposed Activities

An implementation plan for execution of the detailed planning for the Gharbia Directorate has been prepared. The implementation plan has been approved by MOI and USAID and the Gharbia Directorate now has it under implementation. The plan involves, for the Gharbia Directorate only, (1) the development of a preventive maintenance organization; (2) its staffing including professional and managerial positions as well as those for laborers and skilled craftsmen; (3) development of a training program to be executed under the Professional Development component (no budget provided in this component); (4) establishment of workshops at three administrative levels, including policies and procedures for workshop operations; (5) the preparation of an inventory of all canals, drains, and structures by location, physical features, condition, and estimated cost of needed repairs; (6) develop procedures for the control and coordination of maintenance work; and (7) development of an operating budget for maintenance, and workshop and office budget requirements.

A Workshop list of equipment has been developed, agreed to by USAID, and is being procured. It is expected to take at least a year before equipment arrives in-country. This period will be used to execute the activities described above.

Once the Gharbia maintenance operation is established and the equipment is available, at least one year of operational experience will be required to iron out all of the problems and be in a position to decide whether to replicate the operation in other Directorates.

A joint MOI/USAID evaluation will be undertaken toward the end of the third quarter of USFY 1988. The main purpose of the evaluation is to recommend whether to expand the program, the nature of this expanded program, and the Directorates to where it should be expanded.

Expansion to other Directorates will require analysis, planning, selection of Directorates, and other preparatory activities. A unit having these, and other appropriate responsibilities, will be created by MOI in the office of U/S Maintenance in the Irrigation Sector. Also at each Directorate, a staff will be formed, headed by a Director of Works (a person who reports directly to the General Director for the Irrigation Department) responsible for planning and implementation at Directorate level. Expatriate consultants will be provided to assist with both planning and implementation.

The Central office would be headed by a Director General (Someone that can report directly to the U/S), and would include the following staff:--Maintenance engineers,--irrigation engineers,--economists, and support staff. This individual will serve as the MOI Project Director responsible for implementation of this project component.

Training activities for the Preventive Maintenance Component will be carried out by a combination of OJT, offshore training arranged through the contractor, and local training by the Training and Manpower Development Unit and the National Irrigation Training Institute when it is formed. The training program for this project component will be coordinated by a Training Coordinator in the Office of the Undersecretary Maintenance, Irrigation Sector. Major areas of training will be in: monitoring, maintenance methods, equipment operation and maintenance, planning and management, and limited advance academic training.

Expanding and intensifying the weed management research program in Egypt is a basic component of the IBRD channel maintenance Plan. The present program, which is limited essentially to research on herbivorous fish (grass carp), will be expanded to include chemical and mechanical methods of weed control, as well as other biological methods. The expanded research program will be implemented by the WRI through increased staffing, additional equipment, local and foreign training, and technical assistance.

Technical assistance as proposed by IBRD will be provided for IS, WRI, EPADP, PECs and private contractors. See Tables F15 and F16.

About half of the channels for which the MOI is responsible are of less than two meters bed width (23,000 km). The World Bank Appraisal Mission has recommended that, as an initial step towards introducing competition into the award of maintenance contracts, the bidding be opened to both public and private sector contractors for channels of less than two meters bed width (Such a policy is not stated in the MOI plan of November 1985 but it was stated and agreed to in the Appraisal Mission Aide Memoire of 14 October 1985 and will be implemented as part of this project). USAID will also require that private contractors have the same access to imported equipment and other project facilities as public contractors.

Another item of concern is that of recovery of costs for O & M and also recovery of capital costs. An agreement between the World Bank and MOI was reached April 1985 under Drainage Project V. regarding improvement and rationalization of collection of operation and maintenance and capital costs. Proposed actions for improved cost recovery are needed for the channel maintenance program.

d. USAID Support

USAID will provide local currency support to Gharbia Directorate for detailed maintenance planning during the coming year. USAID will also support maintenance operations for two years, including the testing period for the new maintenance equipment.

Following at least a year's experience with the AID financed equipment, the proposed evaluation to be undertaken to determine replicability will be financed by USAID.

USAID will also share in the costs of local support, maintenance equipment, training and technical assistance and in establishment and operational start-up costs of the Central and Directorate offices to be created for planning and establishing the Preventive Maintenance program in Directorates where it is to be replicated.

A detailed description of heavy equipment, and estimated foreign costs, for work on mesqas is given in Table F17. AID proposes to finance some portion of this equipment that would be made available to private contractors bidding for work on maintaining and remodeling the mesqas or to Directorates for maintaining small channels.

The efficiency of both the IS and WRI is hampered by lack of vehicles and office equipment. The Project would finance the upgrading of these facilities as necessary for project implementation. Office equipment for the WRI would include computer facilities for data processing and recording, statistical analysis and monitoring studies. In addition, WRI would need specialized field and laboratory equipment to conduct aquatic weed studies and monitor herbicide residue. The estimated foreign costs of required equipment and goods for IS and WRI to be financed by AID are presented in Table F18. In addition, Table F18 includes the transportation and other equipment for PECs to be financed by MOI.

USAID will finance the TA component of the project as agreed by MOI and IBRD. This will include expatriate TA for WRI, IS, and the PECs; and local financial experts for the PECs (See Tables F15 and F16). In order to support transition to cycle-based, integrated maintenance, technical assistance would be provided to the IS and EPADP in the planning and scheduling of maintenance cycles, manpower development, and machinery evaluation techniques. WRI would also receive assistance in specialized areas of botanical, chemical and biological weed control research.

A channel maintenance specialist (36 person-months in resident status), non-resident equipment specialist, short-term consultancies by chemical and botanical weed control specialists, a hydraulic engineer, and an analytical chemist would assist in upgrading existing methods and procedures in respective fields.

For the Irrigation Public Sector Authority (IPSA) and the Public Excavation companies (PECs), the project would finance specialists in corporate planning and MIS as well as manpower development, workshop management and equipment operations, and in financial management--improved budgetary, cost accounting and inventory control procedures. In total, there will be approximately 120 person months of resident and 170 person months of TDY assistance associated with both the USAID and World Bank programs.

USAID will finance the training and manpower development component of the Project as agreed by MOI and IBRD. These inputs are identified in Tables F15 and F16. The training coordinator in the IS, assisted by the channel maintenance specialist, would design the training program in detail. Most training of civil engineers and irrigation technicians would be performed through the MOI's Manpower and Development Center which was established under the WRC in 1982 with assistance from USAID. About 104 person-months of training is planned over the life of the project. Where training cannot be provided through Egyptian facilities, training and study tours are currently arranged by MOI through bilateral arrangements. A total of 18 person-months of training and study tours outside of Egypt would be financed by the project. Project assistance would be focused on in-service training through the channel maintenance specialist. In addition, USAID would finance about 30 study tours for senior officials and in-country and on-the-job training on maintenance programs and procedures for about 270 officials with the rank of junior engineer and above for IS and EPADP; and 14 study tours and in-country and on-the-job training of about 245 engineers and 1,325 foremen, mechanics and operators for IPSA and the PECs.

Summary of Training Program and Technical Assistance for Implementing Agencies.

	Unit	86/87	87/88	88/89	89/90	90/91	91/92	92/93	Total
<u>MOI and EPADP Staff</u>									
<u>I. Manpower Development</u>									
<u>(a) Special Training 1/</u>									
Manpower Development Coordinators (IS and EPADP)	month	-	2	-	-	-	-	-	2
Agency Planners (IS and EPADP)	month	-	2	-	-	-	-	-	2
Senior Maintenance Staff (IS and EPADP)	2-week	-	9	9	9	-	-	-	27
<u>(b) Local Manpower Development for Mechanical and Chemical Maintenance 2/</u>									
Chief Maintenance Engineers (MOI)	month	-	19	-	-	-	-	-	19
Weed Specialists (WRI)	month	-	5	-	-	-	-	-	5
Chief Engineers, Inspectors (MOI)	2-week	-	20	21	-	-	-	-	41
Deputy General Directors (MOI)	2-week	-	10	9	-	-	-	-	19
Deputy General Directors (EPADP)	2-week	-	4	4	-	-	-	-	8
District Engineers (MOI)	1-week	-	56	56	57	-	-	-	169
Maintenance Engineers (EPADP)	1-week	-	8	8	-	-	-	-	16
<u>II. Technical Assistance 3/</u>									
-Channel Maintenance Specialist (IS) 4/	month	-	12	12	12	1	1	1	39
-Chemical Weed Control Specialist (WRI)	month	-	3	3	3	1	1	1	12
-Biological Weed Control Specialist (WRI)	month	-	3	1	1	1	-	-	6
-Botanical Weed Control Specialist (WRI)	month	-	3	1	1	-	-	-	5
-Hydraulic Engineering Specialist (WRI) 5/	month	-	1	1	-	-	-	-	2
-Mechanical Engineer Specialist (IS)	month	-	2	-	3	-	2	-	7
-Analytical Chemistry Specialist (WRI) 6/	month	-	2	1	1	-	-	-	4

1/ Estimated on the basis of overseas study tours.

2/ To be provided using local facilities.

3/ Estimate based on expatriate experts.

4/ First 36 months in resident status.

5/ Screen designs for Biological weed control.

6/ To set up in-channel sampling network and to improve chemical residue analysis.

3/ Amounts subject to change based on negotiations with the WB.

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Summary of Training Program and Technical Assistance for PECs

Public Excavation Companies	Unit	86/87	87/88	88/89	89/90	90/91	91/92	92/93	Total
I. Manpower Development									
(a) Study Tours and Short-term Courses (overseas)									
Manpower Development Coordinators 1/	month	-	5	-	-	-	-	-	5
Corporate Planners 2/	month	-	5	-	-	-	-	-	5
PEC's Workshop Engineers	3-week	-	4	-	-	-	-	-	5
Subtotal									4
(b) Local Manpower Development for Mechanical and Chemical Maintenance									
PEC's Field Engineers 3/	2-week	-	125	12	12	12	12	12	785
PEC's Machine Operators 4/	1-week	-	100	150	150	150	50	50	650
PEC's Field Mechanics 5/	1-week	-	50	75	75	50	25	25	300
PEC's Workshop Engineers	2-week	-	35	5	5	5	5	5	60
PEC's Workshop Foremen 5/	2-week	-	35	35	35	10	10	10	135
Mobile Sprayers Crews, Operators 5/*	1-week	-	15	15	15	5	5	5	60
Mobile Sprayers Crews, Sprayers 5/*	1-week	-	30	30	30	10	10	10	120
Mobile Sprayers Crews, Mechanics 5/*	1-week	-	15	15	15	5	5	5	60
Subtotal									60
(c) Local Manpower Development for Administration and Accounting									
Cost Accounting Methods	month	-	9	1	1	1	1	1	14
Inventory Control Systems	month	-	9	1	1	1	1	1	14
Budgetary Planning Procedures	month	-	9	1	1	1	1	1	14
Micro-computer	2-week	-	38	4	4	4	4	4	58
Subtotal									58
II. Technical Assistance *									
(a) Foreign Technical Assistance									
Manpower Development Specialist	month	-	3	-	1	-	-	-	4
Corporate Planning Specialist	month	-	6	-	1	-	-	-	7
Workshop Operations Specialist	month	-	4	-	2	-	1	-	7
Management Information Systems Specialist	month	-	4	-	1	-	-	-	5
Equipment Specialist	month	-	2	-	1	-	1	-	4
Subtotal									4
(b) Local Technical Assistance 6/*									
Cost Accounting Specialist	month	-	13	-	1	-	-	-	14
Inventory Control Specialist	month	-	13	-	1	-	-	-	14
Budgetary Planning Specialist	month	-	8	-	1	-	-	-	9
Micro-Computer Specialist	month	-	8	5	1	-	-	-	14
Subtotal									9
Total									14
Contingencies									
Total									

* Amounts subject to change based on negotiations with the WB.

- 1/ Includes one manpower development specialist from each company and IPSA for one month.
 2/ Includes one corporate planner from each company and IPSA for one month.
 3/ Includes one field engineer per 5 machines for the 2nd year and 10% thereof for the following years to account for staff turnover (partly by equipment suppliers' technicians).
 4/ Includes \$50 machine operators from the 2nd to 5th year, and 10% for each following year for staff turnover.
 5/ Partly by machine suppliers' technicians.
 6/ Assumes one local firm to ensure compatibility.

Table F17

ICB Procurement Schedule for Maintenance
and Support Equipment for Mesqa Maintenance

Equipment	Unit Value (CIF) (US\$)	No.	Value \$1,000
<hr/>			
Equipment for Private Contractors			
-Hydraulic Excavator 7t w/mow and mud buckets	44,800	56	2,509
-Wheel Tractor 80 KW w/side boom	44,800	56	2,509
-Mow Bucket 4 m	7,000	48	336
-Low Loader 30 and 60 tons	85,000	8	608
-Lorries 8 to 10 tons	35,000	25	875
-Pick-ups 3/4 tons	7,000	17	128
-Spare Parts for above	sum	1/2	2,836
<hr/>			
Base Cost			9,801

Table F18

Transport Vehicles and Office, Field, and Laboratory Equipment

Equipment	Quantity	Estimated Cost ^{1/}
		(US\$'000)
<u>For IS & WRI (To be finance by AID)</u>		
Standard Pick-ups	10	75.0
Cars ^{2/}	62	341.0
Motorcycles ^{3/}	270	270.0
Computer with software ^{4/}	sum	130.0
Office Equipment & Supplies ^{4/}	sum	75.0
Field Equipment ^{4/}	sum	750.0
Spare Parts for above Equipment & Replacement for Laboratory Equipment	sum	557.0
	Base Cost	2,408.0
<u>For PECs (To be financed by (PEC)</u>		
Lorries 8 to 10 tons ^{2/}	25	875.0
Buses ^{2/}	20	580.0
Standard Pick-ups ^{2/}	103	772.5
Cars ^{2/}	80	440.0
Spare Parts for above Vehicles	sum	996.5
Misc. Light Equipment and Spares	sum	950.0
Computers with Software ^{4/}	sum	250.0
	Base Cost	4,834.0
	Contingencies	

^{1/} Estimated foreign cost net of taxes and duties.

^{2/} To be procured following local procedures for vehicles produced/ assembled in Egypt.

^{3/} To be procured through LCB.

^{4/} To be procured by inviting quotations from at least three suppliers.

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PREVENTIVE MAINTENANCE

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

Table F 19

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$
1 Consulting Services #1															
Resident (Long Term)	150	0	0	0	528	0	544	0	571	0	526	0	2319	0	2319
Non Resident	40	0	0	0	934	0	579	0	702	0	622	0	2877	0	2877
Sub Total	190	0	0	0	1462	0	1123	0	1273	0	1148	0	5196	0	5196
2 Training															
Non Degree	0	0	0	0	123	0	130	0	136	0	142	0	531	0	531
Degree (MS, PhD, etc)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Training #4	0	0	0	50	0	250	0	323	0	287	0	232	0	1142	1142
Sub Total	0	0	0	50	123	250	130	323	136	287	142	232	531	1142	1673
3 Construction															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities															
Workshop & Field Maint. Equip.	0	0	2205	0	0	0	13230	0	(13890)	0	(14578)	0	15435	0	15435
Office Equipment #2	0	0	30	0	276	0	133	0	24	0	25	0	488	0	488
Vehicles #3	0	0	70	0	389	0	290	0	0	0	0	0	740	0	740
Meska Maint Equip #3	0	0	0	0	3600	0	3280	0	3970	0	0	0	10850	0	10850
Miscellaneous #3	0	0	100	0	710	0	460	0	400	0	0	0	1670	0	1670
Sub Total	0	0	2405	0	4966	0	17393	0	4394	0	25	0	29183	0	29183
5 Local Services															
Administration	0	25	0	80	0	232	0	902	0	1055	0	666	0	2960	2960
Maintenance				35		480		203		115				833	833
Sub Total	0	25	0	115	0	712	0	1105	0	1170	0	666	0	3793	3793
6 Other															
Invitational Travel															
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Annual Totals	190	25	2405	165	6551	962	19646	1428	5803	1457	1315	898	34910	4935	39845
Cumulative Totals	190	25	2595	190	9146	1152	27792	2580	33595	4037	34910	4935			
Project Obligation \$	3522	16800	13200	6323	0	0	39845								

#1 Includes \$1,568,000 for World Bank activities #2 Includes \$140,000 for WB data processing equip. #3 In cooperation with World Bank Channel Maintenance Program

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TABLE F20

PREVENTIVE MAINTENANCE

Projected Expenditures - GOE Funds(000's)

Table F 20

Category		Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
		\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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		50	200	250	300	350	1150
	Sub Total	0	50	200	250	300	350	1150
3	Construction							
	District Workshops	100	0	1000	1150	1325	0	3575
	Dir & Gov't Workshop	0	200	2300	2691	3148		8339
	Sub Total	100	200	3300	3841	4473	0	11914
4	Commodities							
	Raw Materials				100	150	200	450
								0
								0
								0
								0
	Sub Total	0	0	0	100	150	200	450
5	Personnel							
	Salaries&Allowances	0	30	200	880	2060	4815	7985
	Incentives	0	131	262	1144	2678	6260	10475
	Travel & Misc.	0	30	60	264	618	1444	2416
	Sub Total	0	191	522	2288	5356	12519	20876
6	Other							
	Oper Cost (Div Off)	0	0	0	200	656	1534	2390
	Maint. Oper. Cost	0	0	0	1875	4386	7700	13961
	Sub Total	0	0	0	2075	5042	9234	16351
	Combined Annual Totals	100	441	4022	8554	15321	22303	50741
	Cumulative Totals	100	541	4563	13117	28438	50741	

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7. Professional Development

a. Background

The IMS project has been supporting the development of a Training and Manpower Development (TMD) unit within the Water Research Center. The program was originally conceived to provide a core of short courses for engineers and technicians in the fields of (1) Design of Irrigation Structures, (2) Planning, Administration and Management, (3) Operation and Maintenance, (4) On-farm Water Management, and (5) Construction Management and Materials Quality Control. Through this core curriculum and an array of special courses MOI would improve and maintain the capability of its staff working on the IMS project within the limits of an in-service training program. Prior to TMD all training activities within the MOI were on an adhoc basis and carried out within the various technical departments.

In September 1985 the "Mid-Term Evaluation Report of the Irrigation Management System Project" was completed. The evaluation concluded that the TMD program was meeting its objectives and had reached its potential of training over 300 engineers and technicians per year. The evaluation team recommended that USAID/MOI proceed with plans to carry out an overall assessment of the total training needs of MOI including all of its departments and authorities.

During October-November 1985 a team of specialists (American and Egyptian) carried out a detailed assessment of MOI's training needs and issued a report in February 1986 (See Annex S). The team evaluated the training needs of the MOI, analyzed the present training resources within and outside the MOI, evaluated the alternate training facilities within the country and developed a set of recommendations. Their central recommendation was the development of a National Irrigation Training Institute (NITI) to provide a structured in-service training program for the 80 to 90 thousand professional and nonprofessional staff of MOI plus some staff of the Ministry of Land Reclamation. The assessment team identified over 60 subject areas requiring courses from one to four weeks. Most candidates would attend several different courses and some would be repeated every few years.

The assessment team estimated that NITI would have to have a capability to provide high quality training to 2,500 students per year to meet the MOI's needs. Such an institute could be established and fully operational over a six year period.

b. Objectives

The objective of this component is to institutionalize a multi disciplined training program to serve the total needs of the MOI by establishing the NITI.

c. Proposed Activities

The training assessment team determined that the proposed National Irrigation Training Institute was feasible and essential to the future operation of the MOI. The team provided two sets of recommendations to expedite the development and expansion of the current TMD unit while establishing the NITI which would incorporate the TMD into its operation. The key recommendations are as follows:

Recommendations for the NITI:

(1) Proceed with plans to build, staff, and equip a National Irrigation Training Institute to be completed and fully operational by 1991. Responsibilities of the Institute should include:

- Provision for and/or coordination of all training for the MOI.
- Establishment of a career development plan for each employee of

the Ministry, to be developed jointly by the employee and supervisor, outlining career objectives, goals, and training needs to fulfill the established plan.

--Development and implementation of a Ministry Management Development program to assist in the selection of junior level employees and train them for future mid-level and top management positions.

--Development and maintenance of a 5-year Training Plan for each organizational unit of the Ministry, giving course subject matter, number of participants, location for training, etc.

(2) The NITI should be established at an organizational level in the Ministry equivalent to that of a major department or authority reporting directly to the Minister's office.

(3) Design the NITI buildings for construction in stages so as to expedite the date of first use and allow for future expansion at the appropriate time as training needs become more clearly defined and as staff availability and development progress.

(4) The NITI staff should include a permanent position of high rank with primary responsibility for curricula development and staffing. This person should be trained and experienced in the education of adults (androgeny).

(5) The NITI should embody a multi disciplinary approach to training. The following disciplines should be included in the curricula: Engineering, Agriculture, social sciences, and management. An action research focus under field conditions should also be utilized in the training activities.

(6) The High Committee for Training should continue to serve in a policy advisory capacity to the new institute.

(7) The MOI should assure that the NITI be developed with the capacity to meet the irrigation and drainage training needs of the Ministry of Development, New Communities, and Land Reclamation. As there is a direct linkage between MOI and the land reclamation activities this would assure that all key staff of both ministries receive the same training.

Recommendations for the TMD:

(1) Continue operation of the present Training and Manpower Development (TMD) unit to provide and expand training services until the new institute becomes operational. The Unit should continue to offer courses in the five main topics as they have in previous years. The responsibility of the TMD should be expanded to include planning and general direction for establishing the new NITI.

(2) An expatriate and an Egyptian education training specialist should be added to the TMD staff for the next two years to advise on institute building both size and layout, curricula development, and organizational structure for the NITI. The advisors should assist in developing the current TMD staff so they can become the nucleus staff for the new NITI.

(3) Explore the possibility of entering into an agreement with the Ministry of Agriculture to provide managerial training for the Ministry of Irrigation through the Center for Agricultural Management Development (CAMD) at Delta Barrage.

(4) Develop expertise within the TMD to do a detailed needs assessment over the next 2 to 5 years to define the skills required by technicians and to aid in curriculum development for technicians.

d. USAID Support

USAID would continue to be provide support to the present TMD unit including commodities, the proposed resident technical assistance advisor, local short term and long term technical assistance, and operating costs outside the normal MOI costs. The process for obtaining an individual consultant (24 person months) for the present TMD is underway and the RFP for the Professional Development consulting team will be prepared in April 1987 with plans to have a team in-country by the end of 1987. The TA team would provide approximately 136 person months of additional resident assistance (team of four) and 65 person months of TDY assistance (See Annex S for details). In addition USAID would provide funding for equipment, training outside Egypt (150 person months of nondegree and 12 persons for degree training), and a portion of the establishment costs, excluding the annual recurrent costs. GOE will be responsible to provide the necessary physical space for the training and consultants. Tables F21 and F22 provide the detailed annual budgets for USAID and GOE.

PROFESSIONAL DEVELOPMENT

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

Table F 21

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand Total \$
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	
1 Consulting Services															
Resident (Long term)	100	0	90	10	600	101	889	118	847	103	678	89	3194	421	3615
Non Resident	50	0	0	0	259	34	389	59	204	34	214	34	1116	161	1277
Sub Total	150	0	90	10	859	135	1278	177	1051	137	892	123	4310	582	4892
2 Training															
Non Degree	83	0	158	0	198	0	208	0	251	0	230	0	1128	0	1128
Degree (MS, PhD, etc)	0	0	20	0	220	0	232	0	320	0	190	0	982	0	982
Local Training	0	0	0	22	0	30	0	30	0	32	0	37	0	151	151
Sub Total	83	0	178	22	418	30	440	30	571	32	420	37	2110	151	2261
3 Construction															
Laboratory	0	0	0	60	0	0	0	0	0	0	0	0	0	60	60
Sub Total	0	0	0	60	0	0	0	0	0	0	0	0	0	60	60
4 Commodities															
Vehicles	154	0	50	0	110	0	160	0	0	0	0	0	474	0	474
Data Processing	20	0	75	0	0	0	0	0	0	0	0	0	95	0	95
Training Equipment	133	0	49	9	190	36	290	59	152	30	108	20	922	154	1076
Training Materials	18	0	40	40	65	65	55	55	35	35	36	36	231	231	462
Office Equip & Spares	60	0	30	10	8	12	6	14	6	14	7	14	117	64	181
Sub Total	367	0	244	59	373	113	511	128	193	79	151	70	1839	449	2288
5 Local Services															
Administration	0	650	0	180	0	170	0	200	0	240	0	250	0	1690	1690
Sub Total	0	650	0	180	0	170	0	200	0	240	0	250	0	1690	1690
6 Other															
Invitational Travel	0	0	100	0	105	0	110	0	120	0	150	0	585	0	585
Sub Total	0	0	100	0	105	0	110	0	120	0	150	0	585	0	585
Combined Annual Totals	600	650	602	331	1753	448	2339	535	1935	488	1613	480	8844	2932	11776
Cumulative Totals	600	650	1202	981	2957	1429	5296	1964	7231	2452	8844	2932			
Project Obligation \$	3825	2600	2300	2000	1051	0	11776								

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TABLE F22

PROFESSIONAL DEVELOPMENT

Projected Expenditures - BOE Funds(000's)

Table F 22

Category		Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
		\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ 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							
		100	200	4150	4200	4000	0	12650
	Sub Total	100	200	4150	4200	4000	0	12650
4	Commodities							
	Vehicles	44						44
	Data Processing							0
	Administration							0
	Training Materials	20	2	2	3	4	4	35
								0
								0
	Sub Total	64	2	2	3	4	4	79
5	Personnel							
	Salaries	100	131	165	213	405	470	1484
	Local Experts	70	16	21	26	29	29	191
	O & M	115	16	21	21	26	25	224
	Travel & Misc	10	8	12	16	26	33	105
	Sub Total	295	171	219	276	486	557	2004
6	Other							
		330	50	55	60	65	70	630
	Sub Total	330	50	55	60	65	70	630
	Combined Annual Totals	789	423	4426	4539	4555	631	15363
	Cumulative Totals	789	1212	5638	10177	14732	15363	

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8. Regional Irrigation Improvement Project (RIIP)

a. Background

The Government of Egypt (GOE) initiated, in 1984, a national program to improve and rehabilitate irrigation canal networks in new as well as old lands in the Nile valley and delta. The MOI's National Irrigation Improvement and Rehabilitation Program (NIIP) is based in part on the successful results of an earlier research project sponsored by USAID, entitled the Egypt Water Use and Management Project (EWUP). The concept of RIIP is to adapt the ideas generated in EWUP and develop them into practical plans that will be applicable for entire canal commands. Methodologies that are being developed in RIIP are for application in the national program.

The GOE's strong interest in NIIP stems from its concerns over the country's growing dependency on imported foodstuffs. To help counter this ominous trend, the GOE is looking for ways to simultaneously increase agricultural production and conserve water in the "old lands". The conserved water would provide more water for "new land" development or other uses.

USAID concurs with the GOE's appraisal of this situation and its desire to upgrade the traditional system. Such an emphasis is consistent with the Mission's earlier funding of EWUP and its current funding of the IMS project.

This will include construction activities as well as technical assistance, acquisition of commodities, and training of personnel. To maximize the benefits of this anticipated expanded support, the MOI should formalize NIIP by decree, changing the name of the organization from the Regional Irrigation Improvement Project to a National Program. New key staff must be added to NIIP to support management, at field offices as well as headquarters, and to add personnel with capabilities in special categories of subjects (subject matter specialists) within Engineering as well as in other disciplines including Economics, Sociology, and Agronomy. MOI should create an autonomous fund for incentives under the control of the NIIP Director. Finally, NIIP needs to develop a rational approach to investigate the opportunities for improvement in any canal command and prepare a technical and economic feasibility report on which USAID support for construction can be based. Elements of such a rational approach are suggested below.

b. Objective

The basic approach in NIIP is to integrate the rehabilitation and improvement of the delivery system infrastructure with improvement of the farm delivery system and management practices. With these improvements to physical works and operational procedures, the objective of the program is to increase agricultural output within the improved systems, conserve water for use in expanding agriculture, and improve equity among farmers. The national purpose is to increase overall food production and decrease importation of food.

c. Proposed Activities

Specific elements of the program remain to be worked out as it evolves. But, a likely combination of improvements includes; (1) installation of measuring and control devices on mains and branches; (2) implementation of continuous flow in distributaries; (3) mesqa improvements, such as reconstruction to proper cross sections, lining to reduce seepage losses, installing turnouts and check structures, and installing low pressure pipes where slopes are very flat; (4) land leveling, whether of the precision land leveling (PLL) type or by less precise means; and (5) advisory

services that integrate inputs from agents of the Ministry of Irrigation (MOI) and Ministry of Agriculture (MOA) to improve irrigation and agricultural practices, organize Water Users Associations (WUA), and create an effective Irrigation Advisory Service (IAS).

(1) A Rationalized Approach

Initiating a comprehensive program on a national scale requires careful planning and selection of alternatives--thus, the need for a rationalized approach. The approach centers on four elements, or phases, with feedback and interaction between them. It is envisioned that improvement activities in a given canal command will progress from one Unit Command Area (UCA) to another. This process will maximize the benefits of feed back and experience gained in each phase, within the particular UCA and successive ones within the command.

First, a process of problem identification must be established to determine the constraints of the irrigation system, and to clearly understand how it operates, not only of the distribution network, but the farm level as well. In this process, good points of the system as well as its problems will be identified. Because an irrigation system is essentially a composition of physical, agronomic, and socioeconomic systems, it is important to include professionals from each of the disciplines in the problem identification process.

Second, a feasibility study of potential solutions needs to be undertaken, including economic analyses of selected alternatives. It is possible that consistent sets of improvement measures can be devised and grouped into separate "packages" for consideration, each package being appropriate to attain certain levels of overall performance. The selection of a final alternative must be technically sound, economically viable, and socially acceptable.

Third, the improvement and rehabilitation must be completed according to the plans and specifications drawn up for the selected alternative, within adherence to specific cost goals and time schedules. Efficient project management is a key requirement in this phase. To be successful, a manager must bring the right resources together at the right place and at the right times and with the least cost.

Fourth, a monitoring and evaluation program must be developed to assess the effects of the improvements. It is important to create a feedback process to the planning activities so that ineffective measures can be discarded for future consideration, while cost-effective measures can be retained for further use. Both the planning phase and the monitoring and evaluation activities will be conducted, by the Project Planning Unit (PPU), a new group which will be formed within NIIP at headquarters and in regional offices.

(2) Implementation

The Assemble of Ministers has paved the way for NIIP by approving the program presented by the National Irrigation Improvement Committee. Plans have been formulated to establish a coordinating committee to bring together key MOI, MOA, and other decision makers at the national and governorate levels. Still another committee to address NIIP's technical needs will be created. The makeup of this technical committee has not yet been determined, but will probably include, besides the Under Secretary for NIIP, members of several institutes in the Water Research Center and Agricultural Research Center, Universities, MOA and other MOI units with relevant expertise.

No changes are foreseen in NIIP's position within the structure of the Irrigation Department during the life of this PPA. In time, however, the MOI anticipates that NIIP will be upgraded in status to that of an Authority. That would give NIIP greater administrative flexibility and more specific funding. Action on that issue has been deferred until the country's financial situation improves.

NIIP will need to cooperate with selected Institutes of WRC to seek solutions to particularly troublesome and persistent problems, and to take advantage of expertise and knowledge which the people in the Institutes have developed over a considerable period of time. The Research Institutes in Water Distribution and Irrigation Methods, Groundwater, Drainage, Hydraulics and Sedimentation, water Resources, and Weed Control can be particularly helpful. Arrangement for cooperation with Institutes in the Agricultural Research Center (ARC) of MOA will also be made.

Division of responsibilities between headquarters and regional offices of NIIP will favor decision making on broad issues by the central staff, and decision making on local issues by the regional offices. Following this pattern, the Central Directorate will focus on the overall program, development of standard procedures and design components, program evaluation, training, troubleshooting, addressing new or complex topics, and administration. The regional offices will focus on data collection and problem identification, development of alternative solutions, preparation of detailed designs, advertising, awarding, and administering contracts, extension and other farmer contacts, and monitoring of results.

The central office staff needs to be augmented by a broader range of disciplines than currently exists, including economists, agronomists, sociologists, and subject matter specialists (SMS), such as statistics and computer programming, independent of discipline. They will, for the most part, staff the new Program Planning Unit. Staff at the governorate levels will be comprised of engineers, sociologists transferred largely from local MOA offices, agricultural economists and agronomists also from MOA. They will work together in the emphasized project planning and evaluation effort, and focus on field and farmer contact.

The following canal commands are currently being studied as part of the RIIP:

<u>Governorates</u>	<u>Canal</u>	<u>CA (Feddans)</u>
Upper Nile		
Kena & Aswan	Redissia, Abadi	13,000
Sohag	Khour El Sahel	12,000
Assuit	Shamia, Okal	21,000
Middle Nile		
Minya	Serri Bachi	100,000
Beni Suef	Kaman, El Arous	5,000
El Fayoum	El Gark	52,000
Eastern Delta		
Sharkia	Saidia	39,000
Middle Delta		
Gharbia	Ahwaki	12,000
Kafr El-Sheikh	Bahr El Saeidi	42,000
Western Delta		
Behaira	Boloktor	11,000
Alexandria	Baheeg	30,000

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d. USAID Support

USAID will finance Technical Assistance (TA) team to assist NIIP throughout the five-year program. Long-term positions in water resources management and irrigation engineering, construction engineering, irrigation agronomy, economics, and sociology will be provided (approximately 38 person years). In addition, approximately 130 person months of short-term (TDY) expertise will be provided. Included among the TDY will be specialists in project planning, statistics, and computer programming. Some of them will be called in to help conceptualize and set up new activities and procedures, while others will be responsible for organizing key elements such as WUA's and the IAS, and develop in-country training programs.

Training for NIIP will be a combination of local and foreign activities. Local training will make use of existing programs initiated under EWUP and currently supported by the IMS Project. New programs will be developed and tested by NIIP before committing them to the NITI for routine offering. There will be considerable on-the-job training (OJT) for professional staff as well as technicians. Sociologists' contact with farmers and organization of WUA's will essentially be all OJT, as will technicians training in maintenance and operation of the system at the mesqa level. Some program and division leaders will be sent overseas for graduate degrees relevant to their positions. Others will be sent overseas for one-year non-degree academic programs pertaining to their specializations. During the five-year program, targets have been set for 480 person-months of local training, 380 person-months for non-degree overseas training, and 64 person-months for attaining graduate degrees.

USAID will support commodities for laboratories, surveying, office and data processing, transportation, instrumentation, communications, and construction and maintenance equipment.

In addition, USAID will make a major input into the construction of the improved irrigation systems that are developed under the Project.

In summary, USAID proposes to support the costs of equipment purchase, imported supplies, technical assistance, training abroad, and construction. The GOE will cover construction activities, base salaries and incentives, travel per diem, local operating expenses, training staff and facilities in Egypt, and related expenditures.

Tables F23 and F24 provide the detailed annual budgets for the USAID and GOE contributions to RIIP.

REGIONAL IRRIGATION IMPROVEMENT PROJECT

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

Table F 23

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand	
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$	
1 Consulting Services																
Resident (Long term)	660	0	650	125	1641	329	1165	271	1223	309	1275	352	6614	1386	8000	
Non Resident	171	0	150	0	501	0	476	0	495	0	515	0	2308	0	2308	
Local Consultants				75		80		75		60		30	0	320	320	
Sub Total	831	0	800	200	2142	409	1641	346	1718	369	1790	382	8922	1706	10628	
2 Training																
Non Degree	40	20	100	10	385	30	400	30	419	40	437	50	1781	180	1961	
Degree (MS, PhD, etc)	0	0	10	0	130	0	149	0	0	0	0	0	289	0	289	
Local Training				30		40		50		50		40	0	210	210	
Sub Total	40	20	110	40	515	70	549	80	419	90	437	90	2070	390	2460	
3 Construction #1																
	0	0	0	500	0	7813	0	15626	0	23438	0	30802	0	78179	78179	
Sub Total	0	0	0	500	0	7813	0	15626	0	23438	0	30802	0	78179	78179	
4 Commodities																
Lab Equipment	0	0	90	0	173	0	14	0	15	0	15	0	307	0	307	
Survey	0	0	400	0	574	0	490	0	95	0	100	0	1659	0	1659	
Office & Computers	70	30	100	210	81	200	0	20	0	20	0	20	251	500	751	
Vehicles	120	0	200	0	772	0	852	0	55	0	57	0	2056	0	2056	
Const & Maintenance	0	0	150	0	800	0	737	0	49	0	51	0	1787	0	1787	
Instr. & Auto.	0	0	100	0	1147	0	1000	0	1000	0	486	0	3733	0	3733	
Communications	0	0	430	0	176	0	10	0	10	0	10	0	636	0	636	
Components & Replicats	0	0	50	0	220	0	0	0	0	0	0	0	270	0	270	
Sub Total	190	30	1520	210	3943	200	3103	20	1224	20	719	20	10699	500	11199	
5 Local Services																
Administration RIIP	0	0	0	40	0	200	0	220	0	260	0	0	0	1040	1040	
Administration TA	0	130	0	230	0	290	0	340	0	400	0	0	0	1930	1930	
Sub Total	0	130	0	270	0	490	0	560	0	660	0	860	0	2970	2970	
6 Other																
Invitational Travel	0	0	84	0	88	0	93	0	97	0	102	0	464	0	464	
Sub Total	0	0	84	0	88	0	93	0	97	0	102	0	464	0	464	
Combined Annual Totals	1061	180	2514	1220	6688	8982	5386	16632	3458	24577	3048	32154	22155	83745	105900	
Cumulative Totals	1061	180	3575	1400	10263	10382	15649	27014	19107	51591	22155	83745				
Project Obligation \$	9955	21700	25000	31600	17645	0	105900									

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TABLE F24

REGIONAL IRRIGATION IMPROVEMENT PROJECT

Projected Expenditures - GDE Funds(000's)

Table F 24

Category	Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C
1 Consulting Services							
Resident(Long term)							0
Non Resident							0
Local Consultants		30	35	40	45	50	200
Sub Total	0	30	35	40	45	50	200
2 Training							
Non Degree	30	32	33	35	36	38	204
Degree(MS,PhD,etc)							0
Local Training							0
Sub Total	30	32	33	35	36	38	204
3 Construction							
	4000	5000	18000	26500	34500	46000	134000
Sub Total	4000	5000	18000	26500	34500	46000	134000
4 Commodities							
Office Equip.	20	50	50	40	30	30	220
Tech. Equip.	40	100	100	100	90	90	520
Misc. Equip.	20	50	50	50	40	40	250
							0
							0
Sub Total	80	200	200	190	160	160	990
5 Personnel							
Salaries	5000	5200	5800	7000	8400	10000	41400
Incentives	200	365	438	525	630	756	2914
Travel & Misc.	100	150	180	216	260	311	1217
Sub Total	5300	5715	6418	7741	9290	11067	45531
6 Other		150	180	216	260	311	1117
							0
							0
Sub Total	0	0	0	0	0	0	0
Combined Annual Totals	9410	10977	24686	34506	44031	57315	180925
Cummulative Totals	9410	20387	45073	79579	123610	180925	

9. Mapping and Survey

a. Background

A program of survey and mapping was initiated in 1894, when the "Survey of Egypt" was established. Geodetic control networks were established throughout the Nile River basin. Cadastral and topographic maps were produced for these areas by 1920. Small scale maps (1:500,000) were published for the entire country by 1945. In 1971 the organization was renamed the Egyptian General Survey Authority (EGSA) and in 1975, EGSA was reorganized and placed under the MOI.

EGSA is responsible for the preparation of high quality maps needed for planning irrigation improvements (1:10,000) and 1:2,500 scale maps for detailed planning and for maintaining cadastral records. The EGSA is also responsible for all cadastral surveying in Egypt. These surveys result in cadastral maps showing ownership boundaries and other important planimetric detail. There are two categories of cadastral maps produced: town maps at 1:500 scale and agricultural land maps at 1:2,500 scale.

In addition to mapping products needed specifically for Project purposes, the EGSA is responsible for mapping on a very large scale (1:500 or 1:1,000) the 4,000 or so towns and villages in Egypt.

The Nile Valley, the Nile Delta, and the Suez Canal area have been mapped at 1:25,000 scale. However, many of these maps (448 in total) were made prior to 1956, and require extensive revisions. These maps are comparable with the largest scale (1:24,000) of national map coverage in the USA.

A special map series of the Nile River area was completed in 1979 at a scale of 1:10,000 with a contour interval of a half meter. These maps cover two kilometers on each side of the Nile from the Mediterranean Sea to the Aswan Dam. Maps of the same scale were completed in 1980 covering the Suez Canal region.

An urban map series of Cairo and the three big towns of the Suez Canal region, namely Suez, Ismailia and Port-Said, were completed in 1979. These maps are to be used as multipurpose, urban planning base maps.

High quality large scale maps (1:10,000) are essential for the design and implementation of improvements in the irrigation delivery system under RIIP and NIIP. The aerial photos on which such maps are based are necessary, in their own right, as a significant problem diagnostic tool. Even larger scale base maps (1:2,500) are required for cadastral mapping and for maintaining current cadastral records. Such maps are essential for certain types of irrigation improvements such as land leveling which involves treatment of contiguous parcels of land. Such records will also be required for any realistic cost recovery scheme.

In addition, accurate measurement of the nation's cropped areas is needed for the development and calibration of complex models of the irrigation system. The aerial photographing techniques provide such accuracy. In order to obtain accurate data for the entire cropping pattern of Egypt, consideration is being given to photograph the cropped area three times (winter, summer and nili seasons) during the agriculture year 1987-1988.

b. Objective

The objective is to make maps and aerial photographs of high quality available for use for irrigation improvement and for other development purposes. This objective will be achieved by EGSA through a series of contracts that will acquire mapping products (aerial photography, orthophoto or digital maps) and through institutional improvement of EGSA itself through equipment and training, much of which will be supplied/performed by the contractors.

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The specific outputs of the project will be:

- (1) New cadastral maps of scale 1: 2,500, and Land Registers for about 4,000,000 feddans (about 16,000 square kilometers) of the area of the Nile Valley.
- (2) Updating cadastral maps and Land Registers in about 4,500,000 feddans (about 18,000 sq. kms.) of the area of the Nile Valley.
- (3) Large-scale contour maps of 1:10,000 scale for the area of the Nile Valley and its near surrounding land (about 50,000 sq. kms.).
- (4) New maps of 1:500 or 1:1,000 scale for the 4,000 towns and villages in Egypt.
- (5) An EGSA staff trained in modern survey and mapping techniques and suitably equipped to maintain and update the mapping system and the mapping products developed under the Project.

c. Proposed Activities

An integrated system of specific activities is required to produce the outputs described above. These are:

(1) Aerial photography of the area to a suitable scale for the Valley, and a larger scale for the towns and villages. This will be contracted under ICB procedures since adequate capability for the quality of photography needed is not available in-country.

(2) Establishing of a ground control system using a modern technique such as the Doppler, Global or Inertial survey positioning system. Horizontal control will be contracted under ICB procedures. Equipment used by contractor will be left with EGSA in good operating order and EGSA staff will be incorporated into the contractors operation for training purposes.

Vertical control, with equipment to be supplied under the Project, can be accomplished by EGSA staff.

(3) Apply modern techniques for minimizing the amount of field work by using a suitable aerial triangulation system within the photogrammetric plotting program.

(4) Production of maps by Orthophoto, Digital or other suitable mapping system. Production of orthophoto or digital maps will be contracted under ICB procedures. Topographic maps will be prepared by EGSA utilizing equipment and training provided under the Project. Cadastral Surveying and mapping will be provided by EGSA using equipment and training to be supplied under the Project. Final map finishing, reproduction, and printing will be handled by EGSA using equipment and training provided under the Project.

(5) Preparation of a Land Register System which can readily accept the generated computer input data from the proposed mapping system, and produce office records and Title Certificates which can be easily updated when amendment, sub-division or sale has affected property boundaries.

d. USAID Support

Project inputs to be supplied by USAID will cover the Nile Valley and the surrounding area to include new land development possibilities.

USAID will finance the FX costs of contracts for aerial photography and other mapping products and for equipment. USAID will also finance the training (40 person months of nondegree) and technical assistance required.

Tables F25 and F26 provide the full budget details for USAID and GOE.

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SURVEY EQUIPMENT AND MAPPING

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

Table F 25

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand	
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$	
1 Consulting Services																
Aerial	0	0	0	0	536	0	0	0	0	0	0	0	536	0	536	
Ground Control	0	0	0	0	400	0	924	0	0	0	0	0	1324	0	1324	
Land Register	0	0	0	0	221	0	232	0	122	0	0	0	575	0	575	
Sub Total	0	0	0	0	1157	0	1156	0	122	0	0	0	2435	0	2435	
2 Training																
Non Degree Degree (MS, PhD, etc)	0	0	50	0	110	0	108	0	0	0	0	0	268	0	268	
Local Training													0	0	0	
Sub Total	0	0	50	0	110	0	108	0	0	0	0	0	268	0	268	
3 Construction																
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities																
Ortho Photo Maps	0	0	0	0	0	579	0	0	0	0	0	0	0	579	579	
Cadastral Maps	0	0	0	0	496	0	463	0	0	0	0	0	959	0	959	
Equipment	0	0	50	0	552	0	579	0	475	0	0	0	1656	0	1656	
Sub Total	0	0	50	0	1048	579	1042	0	475	0	0	0	2615	579	3194	
5 Local Services																
Administration	0	0	0	30	0	60	0	50	0	30	0	0	0	170	170	
Sub Total	0	0	0	30	0	60	0	50	0	30	0	0	0	170	170	
6 Other																
Invitational Travel													0	0	0	
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Combined Annual Totals	0	0	100	30	2315	639	2306	50	597	30	0	0	5318	749	6067	
Cumulative Totals	0	0	100	30	2415	669	4721	719	5318	749	5318	749				
Project Obligation \$	0	4300	1767	0	0	0	0	0	0	0	0	0				

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TABLE F26

SURVEY EQUIPMENT AND MAPPING

Projected Expenditures - GOE Funds (000's)

Table F 26

Category		Thru FY86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
		\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C	\$ L/C
1	Consulting Services							
	Ariel Photos	0	234	0	0	0	0	234
	Ground Control	0	0	1369	0	0	0	1369
	Land Register	0	234	274	320	375	438	1641
	Sub Total	0	468	1643	320	375	438	3244
2	Training							
	Non Degree	0	176	205	0	0	0	381
	Degree (MS, PhD, etc)	0	0	0	0	0	0	0
	Local Training							0
	Sub Total	0	176	205	0	0	0	381
3	Construction							
								0
								0
	Sub Total	0	0	0	0	0	0	0
4	Commodities							
	Vehicles	0	0	0	0	0	0	0
	Cadastral Maps	0	0	1027	1202	1406	1644	5279
	Equipment	0	351	411	481	562	658	2463
								0
								0
								0
	Sub Total	0	351	1438	1683	1968	2302	7742
5	Personnel							
	Salaries		80	94	110	128	150	562
	Incentives		30	35	41	48	56	210
	Travel & Misc.		6	7	8	9	10	40
	Sub Total	0	116	136	159	185	216	812
6	Other							
	Sub Total	0	0	0	0	0	0	0
	Combined Annual Totals	0	1111	3422	2162	2528	2956	12179
	Cummulative Totals	0	1111	4533	6695	9223	12179	

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10. Miscellaneous Technical Assistance and Commodity Procurement

a. Background

The complexity and magnitude of the tasks facing the Minister and the Ministry of Irrigation have been discussed in a number of the other components. It is intended that the nine specific components provide coverage for most of these complex problems. However, it is also recognized that unforeseen requirements could surface that would be serious bottlenecks to achieving the goals of Nile River control and efficient irrigation system operation.

b. Objective

The objective of this component is, therefore, to make available to the Minister, and key senior staff of the MOI, technical, training, and commodity resources to cope with emerging problems or to take advantage of particular opportunities.

c. Proposed Activities

In view of the residual role played by this component, specific activities cannot be identified. However, it is expected that this component will provide consultant services for a broad range of activities including screening proposals, analyzing bids, solving particular engineering problems, etc. Consultant services would be available to address any issue or problem for which MOI senior managers feel that consultants would be helpful. One million dollars is allocated for these consulting services.

Similarly, unforeseen commodity requirements not covered by the other components, but judged by USAID managers to contribute to the Project purpose, would be financed under this component. This could include office and professional equipment, vehicles, and engineering supplies and equipment for district/directorate field levels as well as central parts of the Ministry. Three million dollars is allocated for such commodities.

There will also be training requirements not met by the other components.

d. USAID Support

The items supported by USAID under this component are shown in Table F27.

MISCELLANEOUS TECHNICAL ASSISTANCE AND COMMODITY PROCUREMENT

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

Table F 27

Category	Through FY 86		FY 87		FY 88		FY 89		FY 90		FY 91		Totals		Grand	
	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	\$ FX	\$ L/C	Total \$	
1 Consulting Services																
Resident (Long term)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non Resident	220	0	307	0	155	0	58	0	61	0	64	0	865	0	865	0
Sub Total	220	0	307	0	155	0	58	0	61	0	64	0	865	0	865	0
2 Training																
Non Degree	580	0	74	0	77	0	81	0	85	0	89	0	986	0	986	0
Degree (MS, PhD, etc)	0	0	21	0	22	0	23	0	24	0	26	0	116	0	116	0
Sub Total	580	0	95	0	99	0	104	0	109	0	115	0	1102	0	1102	0
3 Construction																
Sub Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Commodities																
Prof & Ofc Equipmen	20	0	210	0	221	0	232	0	243	0	153	0	1079	0	1079	0
Computers - Monitor.			60		50		50						110	0	110	0
Computers - PC's			50		50		50						150	0	150	0
Sub Total	20	0	320	0	321	0	282	0	243	0	153	0	1339	0	1339	0
5 Services																
Monitoring	160	0	158	15	165	22	174	24	182	26	74	30	913	117	1030	0
Evaluations, Etc	90	0	105	0	200	0	243	0	243	0	268	0	1149	0	1149	0
Audits											200	0	200	0	200	0
Sub Total	250	0	263	15	365	22	417	24	425	26	542	30	2262	117	2379	0
6 Other																
Invitational Travel	26												26	0	26	0
Sub Total	26	0	0	0	0	0	0	0	0	0	0	0	26	0	26	0
Combined Annual Totals	1096	0	985	15	940	22	861	24	838	26	874	30	5594	117	5711	0
Cumulative Totals	1096	0	2081	15	3021	37	3882	61	4720	87	5594	117				
Project Obligation \$	1939	1600	1272	900	0	0	5711									

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Recommendation	Responsibility for Action		Completion Dates		
	USAID	MOI	Proposed	Actual	
7. With guidance from the Coordinating Committee, the Project Director should seek out Egyptian staff with considerably more planning experience than those presently staffing the Unit		X	02/86	Ongoing	This guidance has been provided to PPD during 10/85, but this is an ongoing process of seeking qualified people to fit the needs of PPD. However, at current GOE salary scales it is very difficult to attract experienced staff. PPD has hired seven new employees; of these, five are recent graduates. PPD is continuing its training process to develop its new and existing staff. PPD plans to begin a process of hiring experienced Egyptian individuals or firms on a task basis to provide services as required to assist in activities as needed.
8. The PPU should begin planning for the extension of its technical assistance contract and USAID should be responsive to continued financial support for such assistance.	ILD	X	6/86	Ongoing	PPD has begun this process and this should be completed during the Project Paper Amendment Process.
9. USAID should not support the design and construction of the North Zifta project as revealed in the draft report nearing completion in early September 1985.	ILD	-	12/85	7/86	The final report indicates an acceptable IRR, however, the IRR is not high enough to warrant utilization of scarce resources at this time.
10. The WRC should field test the open channel/buried pipe concept developed in the North Zifta study.	-	X	10/86	Ongoing	The Water Research Institute has been assigned this responsibility and a project to test the buried pipe concept is currently underway.
11. The Vice Minister should change the Project Director responsible for the Gharbia O&M Project to one from Water Distribution, which will be the implementing unit within the MOI.	-	X	11/85	12/85	
12. The Project Director should obtain consulting help to complete the Gharbia O&M study, using results and relevant sections of USAID's Position Paper.	-	X	12/85	Ongoing	The new Project Director, with the assistance of AID, has developed a revised strategy and plan for completing the O&M study. The plan has been reviewed and approved by MOI. A local consultant has been hired to assist and procurement is underway.
13. The Workshop equipment (Gharbia O&M) ordering process should recommence as soon as	ILD	-	4/86	Ongoing	Action has been started, based on the revised plan (Item 12).
14. The Project Director (T&MD) should secure the services of an expatriate specialist in building a training institute capable of meeting MOI's training needs concerning delivery systems and on-farm water use. The need for training appropriate MOA staff should also be taken into account.	ILD	X	3/86		Utilizing the Training Assessment Report, a scope of work has been prepared and is being reviewed by MOI.

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OFFICE OF IRRIGATION AND LAND DEVELOPMENT
 IRRIGATION MANAGEMENT SYSTEMS PROJECT
 (263 - 0132)
 Structure Replacement Component

Annex G2

Recommendation	Responsibility for Action		Completion Dates		
	USAID	MOI	Proposed	Actual	
1. It is recommended that implementation of new structures program in Districts should go in parallel with the district engineer completing the course entitled Construction Management and Quality Control.	-	X	6/86	3/86	
2. Accelerate training seminars and on the job training to update inspection forces so construction work can proceed as soon as possible.	-	X	6/86	3/86	
3. Increase engineering staff to provide one district engineer for each 20 to 25 structures per year for the necessary inspection required to administer the SR program. This does not apply to small structures such as small intakes, aquaduct and steel gates.	-	X	2/86	3/86	
4. Increase monitoring staff.					
a. USAID - two extra for field review	X		11/85		a. One hired July 1985.
b. Consultant - one extra for field review & training if possible	X	X	12/85	12/85	
c. MOI - SR section - two extra for field review.		X	12/85	3/86	
5. Provide testing equipment and at least two personnel to perform quality control testing on major structures through the Training and Manpower Development project.	-	X	1/86	Ongoing	Equipment lists have been prepared for five field labs. These labs will be located in existing facilities as follows: Tanta; Gharbia; B. heira; Esna; and Assuit. Procurement is underway.
6. Have existing construction manual distributed to all personnel involved in SR program.	-	X	12/85	1/86	
7. Preconstruction Conferences - At the time a contract is awarded, have a meeting between contractor, MOI staff, and expatriate engineer and USAID, if possible, and others to discuss important points of contract and general problems. Discuss important requirements of plans and specifications and schedule of pay to contractor etc.	X	X	con't	On-going	The SR Project Director is in agreement with this concept and is planning to pass instructions to the Directorates in the near future. The PD also preparing pre-qualification criteria for prospective contractors as well as instituting pre-bid conferences.

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OFFICE OF IRRIGATION AND LAND DEVELOPMENT
EGYPT WATER USE AND MANAGEMENT PROJECT
263 - 0017
END OF PROJECT EVALUATION REPORT

Recommendation	Responsible for Action		Completion Dates		
	USAID	MOI	Proposed	Actual	
1. That WRC/WDRI, as a next stage, be supported in a project to specifically convert methodologies and technologies developed during EWUP into an operational system.	X	X	12/85	On-going	WRC (WDRI) workplan is being developed.
2. Further considerations should be devoted to establishing an official role, guidelines, and incentives necessary for the organization of WUA's along with a definition of the functional responsibilities and authority of the WUA.	-	X	11/86	Ongoing	MOI has decided to proceed with the Irrigation Advisory Service (IAS) as a way to implement this concept on the RIIP. TA is being arranged to assist in developing a training program for the individuals that will carry out the IAS..
3. The economic cost-benefit of large scale implementation of EWUP findings need to be extrapolated in a pre-feasibility study with respect to the on-farm as well as the national level. Data collection and methodology needs additional emphasis.	-	X	11/86		Feasibility is being evaluated for each study area.
4. Additional adaptations of methods and equipment to the small farms of Egypt should be explored.	-	X	6/87		WRC(WDRI) workplan being developed.
5. Work should continue on water conveyance structures and materials to improve the water delivery system.	-	X	6/87	On-going	WRC(IMS) In process
6. An expanded project to further test this management intervention (replace saqias with at head of Mesqa) on a large scale. This could be incorporated in the IMS project or stand by itself as a new AID supported activity.	-	X	6/87	On-going	Being considered, areas are being evaluated for pump implementation under RIIP
7. In an expanded regional project GOV and USAID should direct more resources to assist agronomic interventions such as micro-nutrient application, pest control, improved cultivation practices, calibrating fertilizer tests for nutrient requirements, increasing plant populations and introducing improved varieties. All of these practices are accepted by most farmers. To facilitate the advisory program a service laboratory should be provided. Such a facility would test the soils from the individual farms to determine the fertilizer requirement and the need for soil amendment such as gypsum. Water quality determinations could also be made. Such a laboratory can operate on a mass production basis.	X	X	5/86		Refer to Item 4, Annex B

Recommendation	Responsibility for Action		Completion Dates		
	USAID	MOI	Proposed	Actual	
8. Change specifications and design:	-	X	12/85	3/86	
1. Require 5cm cover of reinforcing Bars					
2. Transportation of mixed concrete by:					
a. Chute					
b. Dump buggy					
c. Wheel barrow					
d. Buckets for small structures					
9. Repair existing structures with sandblasting and gunite or equivalent to bring structures to specification requirements.	-	X	12/86		Equipment is being procured.
10. Establish a data system for the purpose of providing	-	X	4/86		Reporting system for voucher processing provides accumulative totals of expenditures and structures constructed or under construction by each Directorate.
1. A survey of the structural inventory				7/86	
2. A bench mark from which changes could be measured for the follow up and evaluation of economic impact.					
11. Education to the farmer to use less water through the extension system of the Ministry of Agriculture.	-	X	4/86		See item 4, Annex H.

Recommendation	Responsibility for Action		Completion Dates	
	USAID	MOI	Proposed	Actual
23. The Project Director (Telemetry) should pay particular attention to his future staffing requirements. He should consider acquiring and training backup staff for key positions.	-	X	2/86	7/86
24. The MOI could help the Project Director in the foregoing recommendation by authorizing significant incentive increases to key employees.	-	X	2/86	No progress. See item 3.

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Recommendation	Responsibility for Action		Completion Dates		
	USAID	MOI	Proposed	Actual	
8. Whenever the EWUP program is extended to a region, the experienced field and main office interdisciplinary staff should be maintained for major inputs into the broadened program. Senior American scientists should be made available on a long-time as well as short-time basis.	X	X	8/85	8/85	
9. Strategy for extending the water management lessons learned from EWUP should include a matching program funded in both Ministries (MOI & MOA).	X	X	6/86		Refer to item 4, Annex H.
10. That continual monitoring and periodic review be an integral component of such projects so any need for changes in objective and scope of work are recognized and made through amendments.	X	X	Con'd		Project Paper Amendment to IMS planned during fourth quarter of FY86.

Administrative Analysis

1. Key Organizations Involved:

The Ministry of Irrigation is the responsible agency of the Government of Egypt for all irrigation activities. It manages Egypt's portion of the waters of Nile Valley and controls its storage, release, use, drainage and disposal. Because of the integrated nature of its responsibilities it is not a decentralized Ministry. The MOI is responsible for all work under this project except that done collaboratively with MOA, particularly in the RIIP areas.

The Ministry of Irrigation is a large and complex organization, consistent with the wide scope of its responsibilities. It is composed of planning; operational, including field level; financial and other support units. This whole structure is augmented by a number of semi-autonomous authorities responsible to the Minister. These are all shown in Figure 1., with those involved in the IMS Project identified by an asterisk. These are:

- the Planning Sector with responsibility for planning, feasibility studies and other analyses, and statistics;
- the Irrigation Department with responsibility for all Nile River activities within Egypt and for the Upper Nile;
- the Water Research Center with responsibility for all aspects of irrigation research, executed through eleven institutes; and
- the Egypt General Survey Authority which is responsible for establishing geodetic control, producing topographic maps, performing cadastral surveys, and preparing and maintaining cadastral records.

Each of these major parts of the Ministry and the sub-parts with which the IMS Project is most directly involved are discussed in the following paragraphs.

2. The Irrigation Department

The Irrigation Department is the operational wing of MOI with responsibility for providing technical guidance to and supervision of the field organization of this centralized Ministry. Within the Department, the Irrigation Sector and the Horizontal Expansion and Projects Sector, both under the direction of a Senior Undersecretary, are the organizations central to major portions of the Irrigation Management Systems Project (SR, RIIP, and Preventive Maintenance). The Senior Undersecretary for the Irrigation Sector has jurisdiction with regard to water delivery and technical guidance to field activities at and below the Directorate level. In other spheres the Directorates receive technical guidance from others, for example the Horizontal Expansion and Projects Sector for major projects, eg., SR and RIIP. Lines of authority are defined to reflect the complex structure and the system appears to function satisfactorily (See Figure 2).

The field operations are conducted under the supervision of undersecretaries who report directly to Cairo. Each Undersecretary has one or more (normally two) field directorates under his jurisdiction. These directorates are headed by a Director General for Irrigation who resides in the Directorate and reports to the Undersecretary. The latter is responsible for liaison with Governorates in which his Directorate falls but since the MOI is not decentralized, as are many ministries, the irrigation function is not under the jurisdiction of the Governors. This reflects the need for integral nationwide management and control of the irrigation systems. The Directorates are the field units with operational responsibility for the irrigation system. Directorates range in size from 168,000 to 700,000 feddans of land under irrigation and are responsible for the O & M for all the canals, structures and drains in the area. They are staffed to carry out management functions such as contracting, disbursement and accounting for funds, personnel administration and monitoring of

contractor performance including site inspection. Below the Undersecretary is a Director General to whom two Inspectors are responsible. They in turn provide supervision to a Director of Works and five to eight District Engineers (DE's) with responsibility for direct oversight of system O & M and contractor site inspection in an area up to approximately 60,000 feddans.

The DE supervises a force of gatekeepers (responsible for monitoring and reporting, two to five times daily, on water flows and system problems) and a number of skilled and unskilled laborers. He may also have several surveyors and/or irrigation technicians but seldom has an adequate force of skilled laborers or other capacity for routine in-house maintenance. Typically the DE has a vehicle which is often used for transport of laborers. Communications depend on gatekeepers walking or bicycling to the DE's office and/or using the telephone when possible. There are no radio communications below the Directorate level.

In actuality, staffing at the Directorate and District levels varies considerably. Since the Ministry has not had competitive salary levels and engineers have not been compulsorily assigned to various Ministries since 1976 there have been few new junior engineers entering the service. The result is a significant shortage of lower level professional engineering staff. There is but one engineer, for example, in each District. The situation is similar with respect to technicians. The DE's are often unable therefore to give as close attention to the various aspects of their routine duties as would be desirable. At the more senior levels of the Irrigation Department, including positions in the Directorates, virtually all posts are filled by qualified engineers with 15 or more years experience.

The MOI has a critical need for better pay, including incentive pay arrangements based on meeting suitable levels of quantitative and qualitative performance. This would improve recruitment prospects and stimulate performance. With a rising demand on the workforce of the Ministry as a whole (with increased investment programs contemplated), and in the Irrigation Department in particular, the existing professional and sub-professional engineering workforce appears to constitute a constraint to substantially expanded activity until incentives, training, and recruitment can have their desired effects.

3. The Planning Sector

Headed by a Senior Undersecretary, the Planning Sector consists of the Project Planning Department (PPD), the Water Planning Group (WPG), a Statistics Unit, and a Planning and Follow-up Unit (See Figure 3).

The Planning Sector has responsibility on behalf of the MOI for data collection, retrieval and analysis related to finance and development of the irrigation and drainage sector, for recurrent and investment budget preparation, analysis, control and reporting for investment projects.

The PPD was formed as part of a joint effort by IBRD and USAID and is supported by the IMS project. The PPD carries out multi-disciplinary analysis and preparation of feasibility studies for projects to be funded within the budget of the MOI and/or by external donors. Since initiation of the IMS Project, the WPG has been transferred from the Water Research Center to the Planning Sector and will be responsible for execution of two critical components of the Project--Studies and Model Development and Main System Management (Telemetry).

Under the leadership of an undersecretary, the Planning and Follow-up Unit provides a set of critical central services for the Ministry. It has the capacity to prepare and present information required for decision making at the central level and for the Directorates. Information on field activities is prepared by the Directorates and reported regularly to the Planning Sector. Monthly budget expenditures on investment activities are prepared by each Directorate as of the twenty-fifth of each month. The fiscal control/system has the capacity to manage SR, RIIP, and other project funding and maintain accounting records showing allocations, contract commitments, expenditures and unexpended balances on a monthly or quarterly basis.

The PPD has serious staffing problems whereas the WPG is considered adequately staffed for carrying out its responsibilities during the project period. The PPD staffing situation and proposed remedial measures are discussed in Annex F.

Authorities for the Planning Sector are fully adequate for it to discharge its Project responsibilities. With proposed staffing and other measures for PPD, the Planning Sector will be adequately staffed. Funding, including USAID support, will be adequate.

4. The Water Research Center

The WRC administers a large research program through a group of eleven institutes. These institutes cover all aspects of irrigation in Egypt, from side effects of the High Aswan Dam to water distribution and irrigation research at the mesqa and on-farm levels (See Annex T and Annex F for details of the research program of WRC).

The WRC is headed by a Senior undersecretary who is supported by four departments to handle budgeting, personnel matters, and other research support activities. One of the Departments is responsible for Training and Manpower Development (TMD) activities (See Figure 4.)

The Project will provide support for all eleven institutes and the departments of WRC which have a total budget of LE 43 million which is sufficient to complete the IMS project activities.

WRC has the core staff to carry out the project and will utilize the private sector and Universities for special studies that are staff intensive.

5. Egyptian General Survey Authority

The Egyptian General Survey Authority (EGSA) is one of six semi-autonomous authorities responsible to the Minister of Irrigation. EGSA has the delegated responsibility to establish (1) geodetic control, (2) produce topographic maps, (3) perform cadastral surveys, and (4) prepare and maintain cadastral records.

a. Legal Authority

The legal basis for EGSA is provided by Presidential Decree Number 239 (June 3, 1978) which designates EGSA as the focal point for surveying and mapping in Egypt. Presidential Decree Number 827 for the year 1975 provided for the reorganization of EGSA and specified its functions in detail; outlined in detail the administration of EGSA by its Board of Directors; and designated the duties of the Chairman of the Board of Directors and of the Authority as its chief administrative officer.

b. Organization

EGSA is administered by a Board of Directors made up of the Chairman of EGSA, the first Undersecretary of the Egyptian Military Survey Department, the first Undersecretary of the Ministry of Irrigation, the Undersecretary of Finance, a consultant to the Council of State, three Vice Chairmen from EGSA, and others.

EGSA is managed by three Vice Chairmen and several support Department heads. The Vice Chairman for Financial and Administrative Affairs is primarily responsible for accounting, routine purchasing, and payroll activities.

The Vice Chairman for Survey Services is primarily responsible for individual property ownership information. This office is also responsible for estimating the value of land to be purchased from private owners for road construction or other developmental projects. Department offices are maintained in each Governorate.

The Vice Chairman For Mapping Affairs has the responsibility for all geodetic, topographic, and cadastral surveying and mapping activities, including reproduction and printing. This office is made up of five departments as follows:

--The Department for Maintenance. This department is responsible for vehicles and real property maintenance.

--The Department for Geodesy, Triangulation and Control. This department is responsible for establishing and computing basic geodetic control, both horizontal and vertical, and for plotting geodetic control and cadastral boundary information on basic map sheets.

--The Department for Topographic Maps and Photogrammetry. This department is responsible for the photogrammetric compilation of topographic maps and for field surveying activities necessary to provide photogrammetric control and field completion information.

--The Department for Cadastral Surveys. This department is responsible for surveying the boundaries of all individual property parcels in Egypt. This involves reviewing each land-owner's deed, resolving any discrepancies and preparing a sketch map of the boundaries and selected planimetric detail.

--The Department for Drafting, Photographing, and Printing. This department is responsible for preparing the final map manuscript copy, enlarging or reducing copy as necessary, and producing printed maps and related materials for public distribution.

The Egyptian General Survey Authority also has a Department of Legal Affairs, responsible for legal problems relating to cadastral activities, a Department for Planning, Organization and Training, responsible for planning, records, and employee development training. All of these units are displayed in Figure 5.

The capacities and capabilities of these Vice-Chairmen and Department heads is satisfactory for execution of the Project. Key personnel will be provided observational training to assist them in assimilating the new technologies to be introduced. Project activities will be focused in the five surveying and mapping departments of the Office of Mapping Affairs.

c. Financial Authority

The EGSA obtains its budget through standard procedures involving budget preparation, clearance with MOI, and approval by the Ministries of Planning and Finance. Once approved the Chairman of EGSA has full authority to spend the budget without further referral to MOI.

Revenue generated by map sales goes to the National Treasury rather than being utilized directly by EGSA. In any case, the amount of funds involved is inconsequential compared to EGSA's overall budget.

Other departments/units of the government, as well as the general public, pay for mapping products as obtained.

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d. Staffing

There are about 14,000 persons employed by the EGSA. Those employed by the surveying and mapping departments represent about 18 percent of this total. The current numbers of engineers and technicians employed in these surveying and mapping departments are sufficient to carry out the activities under this project and are as follows:

	<u>Engineers</u>	<u>Technicians</u>
Cadastral	14	511
Geodetic	10	357
Topographic	10	199
Map Printing	<u>4</u>	<u>193</u>
Total	38	1260

6. The Coordination Committee:

Recognizing the interrelationship of the various activities within the IMS project, yet wishing to execute them within the existing units of the MOI organization, the Ministry has created a formal IMS Coordinating Committee. This group chaired by the Head, Irrigation Department, includes key people of Senior Undersecretary, Undersecretary, and Project Director level with responsibilities in the areas where IMS activities will be, or are being, carried out. Operational responsibility lies in the respective units but the Committee provides a means of developing coordinated policies which can be recommended to the Minister. In this way coordination is achieved while keeping normal lines of authority and responsibility intact.

The Coordination Committee consists of the following:

<u>Member</u>	<u>Project Area of Responsibility</u>
1. Senior Undersecretary, Irrigation Sector	Structure Maintenance, Channel Maintenance
2. Senior Undersecretary, Planning and Follow-up Sector	Development of the PPD, Studies and Models, Main System Management (Telemetry)
3. Senior Undersecretary, Horizontal Expansion and New Projects Sector	SR and RIIP programs
4. Chairman Water Research Center	All institutes, including Training
5. Director SR and RIIP Programs (Undersecretary level within Horizontal Expansion)	SR Program, RIIP
6. Undersecretary, PPD	PPD development
7. Director, National Irrigation Training Institute	Training
8. Undersecretary, Egyptian General Survey Authority	Mapping

9. Three others to be designated by the Minister of Irrigation Not project related

10. AID Representative Observer only

The Coordination Committee will identify priority needs for training, advise the Minister on budget and staff deployment priorities in relation to the needs of the project, and facilitate communication among those engaged in the various activities. It will facilitate more effective project operations.

To facilitate coordination of activities of RIIP that require or are associated with inputs from MOA, the following committees will be utilized:

(1) National Irrigation Improvement Committee (NIIC)

The NIIC was formed in 1984 by Ministerial decree and is a high level committee within MOI to recommend policy changes to the Minister and provide coordination of overall irrigation improvement activities. The MOI will now add an MOA representative to NIIC to improve high level coordination for the RIIP activities.

(2) Technical Advisory Committee (TAC)

The TAC will be formed under this project to advise the Director of the National Irrigation Improvement Program (part of which is RIIP). Its membership will consist of specialists from the MOA, MOI, consultants, USAID, UNDP, and Universities. The TAC will provide the breadth of technical scope and integration needed in this large national program.

(3) Coordination Committee (Governorate)

In each Governorate a coordinating committee will be formed as part of this project to facilitate the implementation of RIIP at the field level. The committee will consist of the Undersecretary of Irrigation, Undersecretary of Agriculture, Director General of RIIP, District Engineers, and others to assure full understanding and coordination of the RIIP implementation.

7. Conclusion:

The Ministry had a major task in gearing up to meet the needs of the original IMS Project. This has been done rather successfully up to this point. The mid-term evaluation found that project inputs had generally been provided in an adequate manner. With the exception of the Preventive Maintenance Component, technical assistance has been well received and commodities provided under the original agreement are mostly in-country and in use. GOE has provided key project counterpart staff to direct the various project components. However, the MOI's difficulty in acquiring and retaining qualified engineering staff, owing to low levels of remuneration, has had a negative impact on implementation, particularly in the case of the PPD and telemetry components which require highly skilled technical personnel.

The evaluation further noted that, overall, the IMS project is contributing to a more functional institutional structure within the MOI. However, progress has been slower than planned because the Project did not make adequate allowance for the lengthy processes of institutional development, AID approvals, and contracting procedures. This Evaluation Report recommended that the Project be extended to provide adequate time for achievement of planned outputs. It also recommended that USAID and the MOI explore ways to resolve the MOI's difficulty in attracting qualified engineering staff. More explicit attention should be given at the project design and negotiation stages as to how project components which require highly skilled manpower for successful implementation can be adequately staffed, given institutional constraints.

The MOI will arrange appropriate staffing for all of its units directly involved in the IMS Project. The MOI will also finance an incentive fund of adequate amount for each Project component which will be administered by the Project Director.

In spite of problems, the MOI has the administrative capability to manage and execute the IMS Project, with the help to be provided by USAID, and the new staff incentive program to be developed and implemented by MOI.

Organization Chart
MINISTRY OF IRRIGATION

Figure 1

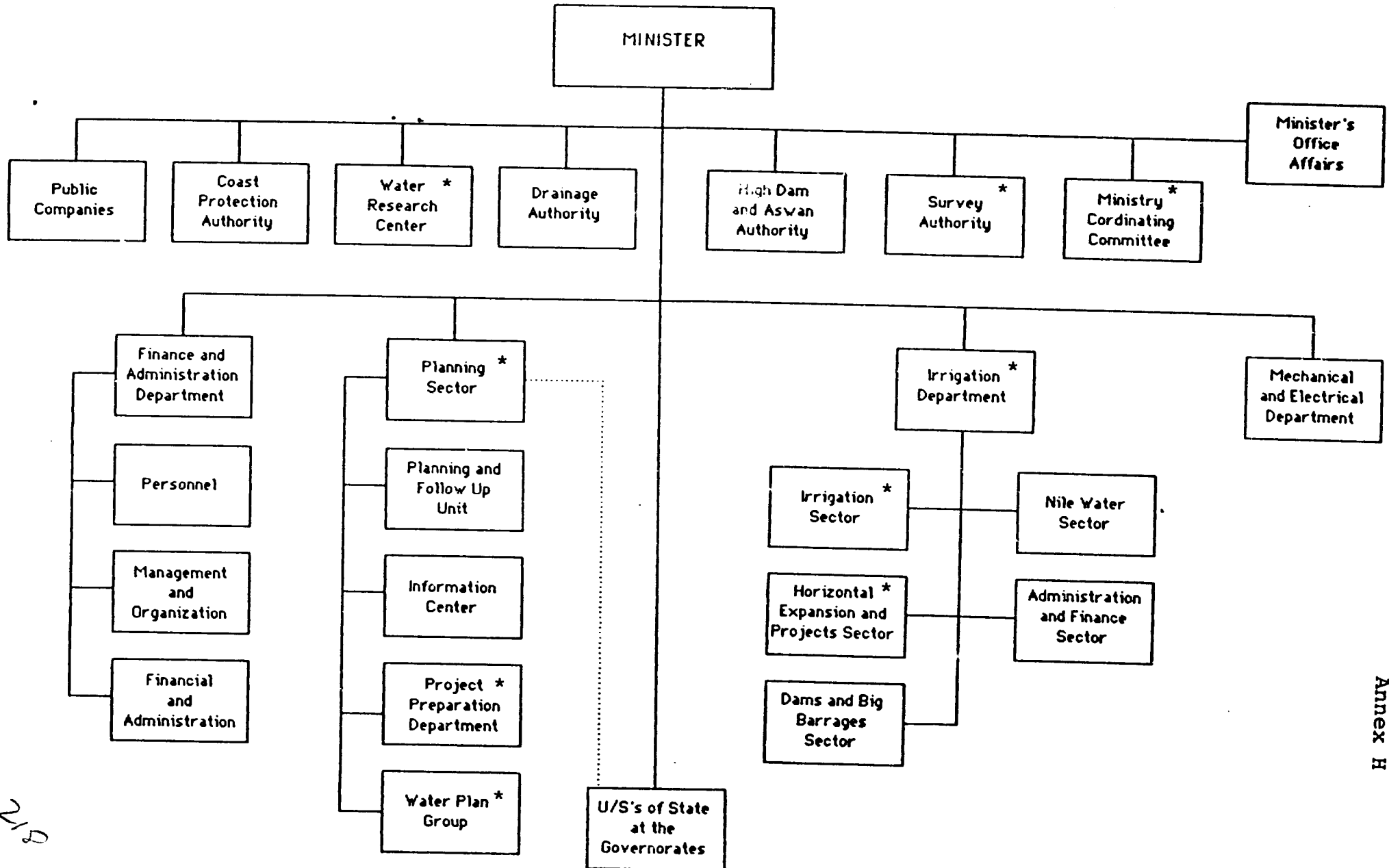


Figure 1
Annex H

2/2

Organization Chart
DEPARTMENT OF IRRIGATION

Figure 2

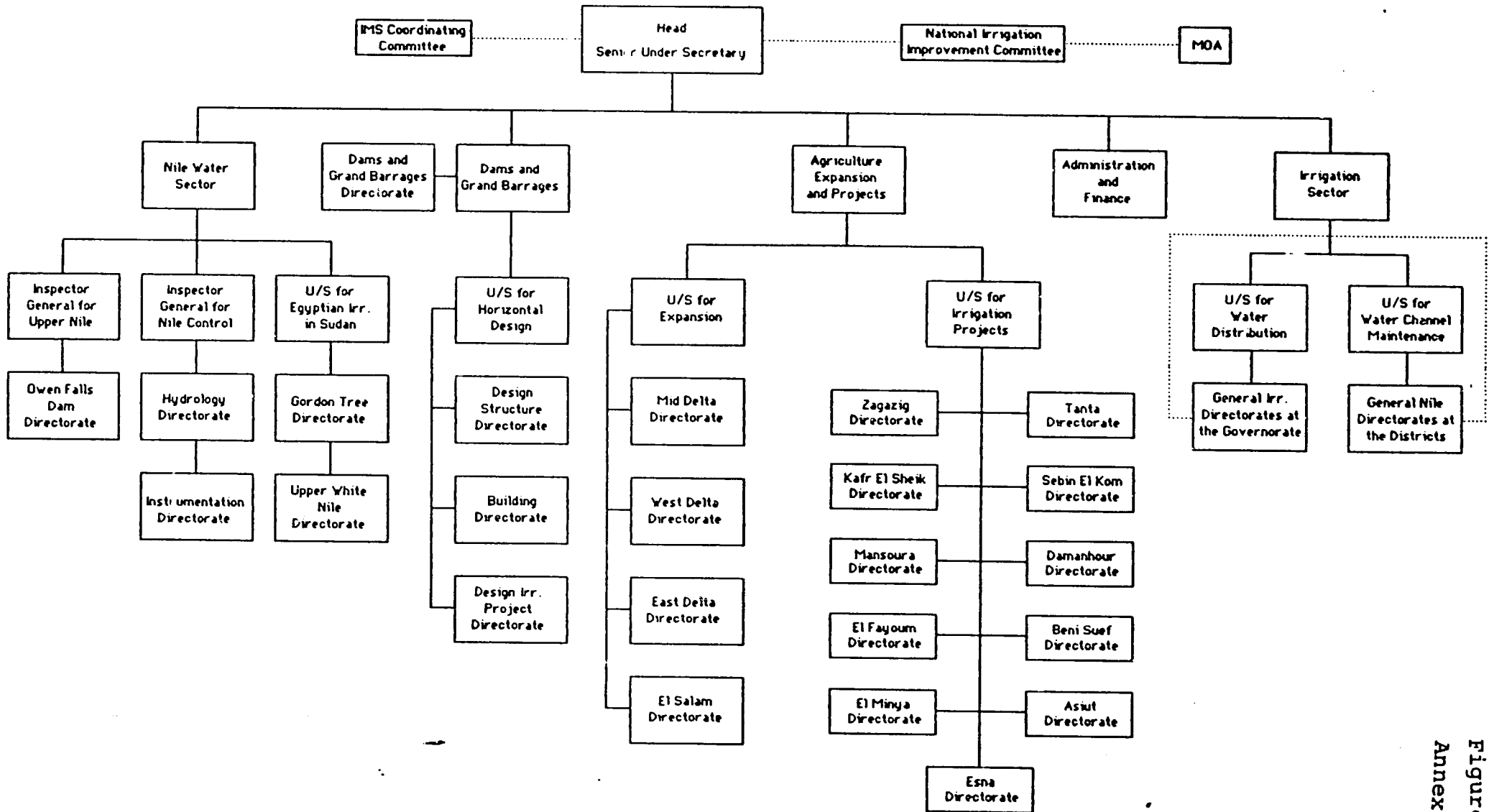


Figure 2
Annex H

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Figure 3

Annex H

Organization Chart

PLANNING SECTOR

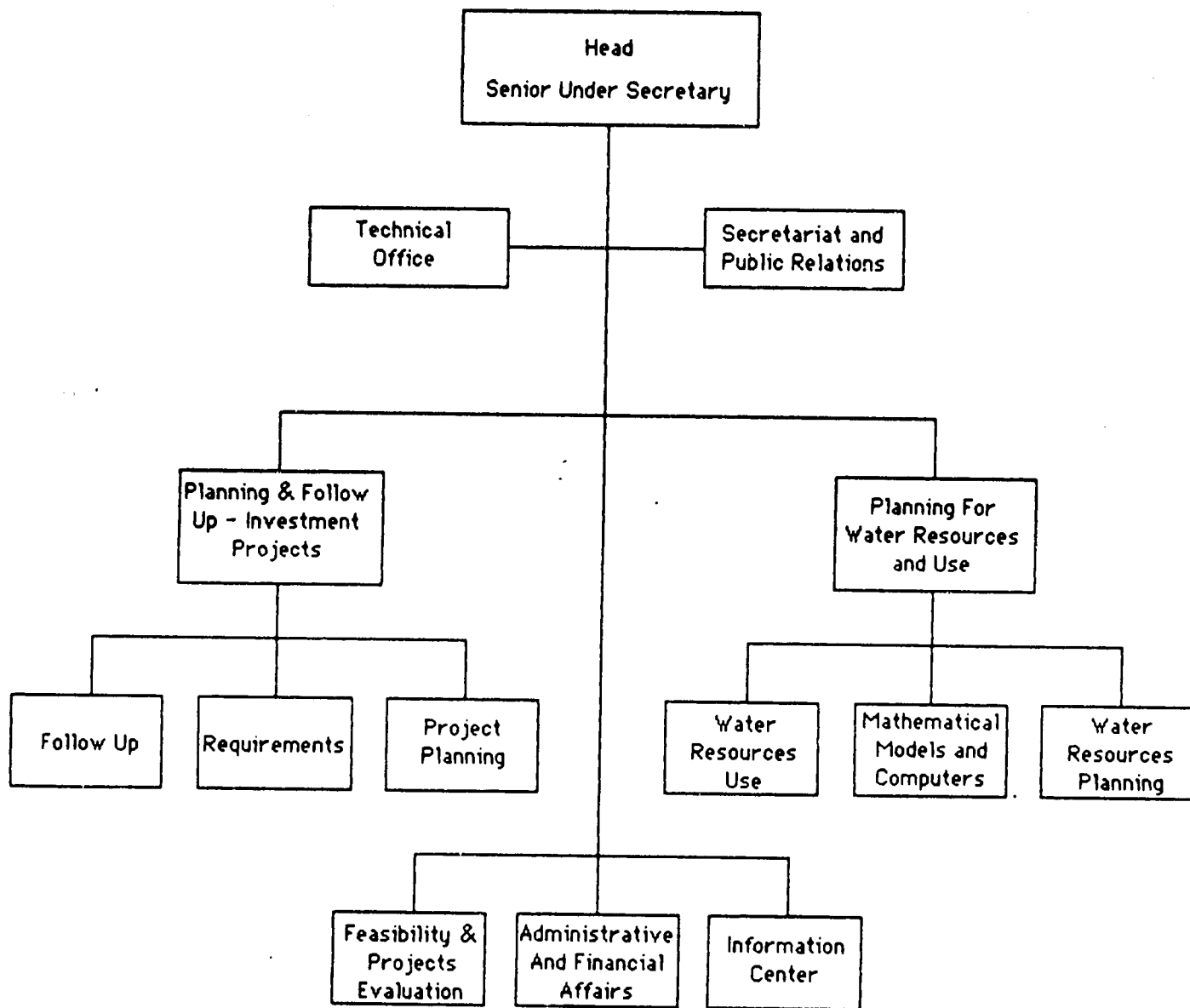


Figure 4
Annex H

Organization Chart
WATER RESEARCH CENTER

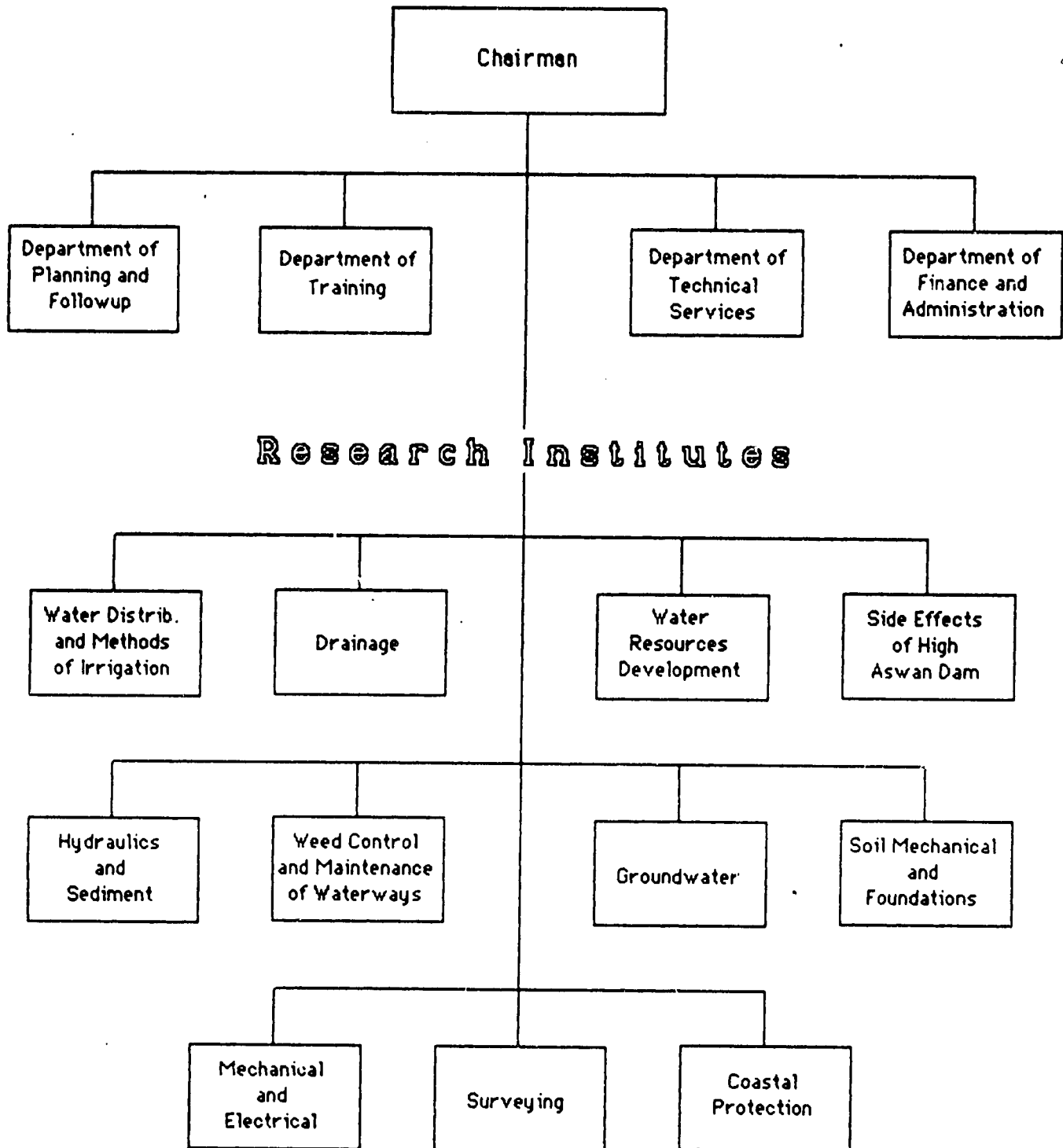
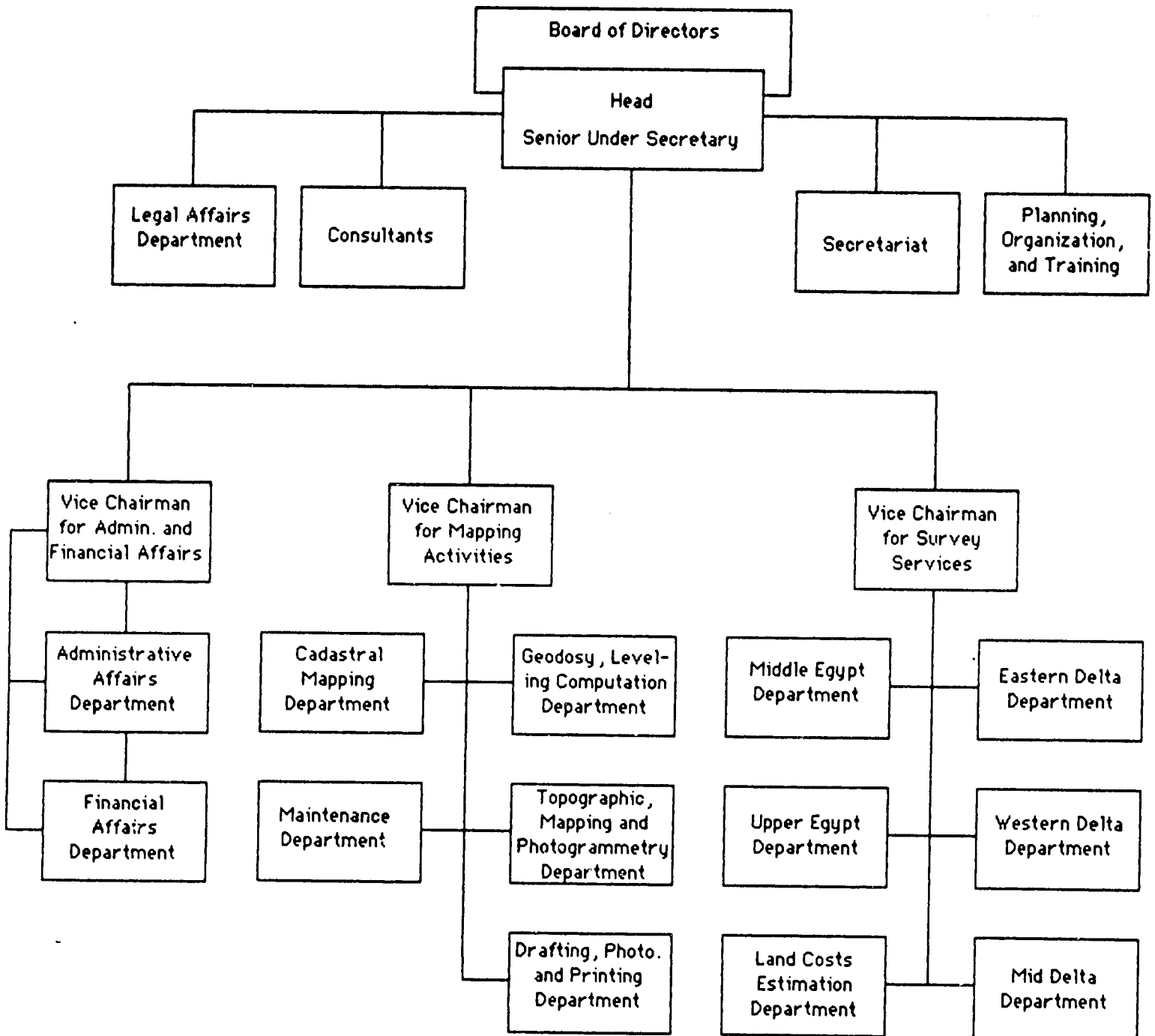


Figure 5

Annex H

Organization Chart
EGYPTIAN SURVEY AUTHORITY



AGRICULTURAL ANALYSIS

1. Agriculture in Egypt

The favorable conditions which prevail in Egypt for agricultural production are well known: the land is flat; the silt and clay soils are extremely fertile; and there is a continuous supply of water, through irrigation, to those lands that are now farmed. Agricultural productivity is high by world standards, the sector generating about 20 percent of GDP and employing more than 30 percent of the labor force, either on a full-time or a part-time basis; but Egyptian agriculture has not yet reached its full potential.

The land resource is relatively small. The cultivated area in Egypt is about 5.8 million feddans. Egypt's population, which is at present about 50 million, is growing at a rate of about 2.8 percent per year, an annual increase of more than one million. The ratio of population to arable land is among the highest in the world. It seems evident, therefore, that a priori for agricultural production to increase there must be a growth in productivity in the old lands, or an expansion of the cultivatable area through the reclamation of new lands, or a combination of both.

Despite the large population/land ratio, there is a seasonal shortage of agricultural labor. This is due to the migration of the male rural worker to towns, cities, or offshore, which results in a delay in the implementation of certain agricultural practices and retards agricultural performance. Selective agricultural mechanization has not succeeded in compensating for the adverse effects on agricultural production that are caused by the increasing labor shortages.

2. Farmers Access to Inputs

Extension:

The MOA has since taken steps to reorganize extension through Ministerial Decree No. 1015, dated November 14, 1984. A General Administration for Applied Agricultural Extension (or National Extension Service (NES) has been established under the Ministry of Agriculture for all agricultural extension functions at both the central and the governorate/local levels. All extension staff in Cairo with a BSc degree or higher, which had earlier been transferred to the ARC, reverted to the Ministry. This newly constituted extension service is controlled by the Central Administration for Agricultural Mechanization and National Campaigns under the First Undersecretary in the MOA. Formal transfer of the service was to have become effective with the new budget at the beginning of the fiscal year on July 1, 1985, but is still in the process of implementation.

The head of this central organization is the Director General for Agricultural Extension. He is assisted by seven Directors for crop improvement, livestock, agricultural mechanization, audio-visual aids, rural development, agricultural councils and planning. In March 1985 a ministerial decree separated the regulatory and extension functions, facilitating creation of a nonregulatory extension service at the governorate, district and village levels which reports to the NES.

Approximately 3,300 village level extension agents (VEA) and 800 assistant village agents have been designated. Their task is to identify local leaders and farmers who are progressive and receptive to new ideas and to demonstrate technical packages for various crops. Alternatively, these packages can be demonstrated on government owned plots. Daily farm visits and weekly group meetings are to provide a forum for transmitting information and answering technical questions. Under the new system, VEA's and Assistant VEA's will report directly to district level extension personnel. Weekly meetings with farmers and SMS allow a two-way flow of information. An assistant in each Governorate Extension Director's office is responsible for two districts.

There are approximately 26 governorate directors and 85 assistants.

This reorganization process should allow the National Extension Service to focus exclusively on technology dissemination, but practical problems remain:

--Lack of Administrative support. Field extension agents and specialists are poorly paid. Transportation is a key constraint at the village level. Some printed materials and audio-visual aids have been produced at the national level, but are scarce in the field.

--Training. Approximately 95 percent of all VEA's hold a BSc in agriculture. A training course introducing new work methods has been developed, but only a small fraction of VEA's are trained.

--The number of agents is not sufficient to cover village areas as conventional extension methods depend heavily on personal communication.

--Lack of knowledge of water application techniques; soil, water, plant relationships, in timing and amount.

--Lack of effective coordination with research. Even though crop packages exist, technical backstopping is inadequate. Technical recommendations are often not adapted to the agri-climate area.

--Policy constraints are not fully considered in extension program planning.

MOA's intentions in the establishment of a strong extension service, capable of effectively disseminating approved research technology to farmers, are clear and well devised. However, to date only the foundation for such a service has been laid. If the research base, which is to be greatly strengthened, is to be effectively utilized at farm level, the research extension linkages will require the further development. This will require much government effort.

Several donors are implementing projects designed to strengthen these research/extension links. USAID has funded two crop research/extension projects (Egyptian Major Cereals Improvement Project and the Rice Research and Training Project). These two projects have trained SMSs, established demonstration fields, and developed sets of agronomic recommendations tailored for selected field crops in specific projects (Minya Agricultural Development Project and the Fayoum Agricultural Development Project) are basically integrated development efforts. The T & V system has been introduced in the two project governments.

A major difference between the AID and the World Bank projects is that the AID projects were funding research and extension while the WB projects were extending known but undissemated research findings. Both styles have been successful, but it remains to be seen how many of the research/extension/farmer links remain when donor funding is completed.

Fertilizer:

Distribution of fertilizer is made through a network of regional banks which operate storage depots. Calculation of fertilizer requirements is based on centrally planned cropping programs at application rates following research recommendations. In practice, farmers apply fertilizer to those crops most favored on financial grounds. Excessive, and therefore wasted, use occurs for some crops. In contrast, growers of high priced crops such as vegetables, for which no government fertilizer allocation is made, pay high open market prices for fertilizer which is allocated, in the first instance, for quota crops. USAID will address some of these policy issues under the new Agricultural Production Credit project.

Seeds:

At present, the seed industry is controlled in MOA by the Central Administration for Seed (CAS), headed by an Undersecretary, assisted by technical directors. Seed testing is undertaken in three laboratories, at Giza, Tanta and Minya. Although the equipment is out dated or inoperative, the quality of work is satisfactory within the

limitations imposed by such equipment and the need for additional staff training. Seed processing is carried out in 11 locations with seed cleaning units of varying capacities. Once a variety is increased beyond the "basic" seed stage, it is the responsibility of CAS to multiply it further on government lands or under contract on farmers' fields. The standards of field inspection, regulating and general supervision of seed produced under CAS or the national seed companies vary.

USAID projects have completed four new seed processing plants and have trained more than 100 plant personnel. One additional processing plant is under construction. IBRD plans to construct two additional seed processing plants.

Pioneer Seed Company, and several other private sector firms provide field crop and vegetable seeds.

Mechanization:

The mechanization of Egyptian agriculture, begun early in this century, has now reached a point where 90% or more of the farmers use some machinery to carry out a portion of their work. Today, the use of mechanized power is widespread for three major operations

--primary tillage, water lifting and transport. The national tractor stock has almost quadrupled from a level of 13,000 in the early 1960's to about 46,000 in 1984. Other operations such as planting, fertilizing, cultivating, harvesting, threshing, etc., are mechanized to a much lower or almost negligible degree.

The pattern of custom hire operations is now well established and seems likely to continue to be the basis for the progressive mechanization of Egypt's smallholdings. A survey of farmers and machinery owners, completed the USAID Agricultural Mechanization Project and 25% of pump owners provide custom services. Whereas, 90% of the farmers used tractors for plowing, fewer than 2% owned tractors, implying a widespread reliance on custom hire.

Through the office of the Senior Undersecretary for Mechanization and National Agriculture Campaigns, a major campaign to increase the use of agricultural mechanization is being promoted. The Ministry aims to establish 150 mechanized stations which will serve as demonstration and training focal points where farmers and machinery operators can learn of a variety of different types of machinery appropriate for a wide range of agricultural operations and be trained in machinery operation and maintenance. These stations will also serve as a source of extension by providing advice on the role of machinery as one input in an integrated package of technological improvements for improving farm incomes. The USAID Agricultural Mechanization Project has provided approximately \$14 million in farm machinery for demonstration purposes.

Prices and Marketing:

Price System and Structure:

The Government's intervention in the agricultural sector through price and area control and input distribution policies is extensive. This has led to low producer prices for such major commodities as cotton, wheat, and rice and some compulsory requisition of a few commodities. Despite the Government's subsidization of the major agricultural inputs, the result has been a net taxation of agriculture. This, in turn, has encouraged farmers to switch to producing alternative uncontrolled commodities as reflected in livestock feed crops at the expense of cereals and cotton. Another result of this policy is that it sends conflicting signals to producers. The cotton farmer, for example, is subject to a melange of policy instruments, including a heavy export tax, a domestic tax on output prices, buffer stock price support, input subsidies, physical controls over input usage and minimum area planted, and incentive payments to expand acreage and to plant early. The Government has been seeking to ameliorate this

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situation by raising producer prices for various crops in recent years. Moreover, although crop area controls have been maintained in a few cases, they are now administered more liberally than in former times.

Marketing

Three Ministries are involved in agricultural marketing in Egypt--the Ministries of Finance, Trade and Supply, and Agriculture and Food Security. Within MOA, several bodies are involved--the Marketing Research Division (MRD) of the Agricultural Economics Research Institute (AERI), the Union for Horticultural Exporters and the Undersecretariat of Agricultural Economics. In addition, a number of private persons develop their own export market outlets for agricultural (particularly horticultural) produce.

The MRD of the AERI is organized into three research units--Domestic Marketing, Foreign Marketing, and Price Analysis--the functions of which are:

(a) domestic marketing covering: marketing channels; costs of domestic marketing; farmer share in consumer prices; supply and demand of agricultural products; feasibility studies on establishment of marketing utilities (stores, shops, packing stations, transportation, etc.), evaluation of cooperative marketing of agricultural products and losses;

(b) foreign marketing covering: organizational structure of agencies and bodies handling agricultural crops (e.g. El Wadi Co., El Nile Co., Export Development Centre and the Union for Horticultural Exporters) and laws and regulations governing these bodies; evaluation of Egyptian exports and imports of agricultural crops; important competing countries with Egypt; marketing export crops; and factors affecting exports and problems impeding exportation, and

(c) analyses covering farm prices and their relation to production costs, marketing and consumer prices; estimation of price response functions of various agricultural crops; efficiencies of the pricing system and price policies; and estimation of demand functions of various agricultural crops.

The Union for Horticultural Exporters (UHE) has a membership in excess of 7,000 and includes small-scale farmers with farms as small as three feddans, small-scale traders operating light trucks for delivery of produce (particularly tomatoes to nearby Arab countries) and large-scale exporters of a variety of fruits and vegetables (notably tomatoes, onions, potatoes, artichokes, asparagus, cantaloupes, and peppers) to European and other markets, frequently developed through personal contacts by the individual exporter.

Agricultural marketing in Egypt suffers from a number of defects--notably the lack of cohesion in the various bodies involved in agricultural marketing, the absence of a marketing strategy, inadequately trained staff, inadequate facilities and equipment, and restrictive government controls (for instance on the importation of packaging materials).

Policy dialogue under the new USAID funded Agriculture Production Credit Project will address policy issues of marketing, agricultural inputs, and price controls.

Research:

The Agricultural Research Center of the Ministry of Agriculture has the overall authority for agricultural research. It is Egypt's largest agricultural research organization. The ARC has a staff of approximately 24,000 about 5,000 of whom are engaged in research. The staff is comprised of 800 PH.D scientists, 1,300 with the M.S.c. degree. The rest consists of 17,000 technical assistants, along with laborers and administrators. The ARC is responsible for 13 research institutes.

Most research is organized on a commodity basis with separate institutes for Field Crops, Horticulture, Cotton, Sugar, Animal Production, Animal Reproduction and Animal Health. In addition, there are separate institutes for services and special

disciplines, such as Plant Protection, Plant pathology, Serums and Vaccines, Soils and Water, Agricultural Economics and Agricultural Mechanization.

The ARC has also developed two central laboratories: the Data Analysis and Design Laboratory and the Pesticide Laboratory. It also directs the Pyramid Institute of Animal Reproduction. Included in the ARC are 32 Agricultural Research stations for field crops, horticultural crops and for animal production. These Research Stations are spread from Aswan in the South to the Mediterranean in the North, and monitor about 27,000 acres of agricultural lands.

Along with these, there are other research units that relate to food and agriculture. These include the National Research Center, the Academy of Scientific Research and Technology, the Water Research Center, the Desert Research Center, the General Authority for Fisheries Resources Development, the Institute of Oceanography and Fisheries, and the Fisheries Management Center.

Most of the research institutes and laboratories have substantial professional and support staff, many of whom are well trained and qualified. However, their ability to conduct meaningful research is limited because equipment, library, and laboratory facilities are inadequate; there are few transport vehicles and tractors; staff salaries are low and economic incentives are weak; there is a general shortage of operating funds; there are poor publishing facilities; and there is insufficient focus on total farming systems research programs where crops, livestock, forestry, water and soil management, and post harvest handling and marketing are linked to production.

A major constraint is that approximately 90 percent of the total expenditure for agricultural research is allocated through the budget for salaries and incentives.

Agricultural faculties, especially at Cairo, Ain Shams and Alexandria Universities, have some outstanding scientists who conduct with their graduate students considerable independent agricultural research with some support from the Ministry of Education and Scientific Research, and the Egyptian Academy of Science and Technology. Indeed, it was reported that 90 percent of the thesis work of graduate students in faculties of agriculture of universities in Egypt, is done at the ARC.

There is also a growing involvement in research by private agricultural production and marketing companies which are recruiting their own consultants, either to supervise or conduct farm research (variety testing, new crops, weed control, pest control technology, fertilizer, plant growing, protected cultivation). Indeed, it appears that some of the large private sector farms, which utilize the most advance production and marketing technologies, are not deriving them from the Agricultural Research Center of the Ministry of Agriculture, or its 13 Research Institutes, or any of the 32 Agricultural Stations which are spread throughout Egypt.

The new AID supported National Agricultural Production Project will support ARC research and is aimed at developing technologies to increase farmers' production.

Credit:

Specialized banks in Egypt, lending in the field of agriculture and agro-industries, consist of 17 governorate Banks for Development and Agricultural Credit (BDACs), supervised by the Principal Bank for Development and Agricultural Credit (PBDAC) in Cairo, the Development Industrial Bank (DIB) and the recently established National Bank for Development (NBD). While the BDACs finance the production and investment credit needs of farmers either individually or through cooperatives, DIB finances the fixed and working capital requirements of private and state-owned agro-industrial enterprises.

The PBDAC is responsible for overall credit planning, raising the necessary funds,

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and implementing its program through the BDACs. In addition, it processes all production inputs, (through importation or from local production), and plans, in conjunction with MOA, their distribution for cash or on credit. In fact, PBDAC's group activities of input supply and marketing is as extensive as its involvement in banking.

The PBDAC group offers a wide range of credit facilities. Short-term loans, with a maximum maturity of 14 months, are extended to farmers for the purchase of inputs and for the payment of hired labor; such credit is provided in kind or in a combination of cash and in kind in accordance with the cropping pattern and quantities of inputs allowed by MOA. Loan amounts are calculated in accordance with detailed budgets of the agricultural operations for each crop or livestock breed. Short-term loans are granted only to farmers who are either owner-operators or tenants, and who hold a passbook registered with the government agricultural cooperative. Medium- and long-term loans are granted for capital investments such as buildings, equipment, machinery, and for operating capital.

Short-term loans constitute the bulk of loans granted, but the share of longer-term loans has soared from 8.3% of loans and advances granted in 1979 to 26% in 1983. In 1984/85 short-term loans amounted to LE 127.5 million, and medium-term to LE 128.25. Crop production and livestock and poultry loans are the predominant categories in short-term lending operations, accounting for 63% and 34% respectively in 1983. The major share of longer-term lending has been consistently for capital investments, livestock and poultry absorbing 61% and mechanization 25% of the total of such loans through additional long-term funds provided by government and foreign financing institutions, notably IDA and USAID under the Small Farmer Production Project. The Role of Women in Egyptian Agriculture

Rural women in Egypt are faced with problems related to: low income and poverty; lack of skills and a means of generating income; and social and cultural constraints. The problems related to low income and poverty are felt by the rural population in general, and by women in particular. In most instances, men are the main wage earners and women depend totally on their male family members to support them. While the expenses related to child-rearing are commonly covered by women, their incomes are usually insufficient to meet these needs. To exacerbate the situation, rural women lack the necessary means to secure a substantial income through wage or self-employment. They lack not only the skills and the financial wherewithal to secure the necessary equipment and materials, but the experience, knowledge, and confidence necessary to manage efficiently their own productive activities and to compete effectively in the local market. This final point is largely the result of social and cultural attitudes which play a predominant role in restricting the mobility of females and hence, their access to educational and training programs, their entry into the labor force, and their participation in community services and activities.

This situation has been aggravated further by the high rate of emigration during recent years of unskilled and agricultural male laborers and the increasing cost of living. The impact of male emigration on women has not yet been fully assessed and demographic statistics to show what has occurred in rural areas will not be available until after the results of the 1986 census become known.

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However, the emigration factor has already brought about abrupt changes in economic roles and relationships at the family and community levels. The women left behind are, by necessity, making independent decisions concerning the management of property and remittances, and are undertaking activities which were traditionally the domain of men. Women are exposed to dealing and contacts with a range of people and institutions within the public sphere to which they would not otherwise have been involved. Another outcome of emigration has been the reduction in the supply of agricultural wage laborers, necessitating the absorption of increasing numbers of women and children into this sector. In addition to these problems, the rising cost of living has created a situation in which many families are no longer able to depend on a single wage earner. The demand for men to hold second jobs and for women to enter the labor market has, therefore, increased dramatically.

Women are playing an increasing role in labor, on-farm decision making and farm management due to out-migration of males (Gulf States and urban areas).

Traditional female labor roles include planting, weeding, thinning, harvesting, post-harvest marketing, and all work associated with animal, animal products and poultry.

Recent reports from other AID-funded projects provide estimates of 35-65% of all farm labor done by women (variance due to locale and commodity).

Women have limited access to agricultural credit and government supplied farm inputs. Traditional extension efforts are not tailored to and do not include female participation.

SOCIAL SOUNDNESS ANALYSIS
IRRIGATION MANAGEMENT SYSTEMS PROJECT(263-0132) PP AMENDMENT

I. PURPOSE

The purpose of this social soundness analysis is threefold: first, it is to assess compatibility of the IMS project with the sociocultural environment into which it is to be introduced; second, it is to examine the institutional relationships between local irrigation communities and the MOI, and third, it is to highlight some of the differences among beneficiary groups, especially those along the three distinct ecological locations of the irrigation waterway in Egypt.

II. SOCIOCULTURAL FEASIBILITY

A. Compatibility of Project's Strategy with Sociocultural Environment

The project's primary justification for more efficient water management is to increase on-farm production. Water use per-se should also be an equally articulated project justification because of the increasing demands that will be made on Egypt's water supply.

The present sociocultural environment into which this project is being introduced is compatible with project objectives. There is currently enough water to allow farmers to rectify delivery system irregularities by compensatory practices (such as flooding fields, pumping from wells and drains, or illegally piping water from major canals to field inlets). In the future, with a growing population, increased urban, industrial and agricultural demands, and stricter quality standards that would limit re-use, per capita supply of water will no doubt be reduced and wasteful practices will have to be replaced by more efficient water allocation.

The the Ford Foundation study on water allocation in Egypt (1983:106) concluded that "it is difficult to imagine that the current local systems of water allocation in Egypt would cope very well with even a minor but permanent reduction in their water supply. These systems work mainly because there is an adequate supply of water. At present, there are several periods a year when farmers scramble for water from any source. The fact that they almost always succeed is responsible for the lack of overt conflict and the low level of extreme measures. If there were a slight decrease in water supply relative to demand, the scrambling would not always succeed. Farmers would behave more desperately making the water supply or the pump availability even more erratic. The loss of the sense of security would create a downward spiral of distrust and competition."

The Ford Foundation study found that in each of the three distinct ecological locations along the irrigation waterway, farmers already break mesqa intakes, install underground pipes from canals, or illegally pump water from a "near by" canal or drain to their mesqa in order to assure their water supply. One can only assume that such acts would increase in frequency in a water-short future. An increase of illegal and destructive acts to get water would greatly undermine the planning of the Ministry of Irrigation (MOI), resulting in loss of control over water delivery. Local regulating tasks would be impossible for the MOI without organized cooperation from below, hence, existing water user groups should be more effectively mobilized to assume greater responsibility for efficient water delivery.

Cooperation from below should be more than simply attempts to coopt their labor for the performance of routine functions that the bureaucracy is unable to achieve.

Innovative approaches should attempt to engage farmers in irrigation development tasks from which they were previously excluded. In particular, farmer participation should be encouraged not only in the operation of irrigation works, but also in the design process for tertiary level facilities. Farmer participation is important for two reasons: (1) the layout design at the tertiary level requires very location-specific data. External designers must rely on the physical and socioeconomic knowledge of local people; and (2) incorporating indigenous knowledge results not only in a technically superior design, but also a locally acceptable one.

RECOMMENDATION

As the project focuses on tighter water budgeting in implementation, the role of local organizations in water allocation should be expanded into a different kind of relationship with the MOI than the one currently in place.

One of the start-up activities under the RIIP component of the project will be experimentation with different types of local relationships between irrigation communities and the MOI. Such relationships would involve the formalization of irrigation community organizations and the expansion of local responsibility over the local delivery system. This project activity would build on the foundation already laid by experiments begun under the Egypt Water Use Project (EWUP) in organizing water user associations in Middle Egypt and mesqa cooperation in the Delta.

Strategies to achieve greater farmer involvement in irrigation development will require significant modifications in agency procedures and behaviors. For example, rather than building new tertiary structures and then attempting to organize farmers around them; first, farmers should be organized, then their participation should be solicited in the design and construction process.

B. Existing Varieties of Local Social Organization

There is considerable variety in the structure of local water allocation in Egypt. The Ford Foundation study revealed three strikingly different local ecological systems, each related to the technology of water delivery. From the unitary organization of an entire mesqa (hundreds of farmers) in Fayoum, to the small, separate, and in a sense, competing saqia rings along the mesqa of the Delta, to the individualistic and ad hoc arrangements in Middle Egypt, one finds almost the entire logical range of patterns of organization and incorporation.

This variety has direct implications for policies of irrigation development. The majority of farmers have to lift water onto their fields and some of the most important decisions in this project are focused around proposed changes in the lifting technology. It is important to recognize that such policies will have several, rather than just one, result. For instance, a widespread availability of diesel pumps reinforces the saqia ring organization in the southern Delta, yet seems to undermine it in the northern Delta. Pumps are largely meaningless to the water users' groups in the gravity system of Fayoum, yet they expand the necessary range of farmer cooperation in Middle Egypt. Therefore, systems developed must be flexible enough to allow farmers in each situation to adapt the technology to their local needs. These systems are not necessarily mutually exclusive. It is the existence of a technologically mixed system that is the key to the farmers' ability to provide efficient water delivery to the fields. For example, one obvious mixed system is the combination of gravity and lift irrigation. Usually these are contrasted as mutually exclusive options, however, both can operate together. Often water is pumped into a mesqa where it flows by gravity to be lifted by saqia and then flows by gravity through the merwa to the field.

The point is that farmers have found ways, individually and often collectively, legally and often not so legally, to get the water to their crops even under unfavorable irrigation circumstances. An improvement of on-farm water management will require focused attention on how the proposed changes will affect the variety of ways that farmers get water to their crops.

III. SPREAD EFFECTS: THE DIFFUSION OF INNOVATION

A. Farmer Receptivity, Participation and Policy Issues

Farmer participation in more efficient water management is closely tied to pricing and marketing policy reform. Replication and institutionalization of project activities will be responsive to policy changes that remove the production constraints that farmers currently face: namely, fixed prices; procurement quotas; and imposed crop rotations that have limited their production options, their ability to accumulate reserves, and their access to credit. This project does call for a "farmer responsive agricultural credit system" and the rationale seems to be that credit will be required to put new technology to use and for irrigation investments at the farm and mesqa level.

B. Cost Recovery and Participation under RIIP

A farmer responsive agricultural credit system in an environment of loosening price controls can be an instrumental vehicle for cost recovery. The EWUP report concluded that farmers are willing to cooperate; to maintain and to operate an improved system facility such as the one in El-Hammami, a vegetable growing area where farmers are not subject to direct price controls.

Greater clarification of what cost recovery will be tied to under this project should be spelled out during the initial stages of RIIP in order to assure some assessment of the social and economic impact of system improvements.

C. Farmer Receptivity and Extension

Technical adoption of new practices is also limited by factors beyond farmers's control. The farmer will adopt practices which are financially attainable. However, the availability and supply of a new technology may be beyond his control. For instance, one of the EWUP findings was that land leveling was seen as extremely beneficial by the farmers. They stated that they would continue the practice if the equipment were available. In fact, EWUP staff reported shortages of equipment. They also reported that "the introduction of new agronomic inputs was made more difficult because many of these items were unavailable at the cooperative."

This raises the question of the role and efficiency of the current extension program which, if operating optimally, would provide the farmer with necessary technical information on new practices. If extension work is weak, adoption and dissemination of new techniques will be questionable.

D. An Obstacle to Diffusion: Staffing Problems in the MOI

One of the obstacles to diffusion of new technology at the local level is the shortage of engineers in Egypt, and especially a shortage of those trained in water management. The Ford Foundation Study reports that as many as half of the MOI's engineering positions are unfilled at the field level and that until recently, positions were filled with reluctant graduates in civil engineering who by law were required to

work for the government for two years after graduation before escaping into more lucrative private practice either in Egypt or abroad.

Those trained irrigation engineers who are assigned to districts confront the normal problems faced by even the most dedicated civil servants. These persons are assigned to areas not of their choice; are underpaid and often must supplement their income from other activities. They lack support staff such as surveyors and are subject to contradictory pressures. Even if every district engineering post was filled with a trained, dedicated and properly compensated irrigation engineer, this person would still face a huge task of supervising the water delivery system for between 20,000 and 100,000 feddans. It is unlikely that this person could respond with the necessary flexibility to the needs of farmers along all the mesqas in the district. The clear implication of this situation is that proposed project activities that would rely heavily on local MOI personnel or that would increase the workload or responsibilities of the district engineer would probably not be very feasible. Yet, the third element of the strategy for this project is to involve MOI staff in actions and activities that focus on the total irrigation system rather than just the water delivery system. This implies increased workloads.

RECOMMENDATION

The project should be incrementally tailored to the realities of the MOI staffing capability. Serious consideration should be given to utilizing staff with special training and experience in working with farmers to help evolve new or strengthen old irrigation groups. In most cases, simply adding this critical task to the schedule of busy irrigation engineers or agricultural extension workers will fail. Not only will the demands on their time limit serious attention to these matters, their lack of experience and skills in this area will hinder success. While this may be readily apparent in the case of engineering staff, it should also be noted that it often applies to extension staff. The basic task in working with irrigation groups is not disseminating information (the task for which extension agents are trained), but assisting in identifying group tasks, resolving conflicts and competition, imparting leadership skills, and fashioning appropriate organizational structure and procedures. These are difficult tasks, not to be uncritically assigned to whichever staff members happen to be physically closest to the farmers.

E. An Obstacle to Diffusion: Lack of Collaboration Between the MOI and the MOA

Another obstacle to technology diffusion in this project could be the lack of collaboration between the MOI and the MOA. This was revealed by the EWUP evaluation team. It is a critical factor in this project because the way in which tasks are to be accomplished is principally through collaboration between the MOI and the MOA. The project states that it will "plan, design, and construct an improved operationally efficient irrigation system in selected canal commands throughout the country, including formal organizations of farmers to liaison with MOI and MOA, and involvement of MOA in on-farm water management." The EWUP team reported that under the EWUP project, some MOA personnel were detailed to work with MOI. The collaboration that did exist during EWUP, such as equipping a major laboratory at the Soil and Water Research Institute,

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project training of non-MOI personnel and the loan of farm leveling machinery from MOA, does not seem to be continuing (even under IMS). There seems little doubt that both inter-and intra-institutional competition over limited resources is a large part of the problem. When clearly allocated project funds are provided for collaborative tasks, common effort occurs. As soon as outside funding is removed, each Ministry seeks to guard its resources for its own activities and personnel. The same is true even within Ministries -- between divisions and professions -- in matters such as incentive pay or allocation of higher echelon positions.

IV. SOCIAL CONSEQUENCES AND BENEFIT INCIDENCE

A. Differential Access and Benefits From Irrigation

Access and benefits from irrigation affect different groups in different ways. The design recognizes that under a rotation system 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.

One of the problems identified by EWUP was that of water shortages at the tail end of some branch canals. EWUP staff observed that there was substantial water shortages during the summer, for example, at the lower end of El-Sheni Canal in the El-Mansuriya site. El-Mansuriya farmers at the lower ends of the canal expected lower yields of maize compared to farmers at the upper end.

The ultimate decision concerning water shares will be made based on long-standing local views and tradition on the sharing of this resource.

The issue of equity often surfaces in discussions of head and tail users of an irrigation waterway. Occasionally, equity is expressed in terms of farm categories--ensuring equity for small farmers vis-a-vis large farmers. The projects efforts to provide equal access of water to farmers all along the mesqa will disrupt the status quo. Farmers who feel that they will "lose" by the changes will resist them. For this reason, this project should establish a research activity within WRC for the (1) identification of existing rights, (2) recognition of the changes in these rights that are implicit in the anticipated design, and (3) adaptation of these changes to increase acceptance of the change by the affected parties.

RECOMMENDATION

One of the on-going data collection activities of this project should be the determination of the economic benefits accruing to farmers from an equitable water distribution. Actual estimates should be calculated to assess returns against costs incurred. Farm records and surveys would provide a framework for data collection. This type of project activity could build on the foundation laid by the EWUP project in data collection.

B. Beneficiary Groups

The purpose of this project is to improve the entire water management system so that new practices will be replicable and sustainable on a significantly wider scale.

There are some readily identifiable beneficiary groups. One of the groups to whom permanent and direct benefits of the project will accrue will be the numerous MOI technical personnel who will receive substantial formal and on-the-job upgrading of their professional skills.

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Another readily identifiable group of beneficiaries will be those farmers directly affected by farm trials. These trials will vary, for example, from direct agronomic field trials to land leveling, to various experiments and improvements of mesqas that should probably affect thousands of feddans and large numbers of farmers. The exact nature and duration of the benefits themselves will be realized over time.

RECOMMENDATION

In order to assess either system benefits or social costs in the long run, the project should be prepared to gather data for analysis of the entire production system. The project will have to examine on-farm production as a total economic system in order to determine with some precision the economic benefits accruing to the farmer.

A causal relationship between improved water efficiency and yield will have to be established at the field level, if efficient water use is stated as the primary factor behind an increase in production.

Farm budget studies--which form the foundation of a project's cost-benefit analysis--should be conducted with an eye to a farmer's location within the system. It is preferable to design sample farm budgets for three reaches of the watercourse: (1) head; (2) middle; and (3) tail. With different assumptions about water losses along the system and about the degree of water control, it will be possible to derive a reasonable set of expectations regarding project performance.

A number of working models are proposed for this project. One of these models is the "individual farm model" which will be designed to project major changes in cropping patterns in response to changed water availability. It is possible that the data suggested above could be gathered under this model.

The development of an additional model, a water response model, to identify the relative contribution of improved irrigation practices should be taken under consideration as a useful management tool under this project. Again, it may be possible to gather data along these lines under the individual farm models already proposed for the project.

C. Water User Groups

USAID's experience with expanding and strengthening water user groups was through the EWUP project. EWUP began with numerous expressions of the lack of cooperative associations among farmers. For example, Staff Paper #1, p. 4 states that "the lack of social organization among farmers, formal or voluntary, causes communication problems and does not promote cooperation among the farmers with respect to water use." In contrast, by the end of EWUP, it had been recognized that not only are there traditional farm organizations that control shared access to and use of the saqia, but that these were of direct relevance to project activities.

What EWUP really demonstrated was that farmers needed to organize themselves in order to interface with MDI representatives. The project accomplished this by establishing, largely through the efforts of the sociological teams, water users' association and councils which met with EWUP personnel, to established on-site procedures to regulate the distribution of water among farmers along project improved canals (mesqas). As such, EWUP demonstrated that such associations could be formed and were a valuable, and probably crucial, mechanism to better water management. EWUP also demonstrated that the way to organize such associations is around the demands of a new technology crucial to their farming operations.

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What EWUP was not able to create a replicable process for the organization of local water user associations and their interface with MOI for extension to an entire region for several reasons. First, it was based on the input of quantities of concentrated efforts by trained personnel that would reach astronomical numbers if required a nationwide effort.

Second, there still exists limited willingness on the part of many engineering and agronomic technicians to share decisions with farmers. The willingness of EWUP technicians to restrict their own decision making prerogatives was only developed over time and within the context of this very special project.

Third, as constituted, the associations still do not directly speak to those who control the water, the MOI engineers. Under the project farmer groups largely depended on the guardianship, goodwill and often personal sacrifice of EWUP sociological team members to act as intermediaries for them.

These problems were recognized in several internal EWUP documents. For example, F. Santopolo's memo 7/28/82 notes: "Two major questions need to be answered concerning farmer organizations. One concerns the legal structure of these organizations...Without some legal recognition these organizations will not be functional." George Radosevich, summed up as follows: (11/17/82 memo) "With irrigation, the sheer numbers of water users is too great for one-on-one contact between the governmental agency and irrigators; some organizational structure needs to be established in which the program components can be allocated and channels of communication, cooperation and coordination set."

The continued need for the mediation of the EWUP sociological team revealed that the informal organizations were not yet permanent self-sustainable institutions vis-a-vis the MOI. Analysis of project activities indicated that while most MOI technicians were willing to use the sociologists and the water groups to help convince the farmer of his responsibilities, few of those MOI technicians were prepared to accept the legitimate role of the water user groups for feedback on their own responsibilities.

RECOMMENDATION

The project should work with the MOI in obtaining official recognition for Egyptian water user groups as they exist along the different locations of the irrigation waterway. Official recognition would include the application of new procedures that clearly define the rights and obligations of both the water users and the local MOI officials vis-a-vis each other. The ultimate goal would be to establish a direct working relation between water user groups and MOI engineers. Effective water user groups are very critical to the application and institutionalization of an improved water management system.

Disbursement Method for Construction Services

The system to be used for irrigation improvement activities (SR, RIIP, and Preventive Maintenance) and for minor buildings will continue to be the "percentage of actual cost reimbursement procedure," an alternative to the "pure" FAR as described in AID HB 3, Annex J, paragraph D.3. This alternative method has been used since the inception of the Project. A separate implementation letter will clearly define the system to be used for each sub-project activity.

In summary this alternative FAR method provides that AID pay a fixed percentage of the actual cost of each GOE construction contract as work progresses with the full AID contribution payable upon completion. If the work is not completed, AID is entitled to full reimbursement of amounts paid. The amounts for budgetary purposes are derived as follows: Structural Replacement--the annual amount is based the projected total disbursements over one year; RIIP--the amount is based on the estimated cost of improving a canal command; minor buildings--the amount is based on the estimated cost of the structures. All of these improvement activities solicit bids for the work competitively from local contractors following established GOE procurement procedures. The actual cost is determined in the contract (fixed price contracts are usually used using the unit price mechanism as described in AID HB 11, Chapter 2, Section 3.3.3.). A detailed description of the system used in the Structural Replacement component of the Project will serve as an illustration of the direct reimbursement disbursement method to be followed.

Reservation of funds is based on an annual program agreement (APA) between AID and MOI for the portion of SR construction to be executed that year. APA's in the form of Project Implementation Letters set forth the overall budget of the MOI SR Program for the upcoming year and specify the levels of total MOI and AID funding available for structures in each Directorate.

The MOI is currently reimbursed 80 percent of their actual expenditures for each contract. Reimbursements are made each quarter based on MOI certification of actual work completed during the reporting period.

The commitment of AID funds is undertaken on the understanding that it is the intent of the GOE to increase steadily the MOI budget for structure replacement (SR) year by year so that by GOE FY 88/89 the unreimbursed portion of the MOI budget in combination with other direct MOI budget allocations for maintenance will sustain the system once the SR backlog has been eliminated.

The "pure" fixed amount reimbursement method (FAR) was considered for application on the project. Due consideration was given to the number, diverse nature, and specific characteristics of the irrigation system. The project has about 9,500 structures in the structural replacement component alone. These structures are designed to meet the specific needs of the irrigation system. Although standard designs are used when practical many of them need to be tailor-made to fit the system. The structures are located along the entire length of the Nile and irrigation service system. The vast majority of them are away from the main roads and are remotely accessible. The RIIP and Preventive Maintenance program are similarly diverse and remote. The pure FAR method requires accurate cost estimates prior to commencement of construction and certification of completion of each construction activity before payment can be made. The manpower requirements to perform these tasks would be awesome. Therefore, the pure FAR method, although appropriate for less numerous, more localized, and uniform construction, is not appropriate for construction of

thousands of diverse, remote construction works on a nationwide scale. AID and the MOI have mutually approved a set of design, contracting and inspection standards that will govern the construction process. The supervision of construction will continue to be the responsibility of the MOI with assistance of the technical advisors and spot checks by AID personnel.

In contracting, the MOI will continue to follow standard GOE procurement practices and regulations. These include competitive procurement of construction services. We estimate that imported shelf items will not constitute more than 25 percent of the commodity element of any project.

In the past, the Project financed numerous relatively small construction contracts. Recent evaluations have recommended that the quality of construction work would be greatly improved if the average amount of the individual construction contracts was increased. An increased contract amount would improve the engineering expertise going into each contract.

Per standard MOI practice once contracts are awarded, the construction work will be inspected by the District Engineer and his assistants under the supervision of the Director of Works and the Inspector. Contractors will receive mobilization advances with contract progress payments at one month intervals pursuant to reports made weekly by the site inspector. Upon completion of work by a contractor a final inspection will be carried out by the supervising engineer who will make the decision on final acceptance and payment for a construction project. A five percent portion of the cost of each project will be withheld from the contractor for one year following the completion of construction. During that time the contractor will be responsible for the soundness of the structure. At the expiration of that period a final inspection will be conducted by the MOI before the final payment is released. If the project is not completed then all amounts paid for the project shall be reimbursed to AID.

Quarterly reports of expenditures are provided to USAID reflecting the APA budget and showing disbursements by Directorates and category of structure for the quarter in question and total for the year to date. Reimbursement to the MOI is made quarterly within the overall limits agreed to, or as amended in the annual agreements.

Each quarterly report is accompanied by a certification from the Undersecretary in charge of each Directorate for which disbursement reports are submitted as follows:

Form 1---Description of Contract Estimated Payable Items

Form 2---Description and Status of Structures in Contract

Form 3---Progress Payment Report Certification---"All construction represented on this report has been constructed by the Contractor in full compliance with standard MOI specifications and with plans and/or specifications specific to each structure."

Undersecretary of State

Form 4---Cumulative Progress Report

Form 5---Cumulative Expenditure Statement

Form 6---Cumulative by Contract Expenditure Statement.

The originals of the above forms are maintained in the SR Project Office with a copy submitted to the USAID/AGR/ILD Office accompanying the Request for Payment.

The reports shall be consolidated and forwarded to AID by the SR Project Director with a request for reimbursement along with the following documentation:

Documentation for Payment From SR Central Office:

The documentation required to be submitted to USAID for payment are as follows:

Cover Letter---Explaining Contents of submittal

Form SF 1034---This is a Voucher Form which has entered onto it a description of the claim for payment, amount to be paid, and payees address.

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Certified Fiscal Report---This report lists the total approved budget of earmarked funds, expenditures during the quarter, and total expenditures to date. This report must be accompanied by the following original certification: "The undersigned hereby certifies that payment of the sum claimed under the Grant/Contract is proper and due under the terms of the Grant/Contract and/or Amendment; the appropriate refund to USAID will be made promptly upon request in the event of disallowance of Amendments; that information on the fiscal report is correct and supported by accounting records, invoices and receipts; and that such additional detailed supporting information as the Project Officer may reasonably require will be furnished by the Grantee/Contractor to USAID upon request.

By: _____
 Title: _____
 Date: _____

Form 4---Cumulative Progress Report
 Form 5---Cumulative Expenditure Statement

The above documents after review by AGR/ILD are submitted along with the Project Officer's certification to the USAID Financial Management Office for review and processing for payment.

To provide senior responsible managers of the MOI and AID assurance that a satisfactory level of quality control is being exercised to meet MOI specifications, evaluations of SR performance will be carried out periodically. In addition routine site visits will continue to be conducted by AGR/ILD and the consultant staff. During these visits structures are randomly selected which allow inspections of structures during various stages of construction.

Through continued use of the GOE's procurement procedures and use of MOI standard building designs and specifications(as prescribed in the original AID Project Authorization - Annex A), supported by the quarterly reporting system, monthly construction inspections, and periodic in-depth field review, it is the Mission's opinion that sufficient scrutiny is taking place to assure implementation of the project.

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Planning Studies and Models
Technical Assistance Needs
Scope of Work

The Water Planning Group (WPG) is a unit within the Planning Sector of the Ministry of Irrigation (MOI), which is responsible for National Water Resources Planning. The WPG conducts studies on the national water supply and demand. In addition, the WPG develops planning tools and large-scale mathematical models for: (1) River Nile inflow prediction at Aswan; (2) High Aswan Dam (HAD) operation; and (3) Irrigation System Operation and Management.

The WPG is attempting to adjust some of the models to assure use by the water system operating departments of the MOI. Technical assistance is needed to conduct this adjustment. This assistance includes planning studies using the existing models, further upgrading of the models and development of other new and complementary planning tools and mathematical models.

Two experts are needed for three years each to work with the WPG in implementing the tasks. The positions of the two experts require high expertise in mathematical programming and modeling techniques of water resources systems.

The position of the first expert is (Hydrologist - Systems Engineer) and requires an experience in reservoir operations and inflow predictions. Specific tasks for this position are as follows:

- (1) Assist in the development of methodologies and procedures for risk evaluation of the operating rules for Lake Nasser. This study would use synthetic flow data and employ dynamic programming to derive operating rules with acceptable levels of risk. Four existing models will be used in this analysis: Lake Nasser simulation model, steady state stochastic dynamic model, adaptive closed loop operation model and a multi-lead forecasting model.
- (2) Assist in the development of methodologies and procedures for an analysis of conjunctive use of the over year storage potential of Lake Nasser and the Plateau Lakes. The Upper Nile model and Lake Nasser models will be used in this analysis. Various schemes for operating Lake Nasser are to be studied in detail to identify those of maximum benefit to Egypt. This will require a simulation model of the entire river basin. The existing models will provide the necessary components of the total system.
- (3) Assist MOI personnel and USAID teams in preparing IFB's or RFP's for additional modeling activities to be done by contractors. These activities include:
 - Conjunctive use of groundwater storage;
 - Runoff estimation of the Nile watershed using satellite imagery and other remote sensing techniques;
 - Preparation of a monograph depicting the Egyptian experience in modeling of water systems.
- (4) Assist in setting training programs for national staff in water resources systems analytical techniques, and development and use of models.

ANNEX L

- (5) Coordinate the modeling activities funded by the UNDP with those funded by USAID. UNDP activities include providing menu-driven, user friendly versions of the existing models, improved user and program documentation; training workshops in use of models; and transfer of all models from HP/3000 mini computer to the IBM AT micro-computer.
- (6) Assist the WPG Director to organize and monitor work activities relating to models and model studies.

The position of the second expert is (Irrigation-Systems Engineer) and requires experience in irrigation/drainage networks systems operations. Specific tasks for this position are as follows:

- (1) Assist in the development of methodologies and procedures for the analysis of the effect of proposed new land reclamation projects and changes in cropping patterns on the water supply and delivery system. The objectives of such an analysis are to identify system bottlenecks, additional capacity requirements and new irrigation facility requirements. The WPG's planning distribution model is to be used for this analysis. This model consists of two submodels, a water balance sub-model for the 50 canal command areas, and a distribution submodel to compute canal flows based on calculated demands and other system constraints.
- (2) Develop methodologies and procedures for an analysis of the reuse of drainage water for irrigation. The planning distribution model is to be used to evaluate the ideal location for drainage reuse, exchange and mixing opportunities with fresh water, and effect on the delivery system.
- (3) Assist in an analysis of the irrigation system rehabilitation program. The planning distribution model is to be used to identify problem structures and canal reaches.
- (4) Assist the UNDP activities to set up a channel measurement unit to provide discharge and other data inputs of sufficient accuracy and detail for the application of the planning distribution model, extended to subcommand areas.
- (5) Assist the WPG in analysing and filing the collected hydrological data inputs according to U.S.A. standard procedures.
- (6) Assist in the adoption, if feasible and advantageous, of the canal command models developed by Utah State University. The model consist of various components and a determination of which component should be adapted to Egypt is necessary. The model is to be calibrated once the components are identified. This model should complement the planning distribution model and be altered to use the WPG's data base for input data.
- (7) Assist the WPG to identify and arrange for the required TDY assistance needed to address specific design and modeling.

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Scope of Work
For Preparing Required Procurement Documents

I. Services to be Provided by the Contractor (herein referred to as "The Team")

A. General

1. The Team will use AID procedures in developing procurement documents. The mode, whether AID direct or host country, will depend on the specific circumstances of each procurement.
2. The Team will prepare solicitation and procurement contracting documents to acquire technical services, training, and A & E and commodity procurement services to support new and/or expanded components as provided for in the IMS Project (No. 263-0132). The precise combination of contracts resulting from the solicitations for procurement will be determined after review and analysis of project documentation by the contract team.
3. All procurements prepared by the Team must comply with U.S. Government procurement regulations.
4. The Team will identify areas particularly suited to disadvantaged and minority businesses and local Egyptian firms.
5. All procurement documents to be prepared by the Team will include provisions for overall plans of work, annual plans of work, procurement plans and schedules, training plans and schedules, plans and schedules for construction and installation services as appropriate to the respective components. These will be subject to the approval of both USAID and the MOI.
6. Each solicitation document will contain provisions to obtain the services of both residential and short term technical assistance (TA). Contractors will be responsible for assisting the GOE Project Directors with technical assistance needs and with management of the respective solicitations. Contract documents to be developed will contain reporting provisions to keep both AID and the MOI appraised of contractor progress. These documents will indicate that: (1) the TA staff will be responsible for preparing technical specifications for AID funded commodity, installation and construction procurements regardless of the administrative avenue used for procurement; (2) TA staff also will be responsible for assisting with planning and management of training activities both in-country and off-shore; (3) other provisions as necessary for the successful performance of each activity for which services are being solicited.
7. The Team will prepare solicitation and contracting documents for obtaining commodities for each component in conjunction with the TA contracts and separately through Procurement Services Agent (PSA) contract. Services are to include preparation of bid documents, notifications through advertisement, bid evaluation criteria, etc.

8. Solicitation and contracting documents will contain provisions for procurement of both degree and nondegree training. Training procurement services to be developed include: curriculum development, identification of appropriate training institutions, administrative processing of participants, development of in-country training programs and management of academic degree programs in U.S. Universities. For AID financed contracts, the preferred method of committing funds is through an AID Direct Letter of Commitment. However, for university contracts a Federal Reserve Letter of Credit is generally used. Training outside Egypt will follow regular AID participant training procedures whether administered directly by AID or the contractors.

B. Specific

1. For each component the Team will develop Requests for Proposals (RFP) for Direct AID Contracts and Requests for Technical Proposals (RFTP) for Host Country Contracts.
 - a. Determine type and level of effort of technical assistance.
 - b. Include mechanism for procurement or arrangements for procurements of commodities, equipment, and training required by each component.
 - c. Prepare an indicative list of commodities and specifications required for each component.
 - d. Identify areas where staff training is required for each component.
 - e. Investigate use of two envelop bid process, advise on its suitability, and include a weighting factor for price in the evaluation criteria.
2. For each RFTP, RFP, or IFB the Team will:
 - a. Prepare advertisements for solicitations of expressions of interest for each component.
 - b. Prepare prequalification questionnaires and evaluation criteria for short listing firms for each component.
 - c. Prepare Scopes of Work as required for each component.
 - d. Prepare Commerce Business Daily advertising notice.
 - e. Prepare evaluation criteria for ranking firms for each procurement action. For activities where price is the main criteria (i.e., commodity IFBs), identification of minimum requirements must be made clear (i.e., amount of bonds, warranty requirements, local agent and servicing, etc.). A standard chart will be developed for each contract keyed to the evaluation criteria. A weight will be assigned to each criterion or group of criteria which must also have previously been clearly stated in each procurement document giving each offer an equal notice of the criteria being used, in the award evaluation.
 - f. Prepare contract documents following AID Guidelines, and incorporating appropriate FIDIC language that will result from each procurement action.

- g. Suggest areas where use of local expertise is appropriate for consideration in the various components (i.e. local consultant for construction supervision, local equipment services, etc.).
 - h. Review background documentation describing each component and related activities.
 - i. Coordinate with appropriate MOI, AID and contract officials.
3. The following is specific to Invitation for Bids (IFB), Systems procurement to support Main Systems Management Component.
- a. Although commodities may make up the bulk of the costs of the systems to be procured, this is not to be treated as a commodity procurement.
 - b. The procurement documents shall be defined as the procurement of an operational system. Progress payments will be defined based on the attainment of certain milestones in the development of the system.
 - c. In defining the components of the system, performance specifications may be utilized.
 - d. Investigation of the use of a turnkey type contract will be made and appropriate justification given, if found most suitable.
 - e. If a turnkey contract is recommended, develop the scope of work and qualifications of personnel required for supervision and recommend the method of procuring these services.
 - f. Investigation will be made of the possibility of using the two stage bidding procedure, as described in AID Handbook 11.
 - g. Training requirements to be performed by the contractor shall be identified.
4. Request for Technical Proposals, Construction Supervision and Management (this will be combined with the RFTP for overall contract services for the Professional Development component).
- a. Although this procurement is supportive of the establishment of the National Irrigation Training Institute (NITI) of the Professional Development component, the actual work TA requirements to be developed also include A & E Services/ Construction Supervision and Construction Management Services for design and construction of the NITI.
 - b. A request for proposal for A & E/ Construction Supervision services will be developed incorporating, as appropriate, site information and design work already performed by the MOI.
 - c. In preparing the Scope of Work for the A & E/Construction Supervision Firm, attention will be given to the items discussed in AID Handbook 11, Chapter 2, Section 3.1.
 - d. Prepare a Scope of Work for a construction management advisor who will interface with the GOV, A & E/Construction Supervision Firm, and AID.

This advisor will review and clear all documentation to insure its accuracy related to the construction activity before submission to AID.

5. For the Survey and Mapping component the Team will prepare draft procurement documents for aerial photography and production of maps from aerial photography for the cultivated parts of the country. Also develop an indicative list of equipment and specifications required for this component.

II. Specific Project Components (Brief Description)

The Team shall prepare a set of procurement documents (IFB, RFP, RFTIP and investigate use of two envelope process for technical and A & E services) to support each of the following project components for technical assistance, training services, and commodity procurements. IFB documents are also to be prepared for several large procurements requiring installation services. A description of the various tasks is given in more detail in section I. Following is a listing of components which require preparation of procurement documents.

Approximate Value (\$ Million)

<u>Component</u>	<u>Technical Assistance</u>	<u>Training Commodities</u>	
RIIP	10.0	2.5	10.5
Water Research Center	11.0	9.5	8.5
Preventive Maintenance	5.2	1.7	29.2
Professional Development	6.9*	2.2	2.3
Main System Management	5.2	0.5	10.9
Survey and Mapping	2.4	0.3	3.2

*Includes A & E Services, with construction additional.

III. Documentation and Coordination

The procurement documents will be submitted to AID in draft as work under each activity progresses.

AID comments on drafts will be reviewed and incorporated by the Team in a final draft to be reviewed and accepted by AID prior to presentation of a final document for each activity.

The Team will coordinate its activities with AID (AGR/ILD), MOI (Specific Project Component), and AID Contract and Legal Advisors.

IV. Personnel

The work will require a team of experts in order to complete the required documentation. Team members will include:

<u>Expertise</u>	<u>Background</u>
Team Leader:	Experienced in AID procedures and in the preparation of a variety of procurement documents described above.
Civil Engineer:	Experienced in equipment specifications, construction management, canal automation, telemetry and associated procurement documentation.

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Irri. Management: Experienced in developing plans of work for specialized large scale Irrigation Rehabilitation Programs in developing countries. To include experience in on-farm water management as well as operation of major delivery systems.

Training Spec: Experienced in developing training systems especially as they relate to irrigation.

Survey & Mapping Specialist: Experienced in determining survey equipment and specifications, especially equipment used in mapping and verifying satellite data related to irrigated agriculture.

V. Duration of Services

It is expected that the full team will be required in Egypt for approximately three months to prepare all documents in final draft. After the departure of the team, six weeks will be required for AID and MOI to review all final drafts. The team leader and specialist as necessary will then return to Cairo for approximately six weeks to finalize all documents.

Attachment 1
Scope of Work for Preparation of
Procurement Documents
PIO/T 263-0132-3

I. Project Background

A. Egypt's Irrigated System

The irrigation delivery system, starting at Aswan Dam, runs the full length of the country. The system has 48,000 km of large public canals and drains with 22,000 water control structures, 80,000 km of private mesqas and farm drains, and 560 large public pumping stations providing water to 5.8 million feddans.

The Ministry of Irrigation is responsible for all aspects of the irrigation and drainage systems--planning, design, construction, operation, maintenance, and management. To administer the irrigation system the Irrigation Department has 19 Directorates (essentially the same area coverage as Governorates), 48 Inspectorates and 167 Districts.

Farm sizes in most of the area are small, 95 percent of the farms being of five feddans or less. The traditional method of irrigation consists of dividing the land into small basins of a size of about 10 m x 10 m and providing water to basins in sequence.

B. Problems to be Addressed

In general, there is poor management and application of water at the farm level. This poor management is caused by problems which emanate from the delivery system (maintenance, scheduling, operation), and from a lack of coordination and cooperation between farmers on the mesqa and MOI personnel. There is also a lack of knowledge of the correct soil-water-plant relationships and poor drainage in many areas has decreased crop yields. There is need to improve the total agricultural irrigation system from the farmer's fields to the major delivery system.

Specific problems with the irrigation system are:

(1) physical--not enough control structures in the system and lack of adequate maintenance, an expandable but finite water resource, and lack of reliable data for decision making; (2) technical--staff are not current on modern irrigation technology; (3) managerial--modern management techniques are not uniformly employed; (4) institutional--salary and incentive structure are inadequate to get proper performance from the staff; and (5) communications--there is a lack of interorganizational communications between units within MOI and between MOI units and those of MOA where collaboration is essential to efficient on-farm water use; and (6) sociological--there is inadequate channels of communication between MOI and waterusers for efficient coordination in the delivery system and for transfer of technical information.

C. Basic Objective of Project

The GOE has assigned sole responsibility for the water delivery system to the Ministry of Irrigation. This responsibility is exercised through a set of primary functions common to any irrigation system-- planning, design, operation, and maintenance. It is the basic objective of the IMS Project to strengthen these primary functions in order to remove the identified constraints and improve the performance of the irrigation system.

D. Present Contract Services

Contract Services are currently being provided through an AID-financed host country contract with a U.S. firm selected through the competitive selection procedures set forth in AID Handbook 11, Chapter 1, and by a direct AID Contract with a Title XII University consortium.

Evaluations have been funded by AID direct contracts. Services currently being provided include technical services, training and commodity procurements.

E. Project Components

Detailed information is included in the Project Paper (Irrigation Management Systems Project 263-0132). However, a brief description of the project components requiring preparation of procurement documents follows:

1. Regional Irrigation Improvement Project (RIIP)

The RIIP program is designed to integrate the rehabilitation and improvement of the delivery system infrastructure with improvement of the farm delivery system and management practices. With these improvements to physical works and operational procedures, the objective of the program is to increase agricultural output within the improved systems, conserve water for use in expanding agriculture, and improve equity among farmers. The national purpose is to increase overall food production and decrease importation of food.

2. Water Research Center (WRC)

This component is designed to provide technical assistance, training and commodity to the WRC for accomplishment of MOI research objectives. The objectives of this component are:

- a) To research to provide solutions to the problems facing the MOI in its activities for the control, use and development of Egypt's water resource for Egypt's economic and social development.
- b) To research to provide answers to key policy issues in the irrigation sector.
- c) To develop the long term capabilities of the WRC and its Research Institutes to provide the MOI and Egypt solutions to their irrigation and water use problems.

3. Preventive Maintenance

The objectives of the Preventive Maintenance component is to develop and implement an integrated system for upgraded maintenance of the irrigation system, initially in Gharbia Directorate which is currently under implementation. A country wide preventative maintenance program is to follow for the Irrigation Department for the remainder of the country.

Another objective of this Component is to assist the MOI and IBRD in a channel maintenance effort. The IBRD component would: (1) assist MOI in introducing maintenance methods appropriate to current needs; strengthen the existing institutional capacity of the agencies concerned with project implementation, (3) increase the productivity of the staff and equipment of the PECs involved in channel maintenance, and (4) shift a portion of the maintenance from PECs to private sector firms. (PEC-Public Excavation Company)

4. Professional Development

The objective of this component is to institutionalize a multi-disciplined training program to serve the total needs of the MOI by establishing a National Irrigation Training Institute. The component includes AE services and construction funding for buildings, technical assistance for establishment of the Institute and commodity and training support.

5. Main System Management

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 expansion of the Nile River Irrigation Data Collection System (NRIDCS) which is a 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. This component will also provide funding for communications enhancement automation of a pilot command area and related activities.

6. Survey Equipment and Mapping

The objective is to make maps and aerial photographs of high quality available for use for irrigation improvement and for other development purposes. This objective will be achieved by the Egyptian Government Survey Authority (EGSA) through a series of contracts that will acquire mapping products (aerial photography,

orthophoto or digital maps) and through institutional improvement of EGSA itself through equipment and training, much of which will be supplied/performed by the contractors.

The specific outputs of the project will be:

- a) New cadastral maps of scale 1: 2,500, and Land Registers for about 4,000,000 feddans (about 16,000 square kilometers) of the area of the Nile Valley.
- b) Updating cadastral maps and Land Registers in about 4,500,000 feddans (about 18,000 sq. kms.) of the area of the Nile Valley.
- c) Large-scale contour maps of 1:10,000 scale for the area of the Nile Valley and its near surrounding land (about 50,000 sq. kms.).
- d) New maps of 1:500 or 1:1,000 scale for the 4,000 towns and villages in Egypt.
- e) An EGSA staff trained in modern survey and mapping techniques and suitability equipped to maintain and update the mapping system and the mapping products developed under the Project.

IMS Project--Target Benchmarks

ANNEX N

ITEM	1987	1988	1989	1990	1991
1. GENERAL					
Special Fund	MOI develops a plan, obtains AID approval, and implements setting up a special fund with each Project Director for payment travel, per diem and other special field costs.	Special fund established and fully funded for each Project Director.	Special fund replenished for each Project Director.	Special Fund replenished for each Project Director.	Special Fund replenished for each Project Director.
Cost Recovery Mesqa	RIIP Project Director develops technical aspects of a cost recovery program for mesqa and on-farm improvement	MOI/GOE reviews proposal and prepares necessary legal documentation. Decree developed and implemented.	Farmers offered opportunity to have mesqa and on-farm improved for a specified level of cost sharing. If farmers don't agree to cost recovery, move to next mesqa.		
O & M	MOI/GOE reviews impact on farm incomes resulting from proposed policy changes in the agriculture sector.	MOI/GOE develop and evaluate alternate plans for collecting and utilizing revenues from water charges. Necessary laws put in place.	O & M collections started in project areas and/or country wide depending on the level of success of overall agricultural policy changes.		
MOI/MQA Technical Committee and Governorate Coordination Committee.	Committees established and terms of reference developed and agreed upon.	Ministerial decree issued defining roles of MQA/MOI on-farm water management and mesqas.			

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ITE.	1987	1988	1989	1990	1991
Staffing	MOI develops annual staffing plan for all components agreeable to AID including multi-discipline staffing where appropriate.	MOI staff in place for GOE FY88-89.	MOI staff in place for GOE FY89-90.	MOI staff in place for GOE FY90-91.	MOI staff in place for GOE FY91-92.
	MOI staff in place for GOE FY87-88.				
Consulting Services	Contractors procured in accordance with the Implementation Plan Schedule Monitoring staff procured and in place.				
Irrigation Pumps Project	USAID supported pumps project complete. Plans for proper utilization reviewed.	USAID pumps project completely operational and used effectively.			
2. INFRASTRUCTURE AND MAINTENANCE					
RIIP	Organizational changes to meet needed RIIP in Cairo and field implemented.			Authority to approve final RIIP plans transferred to field office.	
	Detailed planning procedures developed and agreed to by AID and TA contractors.	Planning procedures implemented on all RIIP areas.			

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ITEM	1987	1988	1989	1990	1991
	World Bank Channel Maintenance Project activated.	Plan developed to increase involvement of private sector firms in maintenance activities.	CM equipment ordered and received for use by private contractors.		
3. MAIN SYSTEM MANAGEMENT	TA consultant selected.				
Models	Work on HAD/Upper Nile models.	Four models operational for HAD/Upper Nile/Lake Nasser operations.	Models used by MOI in operating the HAD system.		
	Work on service area models	Work on service area models	Six models, including Planning Distribution Model variations, operational.	Models used by MOI in operating the water distribution system. Instructions being sent to the field.	
	Work on planning models	Planning models fully calibrated and developed.	Three planning models in use by MOA and MOI managers for analyzing agricultural policy variables.		
	Complete feasibility study of Runoff using satellite imagery.				
Telemetry	1st stage of Telemetry completed.	Data from Telemetry used to compare with ID conventional operation procedures.	Telemetry operation fully operational and transferred to ID.	Telemetry expansion completed.	

ITEM	1987	1988	1989	1990	1991
	Criteria developed for selecting areas to be improved.	Benefit/cost analysis procedures adopted to control construction program.	Joint implementation plans being prepared by MOI-MOA.	Implementation plans in process of execution.	Implementation plans in process of execution.
	Procedure and legal requirements defined for establishing WUA. Role of farmers, MOA, and MOI defined.	Farmers informally organized on masqas being improved under RIIP.	Improvement plans discussed with and agreed to by farmers.		
		WUA Decree issued.	Farmers agree to cost sharing formula.		
SR IMPLEMENTATION	Maintenance budget increased over '86.	Maintenance budget increased over '87.	Maintenance budget in excess of depreciation rate.	Backlog of SR structures eliminated.	
	1,700 structures completed.	1,700 structures completed.	Final construction contracts awarded to complete remaining 1,200 structures.	MOI continues to meet irrigation system requirements for replacement of structures and regular maintenance.	MOI continues to meet irrigation system requirements for replacement of structures and regular maintenance.
PREVENTIVE MAINTENANCE	Equipment arrives.	Equipment in service.	Evaluation order equipment for remaining Governorates.		
	Maintenance planning group established in IS, Maintenance.	Planning completed for remaining Governorates.			
	Staffing organization plan developed and approved for Gharbia.	Replication begun in other Governorates.	Replication begun in other Governorates.	Replication begun in other Governorates.	Replication begun in other Governorates.

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ITEM	1987	1988	1989	1990	1991
PPD		2 high quality studies each year.	3 high quality studies each year.	4 high quality studies each year.	4 high quality studies each year.
	Planning Sector Director expedites staff recruitment.	Staff fully trained.	PPD component Assistance terminated.		
	PPD initial experience at contracting studies out locally and internationally.	Outside resources continue to be utilized as needed.	Outside resources continue to be utilized as needed.	Outside resources continue to be utilized as needed.	Outside resources continue to be utilized as needed.
MAPPING AND SURVEY	Develop detailed work plans.	Build staff training into each contract.	Basic staff training complete.	In-service training continues.	In-service training continues.
	Contract for aerial photography.	Contract for mapping products.			
	Procure equipment.	Maps available for all agricultural areas.			
	Resident TA on the job.				
MISCELLANEOUS	Report on funds used and for what purpose.	Report on funds used and for what purpose.	Report on funds used and for what purpose.	Report on funds used and for what purpose.	Report on funds used and for what purpose.

ITEM	1987	1988	1989	1990	1991
	Flow meter test equipment procured.	Flow meter test completed.			
		Organizational changes defined to move Telemetry activity to the ID.			
Automation	Detailed plans for Salheya Pilot complete and approved.		Installation of Salheya Pilot completed.	Operational testing of Salheya.	
4. PROFESSIONAL	TA arranged and detailed training plans developed for all MOI departments.	Training plans updated annually.			NITI fully operational. Elevate NITI to authority level within MOI.
		NITI instruction started.			
5. SUPPORT ACTIVITIES					
. WRC	Complete work plans for 11 institutes.	Updated annual work plans for all institutes.	Updated annual work plans for all institutes.	Updated annual work plans for all institutes.	Updated annual work plans for all institutes.
	Area for MOA-MOI cooperation research defined.	MOA-MOI cooperation research undertaken.	MOA-MOI cooperation research undertaken.	MOA-MOI cooperation research undertaken.	MOA-MOI cooperation research undertaken.
		Private firms and/or Universities utilized for research.	Private firms and/or Universities utilized for research.	Private firms and/or Universities utilized for research.	Private firms and/or Universities utilized for research.

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CONCEPT PAPER
AMENDMENT TO THE IRRIGATION MANAGEMENT SYSTEMS PROJECT
(263-0132)

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CONCEPT PAPER
Amendment to the Irrigation Management Systems Project
(263-0132)

I. Introduction

The USAID/Cairo Agricultural Directorate is responsible for assisting the GOE to identify and remove constraints to agriculture production. The Directorate has carried out a series of studies over the past 18 months to identify the major constraints to agricultural production, both water and non water. The specific constraints in the irrigation sector have been identified and the effectiveness of USAID's approach to date has been evaluated by carrying out three separate project evaluations, a training needs assessment of the Ministry of Irrigation (MOI), and a comprehensive overall irrigation sector review.

The agricultural production over the past 10 years has remained essentially stagnant, and real growth from 1980-84 has been negative. Recent analyses clearly indicate that the reason for this is that the policy environment has remained virtually unchanged for over a decade and is not conducive to improving agriculture production.

The current policy structure, founded in the egalitarian aspirations of the 1952 revolution, maintains a centrally planned, state controlled environment which strips farmers of incentives for increasing economically productive investments. The government system dictates cropping patterns, use of inputs, and availability of transport. Many farmers are forced to grow crops which do not maximize financial returns. The government sets farm gate and retail prices on many inputs and outputs, and mandates the end use of a large number of agricultural products, including levels of exports.

Until this stifling policy structure is modified, significant increases in agricultural production will not be achieved. As has been clearly demonstrated by USAID/GOE projects and horticultural production projects, both of which operate under less restrictive market conditions, Egyptian farmers will aggressively respond to an incentive based policy environment. Technical studies indicate that if market forces were allowed to operate, farmers would make investments and utilize existing technology, resulting in increases in revenue of over 50 percent.

The purpose of this paper is to lay the foundation for preparing a Project Paper Amendment for the Irrigation Management Systems (IMS) Project expanding it to assist the Ministry of Irrigation improve its effectiveness in implementing its program. In addition the amendment will be used to justify the obligation required for FY 87.

The continuation and expansion of the IMS project will assist the MOI in preparing the water delivery system to respond to the needs of the farmers to allow increased production to come about. This Project, in conjunction with the other ongoing or proposed USAID agriculture projects, indicates USAID's willingness to significantly increase its support to the overall agriculture sector as the needed agriculture policy changes are put in place. The constraints in the irrigation sector that this paper and the IMS project address can not be treated in isolation from the nonwater constraints. That is, policy changes within the overall agricultural sector will affect the effectiveness of all of our agriculture and irrigation projects.

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II. Problems Statement

The agricultural production in Egypt needs to be increased to reduce food importation and increase the export of agricultural products in those areas where Egypt has a comparative advantage. The technology is in hand to move Egypt out of its current heavy dependence on food imports. However, as the proper policies and non water related technologies are put in place, water and the root zone environment (drainage, salinity, timely irrigations) in their current condition will prevent attainment of maximum production levels. As such water, which is a limited resource in Egypt, and its management are the ultimate limiting factors to agriculture production in Egypt.

Egypt is almost totally dependent on inflows from the Nile River fed by precipitation outside the borders of Egypt. Egypt's share, set by international agreements, is 55 billion cubic meters per year which represents about 95 percent of Egypt's total water resources. In the past, water has essentially been taken for granted without adequate planning until shortages begin to occur. Since the construction of the High Aswan Dam, Egypt has not faced serious water shortages. However, as Egypt's water requirements increase over the coming years, there is no viable alternative to significantly increase the net water supplies available to Egypt other than to improve current water use efficiencies with the goal of eliminating waste. Egypt urgently needs to develop and implement a long-range program to better manage their limited water resources based on the needs and the conditions in the Nile watershed. This urgency stems from:

- (1) The apparent lack of conservation measures with regard to the use of the water resources behind the Aswan High Dam during the recent African drought;
- (2) Estimates that show that there will be insufficient water to sustain Egypt's projected population by the year 2000 unless drastic conservation and management improvements are put in place during the next few years;
- (3) Trends of increased salinization and water logging with corresponding drops in agricultural production;
- (4) Abnormal water losses from new canals that serve reclaimed lands; and
- (5) Problems of coordination between water managers and users.

The constraints in the irrigation sector that affect agricultural production and the availability of water for non agricultural purposes are complex and multi-faceted, ranging from the need to improve the MOI's ability of accurately predicting runoff from the watershed in advance to allocation and distribution (system management) of the water resources, to on-farm water management and all aspects in between. Removal of these constraints requires the use of advanced management and technical techniques and requires full coordination between agencies, specifically between the Ministry of Agriculture and the Ministries of Irrigation and Reclamation. An analysis of the sector showed that MOI lacks sufficient trained personnel needed to develop a multi-disciplined approach of identifying and solving problems throughout the system. It appears that special attention needs to be given to the end user at the farm level, including obtaining the input of the farmers themselves in planning for future improvements.

III. Current Project

A. Overview

In July of 1981 the MOI, on behalf of the Government of Egypt (GOE), requested USAID assistance in rehabilitating the irrigation system on the old lands and strengthening their capacity to plan, design, operate, and maintain the irrigation network. To assist the GOE in this effort, USAID, with the assistance of MOI, developed the IMS Project Paper in 1981, proposing a total AID expenditure of \$112 million of which \$92 million was proposed for structural replacement (SR) to remove a backlog of old nonfunctioning structures in the irrigation delivery system. In that year the project was authorized at \$42 million, although the concept of the larger program was accepted. Supplemental funding beyond the initial obligation was conditioned on successful MOI management in eliminating the SR backlog in five selected Directorates. Based on the first two years of implementation, evaluation of the SR sub-project, and confirmed economic viability, a project paper amendment was prepared in 1983, authorized in June 1984, and a grant agreement signed in August 1984. The SR component was increased to \$93 million and expanded country wide (19 Directorates), and three additional sub-projects were added, bringing the total authorization to \$139.5 million and setting the PACD to July 31, 1987.

Since the beginning of the project the SR sub-project has been evaluated each year to confirm its viability and an overall mid-term evaluation was carried out for the IMS Project in September 1985. The evaluations suggested that minor improvements be made to the project and a detailed study be made of the MOI's total training needs. The recommendations from the evaluations were accepted by the MOI and are being incorporated into the project, and the training study has been completed.

B. Physical Status

The IMS project consists of 10 sub-projects administered by six Ministry of Irrigation (MOI) Project Directors and involves two US consulting firms (10 resident staff) and one US contractor (one resident staff member). Several of the activities include association with the IBRD, FAO and UNDP. The project has activities in all nineteen irrigation directorates that cover the six million feddans of irrigated land (old lands) in Egypt. Contracts for the various project components use both Host Country and direct USAID funding and the training and procurement activities involve all of the above organizations. Attachment 1 provides a brief description and status of each of the ten sub-project activities.

In brief, the ten IMS sub-project activities provide: support to the Project Preparation Department (PPD) to establish a planning unit within MOI; support for a feasibility study of the North Zifta Irrigation Project which has now been completed; support for installing 11,000 irrigation water control structures and bridges under Structural Replacement; development of an Operation and Maintenance model for the Gharbia Directorate; development of a Training and Manpower Development Unit within the MOI; establishment of the Nile River Irrigation Data Collection system under the Telemetry sub-project to collect data at 260 measuring points throughout the distribution system for improving the management of the water resources; assistance to initiate

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the Regional Irrigation Improvement Program (RIIP) in two areas of the country; assistance to the Water Research Center (WRC) to continue adapting research and provide support to the RIIP; miscellaneous commodity and equipment procurement to support the IMS project; and miscellaneous consulting services to assist MOI in a broad range of activities, both managerial and technical.

C. Financial Status

Of the authorized level of \$139.5 million, \$93 million have been obligated to date. The following table provides a breakdown of the \$93 million as of 31 March 1986.

	<u>Obligations</u>	<u>Earmarks</u>	<u>Commitments</u>	<u>Expenditures</u>
Consulting Services	23.2	14.0	13.5	4.0
Construction Costs	54.4	42.3	42.3	32.8
Commodities	10.5	7.7	4.4	1.7
Training	2.5	1.5	1.5	0.5
Miscellaneous	<u>2.4</u>	<u>0.9</u>	<u>0.9</u>	<u>0.5</u>
TOTAL	93.0	66.4	62.2	39.5
Obligation Pipeline		26.6	30.4	53.5
Difference between pipelines			3.8	23.1

The last obligation (\$20 million) was made December 31, 1985. This obligation was based on the results of a "Special Report - Compliance with Section 611 of FAA 1961, as Amended" - Prepared December 5, 1985. That report reviewed the technical and economic feasibility of the project and re-certified the Section 611 requirements. Of the above the total pipeline of 26.6 will be committed by the end of FY 86 for construction contracts in late FY 86 and early FY 87 and for consultive services currently being negotiated.

The USAID contribution to the IMS project consists of approximately 30 percent foreign exchange and 70 percent local currency. As the economics and currency requirements have been based on an exchange rate of 0.83, a revised financial plan will be prepared as part of the amendment exercise to account for the prevailing exchange rates and form the basis for re-computing the economics of the project.

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IV. Proposed Solution

A. Experienced to Date

In addition to the IMS project described in Section III above, USAID was involved in the Egypt Water Use and Management Project (EWUP) that was initiated in 1976 and ended in December of 1984. The EWUP project, with a \$13 million USAID input, was designed as an adaptive research project to develop appropriate irrigated agricultural packages of technical and non-technical approaches for improving production and increasing the overall social and economic well being of the small farmer farming the old alluvial lands within the Nile River Valley and the Delta. The results of the EWUP project were used during the design of the later components of the IMS project and will have an effect on the current proposed amendment. These two AID projects (EWJP and IMS) have had a positive impact on the way the MOI conducts its business. The EWUP project resulted in the MOI developing a proposal, subsequently approved by the GOE, for the National Irrigation Improvement Program to be implemented over the next two decades. In addition, the USAID projects have resulted in changing attitudes of key irrigation officials to move away from the traditional approach of irrigation improvement which did not include inputs at the farm level or from the farmers themselves to an approach of involving farmers in the planning process. It also resulted in developing many improved planning, design, operation, and quality control procedures being used throughout the MOI and country. Experience to date has demonstrated that the Ministry has confidence in the expertise and assistance provided by AID and will change their technical and managerial approaches based on recommendations demonstrated to be effective.

B. Constraint to be Overcome

The major objective for the water sector is to improve efficiency of the water use. The current overall efficiency of water use below the Aswan High Dam is approximately 54 percent. A four percent increase in the overall efficiency amounts to approximately 2.4 billion cubic meters or more than the total water currently used for municipal and industrial purposes throughout the country. With the proper programs in place, it is not unrealistic to be able to improve the overall water efficiency in Egypt by two percent per year over the next 10 to 15 years. USAID has the technical, managerial and financial means to assist the MOI in developing a program to remove all major physical and managerial constraints required to increase water use efficiencies.

Major constraints in the irrigation sector fall into the categories of physical, managerial and policy. Specific constraints include policies that create dis-incentives to improved water use and agricultural production, inadequate funding to implement improvements, social factors that make acceptance of new ideas slow, inadequate staffing and incentives within the MOI, and managerial impediments.

Removal of the physical and managerial constraints within the irrigation system is not enough. To make the proposed irrigation program entirely effective with a resultant impact on agricultural production and the national economy, indications are that the current agricultural pricing and subsidy

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policies must be revised through the GOE and Ministry of Agriculture (MOA). The movement towards world market prices would have two major effects on the irrigation system operation: (1) provide increased incentives and financial resources to make needed improvements in the private and communal portions of the irrigation system and (2) lead the way for the MOI to establish water use charges which should result in improved on-farm water use efficiencies.

To make the proposed changes effective within the irrigation sector, management and administration constraints must be tackled. Those include the ability of the MOI to obtain and retain highly qualified individuals to plan and manage the system through appropriate salary benefit packages and per diem commensurate with actual travel costs in Egypt and the ability of the MOI to institutionalize changes. These changes will require considerable effort and time, but are feasible with an additional effort by AID and GOE.

By providing sufficient increased financial and technical support to the irrigated agriculture sector, USAID should have sufficient leverage to help induce the needed policy changes in the above mentioned areas.

C. Alternatives

Egypt currently imports approximately 50 percent of its food needs which amounts to 3.8 billion dollars per year in foreign exchange. As Egypt approaches the year 2000, based on its current population growth rate, there appears to be only two main alternatives. One would be to improve water use efficiency to save sufficient water to meet the municipal, industrial and agricultural needs of the country. This alternative is to take the combination of measures necessary to gradually increase water use and delivery efficiencies, especially in the agricultural sector.

Without improving water use efficiency and accompanying agricultural production, the GOE would have to undertake an alternative of building its industrial base sufficiently high enough to generate sufficient foreign exchange to cover the costs of importing the additional required food and fiber for the country.

V. Relationship of the Project to:

A. CDSS and Sector Strategies

The current IMS Project and the proposed components, as listed in Section VI of this report, are in conformity with the sectorial and macro economics interest, as outlined in the USAID action plan. That is, "providing provisions for basic infrastructure and services needed for Egypt's development, particularly related to industry and agriculture; improving GOE's capability to design, implement, operate and maintain said developments; and improving GOE's capability to undertake technical research and analysis." The current IMS Project and the proposed expansion will also provide substantial resources to be utilized in private sector channels through local construction contracts for irrigation structures and canals, improvements through consultant services, and commodity procurement.

The expansion of the IMS project will move USAID into a more advantageous position for instituting needed policy reforms in irrigation. Our position has improved considerably over the last 18 months as the MOI developed confidence in the ability of USAID to respond to their needs and as demonstrated by MOI's acceptance of our numerous suggestions for improving their operation. If this position can now be strengthened by increasing our support of their Chapter III investment funding from our current level of approximately seven percent to 25 percent per year, the ability to escalate policy changes will be enhanced. In addition, when we deal with the agriculture sector as a whole and include our other agricultural projects, the ability of coming to terms with the broader policy issues with the MOA and MPIC also improves.

B. GOE Plans and Priorities:

The proposed additional support to the irrigation sector is in conformity with the GOE plans and priorities, as discussed in the "Strategies for Irrigation Development" Report and was derived from the preliminary five-year plan being developed by the GOE. In the irrigation sector this translates to improving the overall water use efficiency in the country by improving the capability to manage the river and canal system, the technical capability, and making the irrigation delivery system compatible to the needs of the individual farmers.

Over the past seven years the Chapter III funds for the MOI have ranged between LE 183 to 291 million per year (averaging LE 240 million) with a slightly increasing trend. It is also noted that although the Chapter III budgets have not increased significantly, the Chapter II budget over the same time frame increased over 100 percent due to the recognition of the need to provide improved operation and maintenance of the overall irrigation system.

C. Other Donor activities:

At the present time there are several donors that have projects and programs in the irrigation sector. Although the level of funding is quite minimal, with the exception of the World Bank, their programs provide an important complementary effort to that of the USAID's current and proposed program. Their total funding support to MOI's Chapter III requirements has been approximately four percent on an annual basis and that level of effort is expected to continue. There has been good coordination between donors regarding the support to the MOI. This coordination has resulted in a set of programs and projects that do not duplicate each other and fit into the overall long-term needs of the GOE. Regular meetings were held between the other donors and USAID during the development of the next plan period of the UNDP-WB program cycle and during the overall irrigation sector review sponsored by USAID. As a result the activities proposed in this paper and the activities of the other main donors described below are in harmony:

1. Canadian Bilateral Development Assistance Program - The Canadian Government is assisting the MOI and MOA with the implementation of the "Integrated Soil and Water Improvement Project" by providing \$1.8 million in grant funds for technical assistance and studies. This small project is on one of 12 areas that MOI has selected for the Regional Irrigation Improvement Program and complements the AID effort on three additional RIIP areas.

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2. United Nations Development Program - The UNDP has provided \$3.65 million support to the MOI's Water Plan Group since 1977. The Water Plan Group (WPG) is staffed and equipped to carry out a wide range of planning and implementation activities regarding the utilization of the water resources of Egypt. This group has been working in cooperation with AID and developed the information and documentation required for USAID to financially support the Telemetry sub-project and the Sonic Flow measuring activity under the Irrigation Management Systems project. The WPG has published a wide range of water resources planning reports that analyze the current and future water resources of the country and identify some of the areas for needed support shown in Section VI of this report.

The UNDP signed an agreement with MOI on March 19, 1986 to provide \$1.65 million of technical assistance to develop feasibility reports and preliminary designs for eight of the RIIP areas. This project is an outgrowth of the USAID EWUP activity and will be coordinated with the current USAID RIIP program by having the same project director and joint project review meetings between USAID, UNDP, MOI and the consultants.

3. The Bank Group - The IBRD and IDA have supported a large drainage program in Egypt since 1970. Agreements totaling \$178 million with the completion of underground drains covering 3.1 million feddans by 1986 have been implemented. The Bank plans to continue its support for the drainage sector program and is supporting some of the pump rehabilitation activities of the MOI.
4. Other Donors - The British Government, through the General Authority for Rehabilitation Projects and Agricultural Development of the Ministry of Reclamation, is providing technical assistance for new lands development. The Japanese AID Program includes several New Lands developments at Katara, Adleya and El Hassaneya. The Governments of Italy and Taiwan are providing technical assistance for the construction of the Rosetta Barrage and the shore protection activities, respectively. Again these activities complement the overall needs of the irrigation sector.

VI. Project Components

An IMS Project Committee meeting was held on May 12, 1986 to discuss the recently completed and AID/W funded Water Management Synthesis II Project Report No. 41 entitled "Strategies for Irrigation Development in Egypt" and an initial draft of this concept paper. As a result of that meeting and discussions with MOI a plan has been developed to improve and expand the existing Irrigation Management Systems (IMS) Project (263-0132). The final shape of the Project and the precise funding levels of individual components will be developed during the design stage. During that process a comprehensive economic analysis will be carried out on each of the project components, including some of the other activities specified in the strategy paper to assure that the items selected have a high economic rating in relation to the other activities being carried out by the Ministry of Irrigation. Based on our current level of knowledge the following two sections describe the anticipated shape of the Project over the next five years.

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A. Current Irrigation Management Systems Project:

The current IMS project has a PACD of July 31, 1987 and the individual components along with their status are described in Attachment I. Four of the existing projects: North Zifta Feasibility Study, Commodity Procurement, Training and Manpower Development, and Telemetry will be essentially completed by the PACD. The following six sub-projects would be continued:

1. Project Preparation Department (PPD) - The main objective of this sub-project is to fully institutionalize a unit within the MOI that can carry out feasibility studies of various irrigation projects to the standards required by international donor organizations. Although this sub-project has been successful to date, it is estimated that a time extension of 18 months will be required to ensure that the goal is fully met, and the unit can proceed without outside technical assistance. Additional funding requirements of approximately one million dollars will be derived from savings of other sub-projects.
2. Structure Replacement Sub-project (SR) - The SR program is proceeding well and has been evaluated each year to confirm its viability. In the early years there were some delays in issuing contracts at the beginning of each construction season due to delays in obligations resulting in an overall delay in the project implementation rate. It is estimated that this sub-project will need to be extended approximately one year to complete the program of installing approximately 11 thousand structures. No additional funding will be required for this sub-project and, if the currently negotiated revised exchange rate goes into effect in the near future, the resulting savings from this sub-project will be utilized to complete funding of the remaining sub-projects, as discussed in this section.
3. Regional Irrigation Improvement Sub-project (RIIP) - This project recently became fully operational providing technical assistance to the MOI for their RIIP program. Initiation of the activity was delayed due to unexpected delays obtaining AID/W approvals and consultant selection. An extension of approximately two years will be needed to meet the original objectives and to have an overlap with the proposed infrastructure support program outlined in the next section of this report. Some additional technical assistance may be required, depending on the scope of the proposed Regional Irrigation Improvement Program.
4. Water Research Center (WRC) - This sub-project was also recently initiated with the assistance of the same consultant as that to the RIIP activity. Its life will also need to be extended two years to coincide with that of RIIP. The WRC is providing adaptive research activities and advice to the Ministry on the implementation of the overall RIIP program. Some additional funding will be required for this activity contingent on finalizing WRC's long-range workplans and the savings from the SR sub-project.
5. Gharbia O&M - This activity will be staffed and equipped by the PACD. However, if successful, this activity would be expanded to extend over the remaining irrigation Directorates within the country to improve their ability to properly operate and maintain the irrigation system. The additional funding requirements of approximately nine million dollars would be derived from savings on the SR sub-project.

6. Miscellaneous Consulting services - This activity provides a contingency fund to provide short-term technical assistance (foreign and local) to assist the Ministry in examining specific issues that come up from time to time. This activity would be extended to coincide with the new PACD of the project. No additional funding is required.

B. Additional Project Components for FY 87 through FY 91

These components will require an additional authorization of funds beyond the current level of \$139.5 million. The indicative funding levels for the six proposed sub-project activities totaling \$200 million are shown in Table 1. The current Project Paper's goals and purpose do not change. The Amendment will be written showing the additional activities and their funding levels with final authorization contingent on the Mission being satisfied that the agricultural policy environment has improved to the point where this project can be fully effective. It is anticipated that the Mission will make this decision later this fall.

The additional components were selected based on an analysis to determine those elements that would have the highest impact on improving the MOI and its operation, that would require a minimum of USAID staff input, have a high level of foreign exchange requirement, and have a high rate of return. The additional components consist of three activities that provide crucial support to the overall MOI program, two that move into implementation of critical projects relating to the channel maintenance program and the management of the main system, and a sixth element which is support for the cost associated with implementing the RIIP which is rapidly becoming the core program for the MOI and its top priority item in the next Five-Year Plan. Although the first five items would be fully funded (USAID component + MOI component), the sixth item (RIIP) will be only be partially funded to initiate the infrastructure changes required to improve the irrigation system from the main barrages down to the farm gate. The RIIP and its follow-on National Irrigation Improvement Program are estimated to cost over LE 3 billion up to the year 2000. Depending on the availability of USAID funds for the irrigation sector, RIIP can be expanded to any reasonable level. The following is a brief discussion of each of the proposed additional sub-projects:

1. Main System Management - This activity would build upon the current telemetry sub-project and provide full monitoring and operation of one major canal command area. The project would consist of installing a comprehensive set of data collection platforms throughout the canal command, installation of a combination of mechanically controlled and self-regulating irrigation structures, computer software, and technical assistance. This activity would cost a total of \$14 million (78% foreign exchange). The objective of the project will be to demonstrate the effectiveness of providing full control over the main system to reduce operation losses, and make the system more responsive to the daily needs of the farmers.
2. Channel Maintenance Program (Phase I) - The Project Preparation Department (under the current IMS project) and the World Bank have developed a comprehensive proposal for improving the maintenance of earthen channels, including weed control, with an overall investment

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requirement of approximately LE 490 million over the next seven years. Phase I would set the program up in one Directorate or major canal command to demonstrate its effectiveness on improving the system performance. The total AID funding would be approximately \$25 million (80% foreign exchange) to convert the existing system from the old mechanical drag line system, which is not satisfactory for the current canal regimes, to a system of weed harvesting equipment designed for the conditions in Egypt. The World Bank and AID have been working together to review the channel maintenance needs of Egypt and review the weed harvesting equipment manufactured in the United States and its adaptability to conditions here in Egypt. Once this program is established the balance of funding required will most likely be provided through the World Bank.

3. Survey Equipment and Mapping - This activity will provide approximately \$16 million (50% foreign exchange) support to the Survey Authority within the MOI. The objective of this sub-project is to upgrade the Survey Authorities' ability to provide comprehensive and accurate ground survey mapping on a timely basis required for the RIIP and other project activities being carried out by the MOI. The funding will be primarily utilized for new equipment, software and training.

4. National Irrigation Training Institute (NITI) - This sub-project will provide the initial funding required to develop and implement a training center for the MOI. This activity is an outgrowth of the current IMS Training and Manpower Development sub-project and will expand it into a national effort by providing training facilities, equipment, technical assistance and organizational changes. The institute will have the responsibility for training (in-country and foreign) within the Ministry of Irrigation and Drainage. Training activities are carried on an ad hoc basis as needed by the various technical and administrative departments. The NITI will coordinate training programs for all levels, carry out or oversee training in Egypt utilizing other available training centers and facilities, and arrange for and coordinate all overseas training.

Planning and Model Development - This sub-project will provide approximately 10 million dollars (70% foreign exchange) to the Planning Sector of the MOI to provide technical assistance and software to expand their capability to develop and make operational various models to improve the operation of the overall water delivery system. This activity will be coordinated with the UNDP effort which has been providing support in the same area.

6. Regional Irrigation Improvement Program (RIIP) - A tentative figure of \$120 million (25% foreign exchange) has been provided to initiate the infrastructure required in the overall RIIP for which technical assistance is already being provided through the current IMS project and through a UNDP project. The funding will be utilized for structural improvements such as water control structures, monitoring structures, canal lining, canal crossings, canal excavation and/or realignment, demonstration land leveling, a farmer organizational effort, and training. This item is of the highest priority within the MOI and will form the basis for all future irrigation improvements over the coming

two decades. A basic thrust is to remodel the system to make it responsive to the needs of the farmers to assure that water is available in the quantities required to support increased production. This activity will also provide some funding for the MOA and be fully coordinated with their extension program.

VII. Financial Requirements

Table 1 provides a breakdown of the additional funding requirements for the project. The funding requirements have been estimated at 1984 prices. It was assumed that AID's overall share would be approximately 75 percent of the total MOI Chapter III investment costs for each activity, including 100 percent of the foreign exchange needs.

The IMS project has been supporting approximately seven percent of the MOI's annual Chapter III budget. This proposed project will increase that level to \$50 million per year or approximately 25 percent of their annual Chapter III budget.

The additional components will be implemented during FY 87 (last year of the current project) and extend through FY 91. As such, the current PACD will be extended to a total of four years.

Table 1

Irrigation Management Systems
263-0132

ADDITIONAL COMPONENTS
(USAID funding levels through FY91 in \$million)

	<u>FE</u>	<u>LC</u>	<u>Total</u>
1. Main System Management (Phase II Telemetry)	\$11	\$ 3	\$14
2. Channel Maintenance Program (Phase I)	20	5	25
3. Survey Equipment - Mapping	8	8	16
4. National Irrigation Training	15	3	18
5. Planning Studies & Models	<u>5</u>	<u>2</u>	<u>7</u>
Sub Total	59	21	80
6. Regional Irrigation Improvement Program	30	90	120
T O T A L S	<u>89</u>	<u>111</u>	<u>200</u>

1/ LE 1.35 to \$1.00

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Attachment #1
31 March 1986

Irrigation Management Systems Project
Physical Status of the ten Sub-Project Activities

1. Project Preparation Department (PPD)

The objective of this sub-project was to establish, within the MOI, an experienced unit capable of formulating natural resources development project plans and carrying out economic analysis to a level acceptable to the international funding community.

The Department has been established, staffed, and has completed project plans in five areas. These include: analysis of the feasibility of a drainage program in over one million feddans; evaluation of 50 existing large pumping plants with a plan for renovation and replacement; development of channel maintenance procedures and equipment requirements; and the carrying out of a shore protection feasibility study. Work is underway on a program to develop and update shadow prices to be used in feasibility reports, development of plans to reduce operation losses when the irrigation canals are closed in the winter for annual maintenance, and carry out a full economical evaluation of Esna Barrage.

Technical assistance is being provided in the areas where additional effort is needed; these include: the area of professional growth and training to assure the sound development, understanding and implementation of planning principles, operating procedures, and policies.

A team of specialists from Harza Engineering Company are assisting the MOI through a Host Country Contract. The IBRD is funding two of Harza's long-term economic specialists.

2. North Zifta Redesign Feasibility Study

The objective of this sub-project was to prepare a feasibility study for the redesign of the North Zifta Irrigation District, covering 40,000 feddans. It was intended that the methodology used to develop the plan could be eventually replicable in other Irrigation Districts in Egypt.

This activity has been successfully completed, the report was distributed in March 1986, and the report will be reviewed by USAID in April.

3. Structure Replacement (SR)

The objective of this sub-project is to upgrade the planning, design and construction procedures within the MOI. A secondary, but equally important, objective is to replace 11,000 thousand nonfunctional irrigation water control structures and bridges associated with the irrigation delivery system.

The first phase replaced approximately 3000 structures in five Delta Directorates. The second phase, currently underway, consists of replacing 8000 structures over a three-year period in the remaining 15 Directorates located in the Nile Delta and Valley.

In December 1984, an in-depth evaluation was carried out on Phase I of the SR sub-project. The recommendations of the evaluation team included: Intensifying monitoring, upgrading specifications, and additional training. These recommendations, mutually approved by MOI and USAID, have been incorporated into the second phase of the project. This activity will require an extension beyond the current PACD but can be completed within the current budget.

One American and one Egyptian engineer from Harza Engineering Company are assisting the Project Director with the training and quality control on this sub-project. Contracting for the construction of the individual structures is being carried out between MOI and local private contractors.

4. Operation and Maintenance For Gharbia Directorate

The objective of this sub-project is to plan and implement a preventative maintenance system for the public canal and drainage system in the Gharbia Directorate. This includes developing maintenance procedures; establishing and equipping the Directorate, Inspectorates, and District level workshops; defining the institutional structure and staffing requirements; and establishing adequate O&M budgets for this Directorate.

An Operation and Maintenance plan acceptable to USAID has recently been developed by the Project Director. The MOI is currently reviewing the plan and, once it is approved, will establish the budgets for implementation. Based on a satisfactory outcome of this project, the O&M planning procedures could be replicated in the other Directorates.

5. Training and Manpower Development

The objective of this sub-project was to establish, within the MOI, a unit capable of fostering professional development and providing the ongoing training necessary to maintain a capable professional staff for implementing the IMS project.

The initial unit has been established and is administering an on-going training program. Over 200-person months of training have been completed in the United States and over 1000 persons have received training in Egypt. The training in Egypt has focused on practical short-term courses of two to eight weeks for technicians and professionals with subject matters ranging from management to concrete design.

MOI and USAID are considering, based on the success being demonstrated by the TMD, establishment of a national training institute. A report was recently finalized that recommended this unit be expanded into a national irrigation training institute to provide the total training needs of the MOI.

6. Telemetry System

The objective of this sub-project, also known as the Nile River Irrigation Data Collection System, is to collect data critical to the operation of the distribution system and transmit it to central locations at Cairo and Aswan. The project will provide approximately 260 measuring devices and automatic data processing necessary for analysis and display of data for decision makers.

An agreement was reached on July 10, 1985 between MOI and the RET Corporation (a small business firm headquartered in Springfield, Virginia) to supply and install the necessary equipment, develop the software, train MOI staff, and make the system operational by July 9, 1987. RET has established its office in Cairo, has completed site surveys of the 260 locations, and has received some of the initial hardware orders.

The telemetry system is being implemented through the Water Planning Group originally established with assistance from the UNDP. The UNDP has an IBRD employee detailed from the U.S. Bureau of Reclamation who assists with implementation of this USAID funded component. The IMS project is providing short-term assistance through a PASA from the U.S. Bureau of Reclamation. In addition, the Danish Government is providing a computer specialist for two years to work with the telemetry system team.

7. Regional Irrigation Improvement Program (RIIP)

The objective of this sub-project is to establish and field test a pilot organization for providing technical assistance, construction assistance, economic analysis, on farm development, and user involvement utilizing the results of the recently completed Egypt Water Use and Management Project.

The activity includes upgrading and integrating irrigation with the non water inputs of agricultural production. The RIIP organization, once tested and accepted, will be the basis for MOI to implement a national improvement program throughout the country.

On May 13, 1985 a USAID direct contract was signed with the Consortium for International Development (CID), with Colorado State University as the lead University, to serve this sub-project and the Water Research Center sub-project. The resident team arrived in Egypt in September 1985.

This activity is being closely coordinated with the UNDP who will be providing technical assistance for eight additional RIIP areas in the near future.

8. Water Research Center (WRC)

The objective of this sub-project is to provide technical and commodity support to the MOI for its water management research activities. The project will support adaptive research for those elements of the recently completed Egyptian Water Use and Management Project that showed promise for further development of appropriate technologies to improve the water use efficiencies and agricultural production in Egypt.

The CID team is also supporting this activity and detailed work plans, including training and procurement, are being developed to cover the next two years.

9. Commodity and Equipment Procurement

This sub-project was provided to procure commodities and equipment not directly related to technical components of the project.

Procurements are underway or completed for water control gates, radio systems, and reference materials. Procurements are planned for workshop equipment, additional reference materials, office equipment, flow measuring equipment, and other miscellaneous items.

10. Consultant Services

This component provides miscellaneous short term consultant services to the MOI for a broad range of activities both managerial and technical.

Consultant services have recently been provided to review of the stability of the Nile River barrages and to assess the overall MOI training needs. Other forms of consultant services will be provided as needed.

ACTION: AID-3 INFO: DCM ECON /5

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UNCLAS SECTION 01 OF 02 STATE 234905

AIDAC

N.O. 12356: N/A

TAGS: N/A

SUBJECT: CONCEPT PAPER FOR AMENDING THE IRRIGATION
MANAGEMENT SYSTEMS PROJECT (IMS)

ACTION TO	AER	PPP
ACTION TAKEN		DUR DATE 7/31
MAN		INITIALS

1. BACKGROUND: ON JULY 10, THE PROJECT REVIEW COMMITTEE (PRC) MET TO REVIEW SUBJECT CONCEPT PAPER. THE OBJECTIVE OF THIS CABLE IS TO PROVIDE THE MISSION WITH OBSERVATIONS AND REMARKS BY THE PRC ON THE REVIEW OF SUBJECT PAPER. ANE/TR/ARD FELT THAT A REVIEW OF THE 1985 IMS EVALUATION FINDINGS WOULD PROVIDE USEFUL BACKGROUND INFORMATION BEFORE REVIEWING SUBJECT PAPER. THUS, ON JUNE 30, THE PRC REVIEWED THE 1985 IMS EVALUATION. OBSERVATIONS ON THE EVALUATION WILL BE PROVIDED SHORTLY.

2. SUMMARY: THE PRC REVIEWED THE PHYSICAL, MANAGERIAL AND POLICY CONSTRAINTS OF THE IRRIGATION SECTOR DESCRIBED IN THE CONCEPT PAPER. THE PRC CONCLUDED THAT THE LEVEL OF ADDITIONAL FUNDS PROPOSED IN THE CONCEPT PAPER WARRANTED THE PREPARATION OF AN IRRIGATION SECTOR POLICY STRATEGY PRIOR TO PROCEEDING WITH DESIGNING THE PROJECT AMENDMENT. AID/W WOULD APPRECIATE THE MISSION SHARING THIS SECTOR POLICY STRATEGY WITH US WHEN FINISHED. THE PRC ALSO DISCUSSED THE TYPE OF ECONOMIC,

INSTITUTIONAL AND RECURRENT COST ANALYSIS NECESSARY TO DETERMINE THE FEASIBILITY OF PROCEEDING WITH AN AMENDMENT OF THIS PROPORTION. END SUMMARY.

3. SECTOR POLICY STRATEGY: IT IS OUR UNDERSTANDING THAT THE MACRO POLICY REFORMS THE MISSION IS STRIVING FOR IN THIS PROJECT ARE IMPROVED WATER USE IN AGRICULTURE AND INCREASED AGRICULTURAL PRODUCTION. WE ARE SUPPORTIVE OF THESE MACRO-LEVEL POLICY OBJECTIVES AND UNDERSTAND THESE OBJECTIVES WOULD ALSO SUPPORT THE OBJECTIVES OF THE AGRICULTURAL PRODUCTION CREDIT PROJECT. HOWEVER, WE BELIEVE THAT THE DECISION TO EXPAND AID INVOLVEMENT IN THIS SECTOR SHOULD BE BASED UPON THE PREPARATION AND REVIEW OF AN IRRIGATION SECTOR POLICY STRATEGY DERIVED FROM THE STRATEGIES FOR IRRIGATION DEVELOPMENT DOCUMENT. IN THIS SENSE, A DECISION TO AMEND THE ONGOING PROJECT (AT A MUCH HIGHER

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LEVEL) OR DESIGN A NEW PROJECT SHOULD REFLECT A LONG-TERM STRATEGY RATHER THAN A CONTINUATION OF ON-GOING ACTIVITIES PLUS SOME NEW ONES. A STRATEGY WOULD IDENTIFY THE POLICY ISSUES AND SUGGEST INDICATORS FOR TRIGGERING FURTHER PROJECT OBLIGATIONS AND DISBURSEMENTS. SUCH A STRATEGY WOULD ALSO CLARIFY POLICY ISSUES AS THEY AFFECT EACH PROJECT COMPONENT. IT MIGHT IDENTIFY POLICIES THAT SHOULD BE RESOLVED BEFORE IMPLEMENTATION OR PROJECT COMPONENTS THAT COULD BE IMPLEMENTED REGARDLESS OF POLICY CHANGES. FOR EXAMPLE, IF PERSONNEL POLICIES, MINISTRY OF IRRIGATION/MINISTRY OF AGRICULTURE RELATIONS AND WATER EFFICIENCY AND DISTRIBUTION ARE SOME OF THE ISSUES AFFECTING SOME OR ALL OF THE PROJECT COMPONENTS, BENCHMARKS COULD BE DEVELOPED TO SPECIFY WHAT SORT OF CHANGES MUST OCCUR BEFORE FURTHER PROJECT OBLIGATIONS ARE MADE FOR THE COMPONENT OR THE AMENDMENT.

4. INSTITUTIONAL DEVELOPMENT: BOTH THE CONCEPT PAPER AND THE EVALUATION OF THE IMS PROJECT REVEAL A SERIOUS PROBLEM OF ACQUIRING AND RETAINING HIGHLY SKILLED ENGINEERS FOR THE MOI. BASED ON THESE FINDINGS, THE PRC IS CONCERNED WITH THE INSTITUTIONAL CAPABILITY (ORGANIZATIONAL AND MANAGERIAL) OF THE MOI AND ITS RESPECTIVE WATER DISTRICTS TO IMPLEMENT THE EXISTING PROJECT COMPONENTS AND THE NEW ONES IDENTIFIED IN THE CONCEPT PAPER. GIVEN THESE FINDINGS, THE PRC RECOMMENDS THAT AN INSTITUTIONAL ANALYSIS THAT BUILDS ON THE OBSERVATIONS OF THE EVALUATION BE INCLUDED AS PART OF THE PREPARATION FOR THE AMENDMENT. THIS ANALYSIS WOULD DESCRIBE THE VARIOUS INSTITUTIONS INVOLVED IN THE IRRIGATION SECTOR AND ANALYZE INTRA AND INTER

INSTITUTIONAL DYNAMICS. IT MIGHT ALSO ADDRESS THE FEASIBILITY OF AN EMPLOYEE MERIT SYSTEM BASED ON SOME OF THE INDICATORS FOR MEASURING PROJECT COMPONENT PROGRESS. FOR EXAMPLE, WOULD IT BE POSSIBLE TO ESTABLISH STAFFING REQUIREMENTS FOR O AND M ACTIVITIES BY DIRECTORATE AND DEVELOP AN EMPLOYEE MERIT SYSTEM THAT WOULD PROMOTE ACTIVE PARTICIPATION IN COORDINATING O AND M ACTIVITIES WITH CHANNEL MAINTENANCE AND RIIP ACTIVITIES? THE CONCEPT PAPER DESCRIBED THE RIIP AS THE MOI'S HIGHEST PRIORITY AND IT WILL BE USED TO FORM A BASIS FOR ALL FUTURE IRRIGATION IMPROVEMENTS FOR THE NEXT TWO DECADES. WHAT INDICATION OF CHANGE IN INSTITUTIONAL DEVELOPMENT AND SUSTAINABILITY MIGHT BE ESTABLISHED TO DEMONSTRATE PROGRESS FOR THE RIIP OR THE O AND M ACTIVITIES? THESE ARE THE TYPES OF QUESTIONS OR STRATEGIES THAT MIGHT BE CONSIDERED IN THE DESIGN EFFORT FOR STRENGTHENING INSTITUTIONAL CAPABILITY.

5. ECONOMIC ANALYSIS: PROVIDING AN ADDITIONAL DOLS 200

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MILLION FOR THIS PROJECT (ALMOST TWICE THE CURRENT AUTHORIZED PROJECT BUDGET) REPRESENTS A SUBSTANTIAL INVESTMENT. THE PRC BELIEVES THAT INCREASED AID INVOLVEMENT SHOULD BE JUSTIFIED ON AN ECONOMIC ANALYSIS LINKED TO PRODUCTIVITY. FOR EXAMPLE, IS IT POSSIBLE TO DETERMINE HOW MUCH WATER WOULD BE SAVED WITHIN A WATER DISTRICT THROUGH A FUNCTIONING CHANNEL AND EFFECTIVE OPERATION MAINTENANCE PROGRAMS?

6. RECURRENT COSTS: THE CHANNEL, OPERATION AND MAINTENANCE PROGRAMS REPRESENT CONTINUOUS ACTIVITIES TO IMPROVE THE EFFICIENCY OF WATER DELIVERY. THESE ACTIVITIES WILL UNDOUBTABLY REQUIRE ADDITIONAL FUNDS FROM THE MOI. THE PRC BELIEVES ANY BASIS TO PROCEED SHOULD INCLUDE A RECURRENT COST ANALYSIS TO DETERMINE THE IMPLICATIONS OF ALL PROJECT ACTIVITIES FOR LOCAL CURRENCY REQUIREMENTS TO CONTINUE THESE ACTIVITIES BEYOND PROJECT LIFE.

7. PLEASE ADVISE YOUR PLANS TO PROCEED ON PREPARATION OF SECTOR POLICY STRATEGY AND WHETHER AID/W ASSISTANCE IS DESIRED. ARMACOST

BT
#4905

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STATE 234905/02

JD

UNCLASSIFIED

BANGKOK 044475

ANNEX P...

ACTION: AID-3 INFO: DCM ECON /5

OOM^VZCZCCRO845
 RR RUEHEG
 DE RUEHBK #4475 2740642
 ZNR UUUUU ZZH
 R 010641Z OCT 86
 FM AMEMBASSY BANGKOK
 TO RUEHEG/AMEMBASSY CAIRO 1007
 INFO RUEHC/SECSTATE WASHDC 0703
 BT
 UNCLAS BANGKOK 44475

LOC: 10 225
 01 OCT 86 0746
 CN: 00026
 CHRG: AID
 DIST: AID

AIDAC

FOR ANE/PD/ENV AND ANE/PD/E

E.O. 12356: N/A

SUBJECT: EGYPT - IRRIGATION MANAGEMENT SYSTEM PROJECT
 (263-0132) PROJECT PAPER AMENDMENT - ENVIRONMENTAL
 CLEARANCE

REF: (A) CAIRO 20873, (B) STATE 294199

1. FOR AID/CAIRO, JOHN STARNES, MISSION ENVIRONMENTAL
 OFFICER FROM ANE/PD/ENV, STEPHEN F. LINTNER,
 ENVIRONMENTAL COORDINATOR.

2. INFORMATION CONTAINED IN REF A COPIED IN REF B TO
 LINTNER WHO IS CURRENTLY ON TDY IN BANG OK.

3. APPROACH TO ENVIRONMENTAL ASSESSMENT AS OUTLINED BY
 MISSION IS FULLY ACCEPTABLE TO ANE/PD/ENV AND PROVIDES
 A COST-EFFECTIVE SOLUTION FOR THE PREPARATION OF THE
 REQUIRED ENVIRONMENTAL STUDIES. MISSION IS REQUESTED
 TO ADVISE ANE/PD/ENV CONCERNING PREPARATION OF THE
 ENVIRONMENTAL ASSESSMENT AS PROJECT ACTIVITIES
 PROGRESS. WINDER

BT
#4475

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BANGKOK 044475

ACTION TO	<u>AGL</u>	<u>PPP</u>
ACTION TAKEN		DATE <u>10/9</u>
NAME		INITIALS