

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT DATA SHEET	1. TRANSACTION CODE <input type="checkbox"/> A = Add <input checked="" type="checkbox"/> A <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete	Amendment Number	DOCUMENT CODE 3
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2. COUNTRY/ENTITY Arab Republic of Egypt	3. PROJECT NUMBER 263-0132
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4. BUREAU/OFFICE NE 04	5. PROJECT TITLE (maximum 40 characters) Irrigation Management Systems
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6. PROJECT ASSISTANCE COMPLETION DATE (PACD) MM DD YY 07 31 86	7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4) A. Initial FY 81 B. Quarter 4 C. Final FY 84
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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	16,860	25,140	42,000
(Grant)	(16,860)	(25,140)	(42,000)	(16,860)	(25,140)	(42,000)
(Loan)	()	()	()	()	()	()
Other U.S.						
1.						
2.						
Host Country	0	22,600	22,600		119,000	119,000
Other Donor(s)						
TOTALS	16,860	47,740	64,600	16,860	144,140	161,000

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)	133	064				42,000		42,000	
(2)									
(3)									
(4)									
TOTALS						42,000		42,000	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each) 022 032 053 070 252	11. SECONDARY PURPOSE CODE
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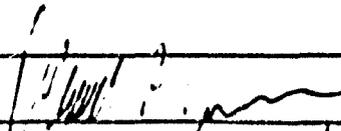
12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each) A. Code BS TNG B. Amount 30,000 2,000	
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13. PROJECT PURPOSE (maximum 480 characters)

Improve the operating efficiency of the total irrigation system, and strengthen the Ministry of Irrigation's operation, maintenance and planning capabilities.

14. SCHEDULED EVALUATIONS Interim MM YY 04 83 Final MM YY 01 86	15. SOURCE/ORIGIN OF GOODS AND SERVICES <input checked="" type="checkbox"/> 000 <input type="checkbox"/> 941 <input checked="" type="checkbox"/> Local <input type="checkbox"/> Other (Specify)
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16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment)

17. APPROVED BY	Signature 	Date Signed MM DD YY 07 28 81	18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY 07 31 81
	Title Donald S. Brown Director		

Glossary and Abbreviations

AID	Agency for International Development
CID	Consortium for International Development
CIP	Commodity Import Program
CP	Conditions Precedent
cu/m	cubic meter
DE	District Engineer
EFY	Egyptian Fiscal Year (July 1 - June 30)
EWUP	Egypt Water Use and Management Project
feddan	unit of land, approximately 1.04 acre
GOE	Government of Egypt
IBRD	International Bank for Reconstruction and Development (World Bank)
IMS	Irrigation Management Systems
IQC	Indefinite Quantity Contract
LE	Egyptian Pounds
MCI	Multiple Cropping Intensity
MLR	Ministry of Land Reclamation
MOI	Ministry of Irrigation
maska	Farm or leader ditch from which the water is diverted directly to the individual farm plots; it may serve from 5 to 40 farm families and an area from 25 to 200 feddans
O & M	Operation and Maintenance
OIT	AID Office of International Training
O/M/SR	Operations, Maintenance and Structure Replacement
OTJ	On-the-job Training

Glossary and Abbreviations

PID	Project Identification Document
PIO/T	Project Implementation Order/Personnel
PP	Project Paper
PPU	Project Preparation Unit
SR	Structure Replacement
TA	Technical Assistance
WMP	Water Master Plan
WRC	Water Research Center

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Mission Project Committee

Chairman	R. Fulton, AGR
Agricultural Development Officer	M. Winter, AGR
Agricultural Engineer	N. Dimick, AGR
Engineer	R. McGuire, DRPS
Program Officer	R. Fraenkel, DPPE
Procurement Officer	C. Raley, IT
Attorney	T. Carter, LEG
Financial Analyst	R. Layton, CON
Agricultural Economist	F. Moore, AGR

I. Summary and Recommendations

- a. **Project Title:** Irrigation Management Systems
- b. **Project Number:** 263-0132
- c. **Grantee:** The Government of Egypt
- d. **Coordinating Agency:** The Ministry of Irrigation;
Senior Coordinating Committee responsible to H.E.
the Minister of Irrigation.
- e. **Implementing Agency:** The Ministry of Irrigation (MOI)
- f. **Amount:** US \$ 42,000,000. Of this total \$23 million is capital assistance covering local costs of initial 2 year structure replacement program (SR); and \$19,000,000 is for: contract services, commodities, training, other costs and evaluation. This amount is to be matched by GOE contribution of \$119 million equivalent for SR (\$33 million) and other costs (\$86 million). An additional \$70 million for SR is expected to be requested in FY 83, dependent upon a successful program the first 2 years.
- g. **Terms:** Grant. SR to be funded through dollar purchase of Egyptian pounds. TA funds for dollar costs (about 90%) and local costs (about 10%).
- h. **Life of Project:** Five years
- i. **Total Project Costs:** Expected to be U.S. \$ 344 million composed of \$ 112 million AID; \$ 232.0 million equivalent from GOE. Additional AID funding and GOE contribution for SR above amounts requested in this Project Paper are projected, dependent upon successful implementation of initial SR program.
- j. **Goal:** Effective control of Nile waters for all uses and particularly their optimal allocation to and within agriculture as a means of helping increase agriculture production and productivity.

k. Purpose: Improve the operating efficiency of the total irrigation system and strengthen the Ministry of Irrigation's operation, maintenance and planning capabilities.

l. Strategy: The project will provide major capital support to reduce the backlog of SR now hampering effective water management and control. Funds for SR will be committed on the understanding it is the intent of MOI/GOE to allocate sufficient funds to eliminate the backlog of SR by the end of this decade. AID funding for SR will be limited to 5 Directorates in the Delta (ex Charbia) in EFY 81/2 and 82/3 before being generalized, assuming implementation of initial SR program proceeds as planned and additional funding is provided, to the whole country in year 3 of the project.

TA, including contract services, training and commodities, will be provided to: (a) plan an improved operations, maintenance and structural replacement O/M/SR system for the Charbia Directorate in the Central Delta; (b) assist the development of a Project Preparation Unit (PPU) in the Planning Department, MOI; (c) support the conduct of a feasibility study to redesign and/or improve the irrigation system of the North Zifta District with the intent of replicating it nationally if found feasible; (d) support the execution of the improved SR program; (e) support in-country management and technical training and participant training abroad; and (f) enable the MOI to draw on engineering consultant services as needed. Additional commodities to support improved O/M/SR performance and selected other MOI activities will also be provided. Finally, funding for project evaluations is included.

m. Project Outputs: (a) an accelerated level of SR which will significantly reduce the SR backlog by the end of the project; (b) a system to plan for O/M/SR requirements in place and ready to be implemented in one or more Directorates; (c) a functioning Project Preparation Unit in place; (d) a feasibility analysis for system redesign

completed; (e) studies presented to funding agencies for needed and feasible irrigation system improvements; (f) additional MOI staff engaged in planning; (g) quantity and quality improvements in MOI personnel; (h) advisory service provided to MOI management on key problems and issues.

n. USAID Project Inputs:

	<u>\$000</u> (constant 1981 prices)
Technical Assistance:	
1. Contract	9,089 <u>1/</u>
2. Commodities	2,995 <u>2/</u>
3. Other Costs	220
4. Participant Training	<u>1,091</u>
Subtotal at 1981 prices	13,395
Inflation	<u>3,831</u>
Total (including inflation)	17,226
Contingency (rounded)	<u>1,774</u>
Total TA	19,000
Capital Assistance (Structure Replacement)	
SR funds at constant 1981 prices	19,302 <u>3/</u>
Inflation	<u>3,698 <u>4/</u></u>
Total CA	<u>23,000 <u>4/</u></u>
 TOTAL AID INPUTS	 42,000

1/ Includes \$1,144,000 in commodities to be procured by the contractor(s).

2/ Includes all commodities to be procured outside the contract(s).

3/ This represents the total funding, excluding inflation, that AID will provide for the initial phase of the SR program. No separate contingency figure is included; however, the total is judged adequate to cover the costs of the initial program including the additional costs due to improvement in construction quality.

4/ Includes \$105,000 to bring total to even \$23.0 million.

o. GOE Inputs:

	<u>Salaries & Allowances</u>	<u>Operating Cost</u>	<u>Total</u>
1. Current budget			
SR/Gharbia ^{1/}	23,800	34,170	57,970
PPU Development	600	500	1,100
North Zifta Study	100	100	200
Training	570	430	1,000
Total (1981 Prices)	<u>25,070</u>	<u>35,200</u>	<u>60,270</u>
Allowance for Inflation (over 5 years)			<u>26,100</u>
Total current budget (including inflation)			86,370
2. Capital budget for SR (including inflation)			<u>32,846</u>
Total Contribution of GOE			<u>119,216</u> ^{2/}
		Rounded to	<u>119,000</u>
GRAND TOTAL PROJECT COST (GOE and AID)			\$161,000

^{1/} Based on 25% of projected budget of the Irrigation Department in years 1 and 2 of the project and 40% thereafter under assumption SR project activity will be generalized to the whole country.

^{2/} In addition to the indicated contribution, GOE inputs will also include the use of offices, classrooms, libraries, laboratories and other facilities.

- p. **GOE Institutions Involved:** The primary agency involved is the Ministry of Irrigation which has responsibility for all irrigation activities in Egypt. Within the MOI, the Irrigation Department and the field Directorates, the Planning Department including the PPU, the Water Research Center and its Training and Water Master plan units are the major concerned organizations. With respect to the North Zifta study coordination with the Ministry of Agriculture, the Agricultural Bank, the Ministry of Economy and selected other agencies will be required.
- q. **Covenants and conditions:**
- (1) The project is conditioned on Grantee covenants as follows:
 - (a) The Grantee shall annually survey structural requirements in accordance with criteria agreed upon by AID to ensure that work is undertaken to meet the highest priority needs for improved water control consistent with reasonable cost.
 - (b) 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;
 - (c) The Grantee shall expeditiously institute a manpower and training program, with an appointed Director, who 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 Ministry further covenants to make such selected individuals available for necessary training, including overseas training, for project purposes;
 - (d) The Grantee shall introduce a performance-based incentive payments systems for MOI project staff;
 - (e) The Grantee shall in its annual budget requests include sufficient funds to adopt and apply the upgraded planning/execution system for operations and maintenance;

(f) 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.

(g) The Grantee shall, prior to the first disbursement during each Egyptian Fiscal year, reach an agreement with AID on the maximum amount of AID reimbursement for structure replacement for that Fiscal year.

(2) Conditions Precedent to Disbursement

(a) 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 AID, the Cooperating Country shall furnish, except as the parties may otherwise agree in writing, in form and substance satisfactory to AID, 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.

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

(1) Assurance that all structure replacement initiated in Directorates for which AID funding will be sought will be adequately funded in advance by the Grantee,

(2) Evidence of criteria indicating that Project Funding will meet the highest priority needs for improved water control consistent with reasonable cost,

(3) 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.

r. Possible Future Amendments:

AID should be prepared to consider amendments to the project as follows:

(1) funding to extend SR program to entire country per the plans developed;

(2) funding to support the extension to one or two additional Directorates in EFY 84/5 and 85/6 of the upgraded O/M/SR program to be developed for Gharbia under this initial funding;

(3) depending on the outcome of the feasibility study, follow-on funding for detailed construction drawings and implementation of a redesigned system or a betterment program in North Zifta; and

(4) funding for nation wide aerial photography and/or mapping as a basis for improved O/M/SR planning.

s. Recommendations:

Grant \$ 42,000,000
(including \$25,134,000 for purchase of LE 17,594,000)

- Based on Mission request (Annex IX)
it is recommended that it be determined that U.S. dollars may be used to purchase local currency.
- Based on Mission request (Annex IX)
it is recommended that a waiver of shelf item limits an amount of individual purchase and total amount purchase be granted.
- Based on Mission request (Annex)
it is recommended that nationality of supplier be waived to allow duty-free zone purchase of three vehicles

II. Introduction and Background

A. Introduction

Egypt has enjoyed many benefits of the Aswan High Dam in the form of increased water supplies for summer crops, greater cropping intensity in the old lands and an improved capacity to meet the requirements of irrigation on the new lands reclaimed under programs for agricultural growth. Yet Egypt needs the assurance of a continuing basis for agricultural growth to improve food security and meet the needs of a growing population. The expanded and assured water supply from the High Dam calls for the best possible management and the irrigation system needs to be in good physical condition so that water can be brought under control for increasingly efficient use. Otherwise the blessing of a supply excess to needs in this decade could leave a tragic legacy of damaged, waterlogged fields for the coming decades when increasing demand will make water a genuinely scarce resource.

USAID interest in the effective operation of the irrigation and drainage system began immediately upon resumption of assistance to Egypt in later 1974. The first assistance activity in a broadly defined agricultural sector was the Water Use and Management Project approved in 1976. Also authorized in 1976 was the Canal Dredging Equipment Project, aimed at improved system maintenance, and the PVC Pipe Drainage Project to support drainage activities. Pumps for the system were provided via an Irrigation Pumps Project (1977) and through CIP financing.

The activities proposed in this Project Paper (PP) represent the results of MOI, World Bank and AID analyses, discussions, meetings and study teams over the past 24 months. Following discussions in the summer/fall of 1979 an Irrigation Rehabilitation/Modernization Team with both World Bank and AID participation was provided. The team identified a number of broad areas requiring assistance 1/ 2/ and was followed in August/September, 1980 by an AID team that examined selected priority areas in more detail. The work of this "Scope of Work" Team 3/, subsequent discussions with the MOI and a

- 1/ G.L. Corey and E.V. Richardson. Improving Irrigation in Egypt. 2/1/1980
- 2/ IBRD, Arab Republic of Egypt - Irrigation Rehabilitation/Modernization, Technical Review Mission Report, February 1980.
- 3/ Stephenson, J.E. et al., Nile River Irrigation System Redesign, Rehabilitation and Improvement Program. Consortium for International Development under AID Contract AID/SDD/PDC-C-0217, W.O. 7, October, 1980.

series of meetings with the World Bank Irrigation Sector Team in November, 1980 provided the basis for the Irrigation Management System PID submitted in February, 1981.

During March-May, 1981 a team of engineers/trainers from CH2MHILL International under AID contract focused on the structural replacement, O&M and training aspects of the proposed project. Their reports 4/ and the work of an AID-funded economic/organizational consultant from Devres, Inc. form the basis for this Project Paper. Both the CH2MHill and Deveres personnel worked closely with MOI staff in analyzing developing the project components which consequently reflect accurately MOI needs and agreed upon elements and procedures.

It will be noticed with the inclusion of the full five year costs of the SR program that the total cost of this project nearly doubled between the PID and the Project Paper. A small portion of the increase is for additional technical assistance and commodities recommended by the design team but the majority of the proposed additional funding is for the SR program. This substantial increase in SR funding is the result of two changes during project development.

First, the strategy changed. The PID did not contemplate an SR program that would completely refurbish the small structures in the system by the end of the decade. Rather, the PID proposed only to fund a portion of the deferred structure replacement backlog that existed. The design team felt, and argued convincingly, that such a modest program would show little positive effect, i.e. the depreciation rate was such that at the end of the project the system would be roughly in the same condition as at the start. Only a larger program which took into account the on-going depreciation while also replacing the backlog of structures was logical. Because the MOI proved willing to fund the majority of such a program and had, or could be assisted to develop, necessary implementation capacity the SR program was expanded. This change added nearly 50 percent to original SR program cost estimates.

4/ Haapala, Richard V. et al. Report of the Egyptian Irrigation Management Systems by the USAID Design Team, Main Report-Egyptian Irrigation Systems Operation, Maintenance and Structural Replacement and Report on Manpower Development and Training. CH2MHILL International under AID Contract AID/OTR-C-1610. May 1981.

Second, the MOI also agreed to address the problem of building to higher quality ^{1/}. Because earlier cost estimates of work necessary to bring the system back to good condition were based on inadequate unit costs, once higher quality was sought the costs rose. This added roughly 30 percent to the earlier estimates.

It might also be noted that the World Bank has agreed to provide assistance to the Project Preparation Unit and is considering assistance for the re-design of one or more irrigation districts in upper Egypt.

B. Background

The Ministry of Irrigation in Egypt has a long, successful tradition of managing the complex system for storage, release, distribution and drainage of Nile River waters which support agriculture and indeed life itself in the country. The system which exists today evolved in the century preceding the commissioning of the High Dam at Aswan in 1964. It consists of two dams at Aswan, seven major barrages (water diversion structures) on the Nile in Upper Egypt and in the Delta, 48,000 Km (30,000 miles) of canals and irrigation channels (virtually all unlined) and a vast array of pumping stations, smaller water control structures and other installations to deliver water to the six million feddans of land irrigated from the Nile.

The basic technology of Egypt's irrigation system and its manner of operation evolved in the historic process of planning and design as greater and greater control permitted a change from traditional basin irrigation to perennial irrigation. Before the completion of the High Dam in 1964 the country was perennially short of water in the summer season (June to August) of peak water demand. With the High Dam in operation providing full control of the flow of the Nile and capacity for multiseason storage, there developed an excess supply of water relative to aggregate crop demand. Overall the potential existed to meet the full water requirements throughout the country at all seasons. In many local areas, however, there are shortages due to limited capacity of the canals and the inadequacy of various water control facilities.

The main characteristics of the Nile irrigation system in Egypt are as follows: (1) amounts being delivered are judged by channel levels rather than by flow measurements; (2) water is

^{1/} See Section III for additional discussion of problem.

supplied to the distribution channels on a rotation system that alternates on-off periods varying seasonally with cropping patterns; (3) most farmers must lift water onto their fields rather than having water delivered by gravity flow. Because adequate supplies in the aggregate are generally available most farmers irrigate only during the daytime even though canals 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 become a serious problem since the High Dam has made available a quantity of water currently in excess of requirements. The result is that the traditional scarcity of water has not been the strong force it had been to encourage the exercise of discipline in water control and management. However, as indicated below, conditions of scarcity are expected to reappear in the not too distant future.

A further important feature of the system is the inter-relationship with the rural road network. In the closely worked fields in the Egyptian farm lands, transport is critical to the movement of people, inputs and outputs. But arteries for such movement have been kept to a minimum in order to maximize available cropped area. The road farm market network, is therefore not extensive yet must often cross waterways. Bridges consequently are highly important to the maintenance of canals and to the O & M process itself. The MOI has the responsibility to maintain these 10,000 bridges and must do so to maintain satisfactory relations in the community and receive farmer cooperation. As a result bridges play a significant part in the total Ministry SR program though they are given lower priority than structures with a direct role in water control.

For the future, consideration must extend beyond the constraints to current and future agricultural yields and overall production on old lands. The Government of Egypt has proposed to undertake further reclamation of 2.8 million feddans of new lands over the next two decades to address the strategic needs of the nation and to provide living space, work places and increased production for a rapidly expanding population. Water will therefore become steadily scarcer and is expected again to be the resource which will limit horizontal expansion, constrain industrial growth and pose a problem to meeting household supply requirements as population continues to grow. As water demands grow, the requirements will call for steadily higher levels of performance by the MOI.

An overly simplified macro analysis of supply/demand of the Nile waters will demonstrate the issue. Egypt's share of the Nile waters, according to its agreement with Sudan, is 55.5 billion cubic meters (cu/m) annually. In addition, about another 2 billion cu/m more are temporarily available from Sudan because Sudan is not currently using its entire share of 18 billion cu/m. The quality of the Nile's water is very good and some drainage water can also be reused. Estimates vary from 4.3 billion cu/m to 12 billion cu/m. Upper Nile projects could add another 9 billion cu/m and perhaps underground water could add another one billion cu/m. Thus even the realization of the most optimistic plans would give Egypt only 77.5 billion cu/m of water. However, in the long run Egypt will probably have less because upstream countries, such as Ethiopia, are planning large-scale diversions of tributaries which feed the Nile and because drainage water reuse is likely to be less than the maximum.

On the demand side, Egyptian farmers currently cultivate approximately 6 million feddans (acres) with a cropping intensity of roughly 200 percent. The result is a cropped area of approximately 12 million feddans. Planned water requirements per feddan of cropped area vary from below 4000 cu/m for some cereals/beans to 18,000 cu/m for sugar cane. Crops such as berseem and rice are somewhere in the middle of the range. If the lower figure of 4000 cu/m is multiplied by 12 million feddans, one finds that already 48 billion cu/m are needed for agricultural purposes alone, excluding industrial and domestic water use. Egypt's plans also call for the reclamation of nearly 3 million feddans of desert land. Assuming double cropping and current water use efficiencies, this will result in an increase of over 20 billion cu/m or a total demand of 68 billion cu/m. Actually, newly reclaimed lands thus far have had extremely high amounts of water applied: 15,000 to 24,000 cu/m per feddan. However, other countries have developed relatively efficient water distribution and application systems through the extensive use of water saving techniques and have reduced usage to 2500 cu/m water per acre. If this can be achieved in Egypt the prospects are much better. Nevertheless, this will be a lengthy process. Given that long-term agricultural development strategy calls for more high value crops, such as fruits, vegetables and sugar cane, it is more likely that water use for the 15 - 16 million feddans in the foreseeable future will be closer to 4000 cu/m than 2500 cu/m. At that level, Egypt has little water margin.

Thus, it becomes absolutely critical, to achieve maximum benefits from its rich, but limited agricultural land base, that Egypt begin to establish the means for a complete and efficient control of the waters of the Nile.

III. Problem Description

A. Overview

Over the past 15 years, budget limitations, an emphasis on major canal maintenance and, more recently, heavy expenditures on the provision of tile drainage in farmers' fields have reduced funds available for maintenance and replacement. Many structures are therefore totally inoperative or only partially functional. Those which have been replaced have sometimes been built to poor standards, are only partially effective and have short life and high maintenance requirements.

Simultaneously, and partially due to the same funding constraint, the MOI has not been able to attract, develop and support the manpower needed to carryout its increasingly complex responsibilities. Modifications to the current irrigation system have not been studied or tested on a sufficient scale. Planning and project design activities have been minimal as on-going activities absorbed available money. The MOI has not been able to change to meet the new requirements.

B. Specific Problem Areas of the Irrigation Sector

Among the set of problems identified in the course of various studies leading up to this project some have emerged as critical constraints to satisfactory future performance in irrigation and hence to agriculture in general. These are: (1) inadequate system operation and maintenance; (2) limited capacity for planning and project design in the MOI; (3) system design characteristics; (4) manpower problems and need for manpower development and training within the MOI; and (5) shortages of expertise in selected areas.

1. System Operations/Maintenance and Structure Replacement:

The Egyptian irrigation system includes many types of structures ranging from the Aswan Dam to small irrigation headgates. The structural replacement program is designed to replace and rehabilitate the minor irrigation structures composed of intake regulators, head regulators, weirs, tail escapes, spillways, bridges and crossing works. These structures vary somewhat in size and are constructed from reinforced concrete, masonry, pipe, steel and timber. Table 1 shows the number of structures by function, hydraulic area and type of construction.

Table 1
 Characteristics of
 Irrigation Structures

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 BCG.	747	1759	1401	—	—	536	420	47	—	—	225	172	18	—	—	79	45	6	—	—	57	31	1	—	—
HEAD REG.	757	582	516	—	—	100	240	32	—	—	116	96	19	—	—	72	57	2	—	—	77	33	—	—	—
WELLS	9	46	10	—	—	15	17	—	—	—	6	19	—	—	—	2	16	—	—	—	15	7	—	—	—
TAIL ESCAPE	73	46	1616	—	—	3	9	4	—	—	2	2	—	—	—	2	—	—	—	—	2	—	—	—	—
SPILLWAY	3	2	126	—	—	2	2	—	—	—	2	2	—	—	—	2	1	—	—	—	6	5	—	—	—
BRIDGES	574	673	1559	2	212	1848	266	21	5	306	1775	129	8	5	352	1017	71	15	1	106	847	23	6	25	79
CROSSING WORKS	22	—	474	—	—	3	—	44	1	—	2	—	3	—	—	7	—	1	—	—	1	—	—	—	—

Notes : RC = Reinforced concrete M = Masonry P = Pipe S = Steel T = Timber

Source: Arab Republic of Egypt, Water Master Plan, Technical Report 20, March 1981

Perhaps the most pressing problem confronting Egypt's irrigation sector is the backlog which has developed in the replacement of those structures. Some observers have characterized the present situation as one in which the irrigation system is in danger of "falling apart"^{1/}. Others, less alarmed, still believe the system at the very least is becoming steadily less able to meet the needs of today's agriculture, poses a serious constraint to an improved growth rate in the agricultural sector, and will be unable to meet anticipated future demands for water for various uses. Both views reflect a concern for the serious threat to Egypt's economic future and national well-being. The deterioration must be reversed. An accelerated program to replace and make major repairs to small structures in the system, while keeping it currently operational at all times, is a high national priority.

According to the most recent (1981) survey by the MOI the backlog of deferred small structure replacement (excluding barrages) amounts to LE 44 million at 1981 costs using current construction practices (See Annex I, Chart 4). In addition, the condition of many of the smaller canals indicates that maintenance requirements of the waterways have not been met. Smaller canals and laterals in all parts of the country are in need of weed control, cleaning and/or reshaping to regain or maintain their design flow capacity.

This situation stems primarily from severe budgetary constraints over a number of years and within these limited resources, the giving of priority to large structure replacement, field drainage and essential maintenance on major canals such as desilting, dewatering and reshaping of these canals for maintaining their water carrying capacity. When funds are limited priority is given to the most urgent needs where the impact of postponed maintenance would be greatest. It has therefore been inevitable that many over age structures were not replaced when funds were scarce because other work took higher priority.

If structure replacement continued at levels below the rate of depreciation both the size of the financial burden and the scale of the task would mount. It is already of such dimensions as to require the most urgent effort and the best management the MOI can bring to bear. If the target is set to eliminate the backlog of SR by the end of the decade it will require average annual expenditures

^{1/} Stephenson, James E. et al, CID, Nile River Irrigation System Redesign, Rehabilitation and Improvement, October 1980, p10

for this purpose during the decade of LE 20 million (at 1981 prices) or nearly three times the 1980/81 level.

This target is based on estimated rates of depreciation and the construction of structures in full compliance with existing design standards and specifications. The design team has reviewed the standard design criteria, specifications and design manuals of the MOI and discussed them fully with the senior technical staff of the MOI. These criteria, standards and specifications are entirely adequate, when fully complied with, to assure sound structures. Cost estimating procedures used by the MOI provide a basis for reasonably firm cost projections. Similarly, existing fiscal procedures and contractor financing arrangements permit estimating periodic funding requirements. The design team found, however, that construction contract award prices, to spread out the limited available funding, often do not contain sufficient funding per unit of work to allow construction to full specification. The view has been taken that small structures do not require a full measure of quality control. While specifications continue to be written according to existing standards, contracts are let and structures completed at a funding level that precludes adherence to specifications, and thus makes inspection and certification a somewhat uncertain process. The MOI recognizes this difficulty, but, since legally designed standards cannot readily be changed, accepts the structures, which do not fully comply with the specifications and which therefore have a shorter, than originally planned design life. This adds to the SR problem in the years immediately ahead and, besides additional funds, requires a new approach and a re-education of the staff to correct these practices. To obtain the necessary quality of brick and concrete (as called for in the MOI specifications) the unit costs will necessarily be higher (See Technical Feasibility Sector of this PP for additional discussions). To raise all construction to specifications and standards, an increase in actual average unit costs is necessary. The LE 20 million includes allowance for this increase.

The SR program will call for the mobilization of a major effort by the MOI, the very efficient deployment of its manpower, a sustained training program to improve its capacity to carry out the program and an incentive payment system to encourage the required level of effort of all concerned. The MOI is experienced in performing and supervising the types of work required for routine maintenance and small structure replacement. Staff, necessary plans and administrative procedures do exist although obviously the capacity

is not unlimited. An expanded program does confront the MOI with major staff, facilities and equipment problems. The scale of the problem poses a genuine challenge to the MOI but one which the Ministry appears to be willing and able to meet.

2. Planning and Project Design:

At present, departments and sectors within the MOI, for example, irrigation, drainage, mechanical and electrical, perform planning functions that are coordinated at the Undersecretary level by the Undersecretary of Planning and Follow-up. In addition, the Water Master Plan staff, now in the Water Research Center, provides some macro-level analytic capacity. Nevertheless, the absence of a multi-disciplinary unit and specialized sections for gathering and analyzing data limits the capacity of the Ministry to prepare general, overall analyses and plans, and to carry out comprehensive technical and economic studies testing the viability of projects proposed by various operating units and donors or developed by other departments or sectors.

Some of the problem stems from a basic shortage of Ministry personnel with necessary skills in planning, economic analysis, and financial analysis. The manpower is not available currently to do all the needed planning no matter what the organizational structure is. In addition, because the benefits of intensive, comprehensive planning have not been convincingly demonstrated, there is also some skepticism at certain Ministry levels over the real value of devoting resources to this function. Study, analysis and plan preparation are sometimes viewed as non-productive consumers of time and resources and as unwelcome substitutes for concrete, physical activities. Nevertheless the MOI has recognized its need. A decision to move forward has been reached and a formal decision taken to create and develop this essential capacity. This will be the responsibility of the recently created Project Preparation Unit to make quality feasibility studies, identify priority projects and obtain needed funding.

3. System Design and Operation:

The existing system encompasses some six million feddans under cultivation and 45,000 kilometers (28,000 miles) of unlined canals in fifty command areas. Water is provided from the main canals to the branches and laterals on a rotation system that alternates on-off time periods (for example, seven days "on" and seven days "off") which vary seasonally with cropping patterns. Water requirements are fulfilled not by measurement to a sub-system or farm but by maintaining water levels throughout the system from

which the farmer may draw at will during the "on" period. This may result in over-application of water by the farmer and substantial waste to drains and seepage at night when the "on" sub-system is flowing full with little off-take by farmers. The costs and economic penalties associated with such a system include handling drainage water that runs through the irrigation system unused, losing cultivable land through water-logging, draining lands water-logged through overuse of water or seepage from conveyance systems, and loss of unused water to the sea. Further, there are often considerable flows to sub-systems during the "off" periods due to leaky control structures, generally wooden stop-logs or worn slide gates.

In an attempt to limit the over-use of water by the farmer, the present system generally provides water in the farm or header ditch at a level below the adjacent farm plots so that the farmer must raise the water to his fields by pumping. Such pumping is done at considerable cost by the farmers and represents an economic cost to the country. (Estimated by the Scope Team to be as much as LE 100 million per year). It has been estimated that only some 10% of farm off-take from the system is accomplished by gravity.

Finally, the management, operation and maintenance of the "meska" (the header or farm ditch from which the water is diverted directly to the individual farm plots; a meska may serve 5-40 farm families and an area of 25-200 feddans, sometimes more) is far from optimum. At present the meskas, all unlined, belong to the farmers, even though some are reported to be as long as five kilometers. Until this year the MOI's responsibility ended when water was delivered to the head of the meska. Under new regulations, the MOI is assuming some responsibilities at the meska level. Generally there are no formal farmer organizations to control quantity or timing of off-takes from the meska and no organized maintenance of the waterway. The result, physically, is that the meska is often overgrown with grass and weeds and of uncertain cross-section and capacity. Operation is discriminatory; the farmer at the upper end of the meska is in a superior position to secure his water requirement (quantity and timing) at will; the "tail-enders" at the downstream end get little or no water at all in peak requirement times until the upper-end users

have had their fill.^{1/} Then the supply must generally come through a grass-choked channel. In an effort to move the water under such conditions maximum head is used. This adds to the seepage problem and the quantity of water wasted as it passes through the system unutilized during the non-daylight hours when generally no one is irrigating (except in an emergency situation when a tail-ender has no choice).

In summary, the meskas are not maintained in reasonably efficient operating condition and an operating procedure does not exist which is equitable and controllable in terms of off-takes to meet the needs of the farmers and significant reductions in water passing through the system unutilized. Simply stated, the current system design imposes unnecessary costs on farmers while not allowing for regularized farmer participation in decision-making about the operation of the system.

Rehabilitation and improvement of the entire system including redesign, physical implementation and operational modifications will be a massive undertaking extending over many years. However, a substantive beginning needs to be made both to initiate the process and to learn lessons to be applied as the process continues.

4. Manpower Capacity:

In the performance of its functions the MOI needs a full cadre of trained staff for management, engineering and technical functions as well as foremen, skilled and unskilled laborers. In fact its ranks have been thinned by recruitment problems for engineers and technicians at the entry level in recent years. Salaries and wages paid by the Ministry have become less and less competitive. Inflation, the economic upswing in Egypt and opportunities for employment abroad have provided alternatives for

^{1/} Extensive information on this problem has not been located. A small survey conducted by the staff of the Egypt Water Use and Management, Project "Economic Costs of Water Shortages Along Branch Canals", Shennawi El Shennawi, et al., Staff Paper June 1, 1980, illustrated differences between upper-end and lower-end farmers along branch canals. The data suggested that up to one-third of the land was being operated below its potential due to water availability problems.

engineers, technicians and skilled workers to secure earnings well above the civil service levels.

Since 1976 the government has ceased to direct engineering graduates to compulsory employment in designated positions in Ministries. As a result, in the case of engineers, there is neither a directed employment requirement nor a monetary incentive sufficient to attract adequate numbers of new recruits. For technicians and skilled workers MOI salary levels are similarly unattractive. As a result the Ministry has on board in 1981 only 707 engineers against a requirement for 1393. The shortage is primarily in the junior ranks. For technicians the shortage is even more acute. Total requirements are estimated at 1282 while only 454 are presently employed, many of whom, are less than fully qualified. The shortage has its main impact on capacity for work in the field.

In addition to performing professional duties, engineers fill most of the more senior administrative positions in the Ministry of Irrigation. Their training as professional engineers equips them well for many of these responsibilities. But they generally feel and express a need for supplementary training in such areas as management, personnel and financial administration, organizational development and for refresher programs to strengthen and update their practical knowledge and engineering skills. They and the Ministry would benefit from greater knowledge of new materials, opportunities to develop skills in examining alternative design options, construction procedures, quality control and management as well as greater knowledge of hydraulics and on-farm water management. Given the key role the Ministry plays in the national life, by managing the water of the Nile, the staff should have greater opportunity to maintain and modernize their skills and grow professionally on the job in order to meet the challenge of a changing set of programs.

The Ministry needs a coordinated manpower development and training program and better linkages with other institutions from which it recruits personnel. In this way there could be a steady growth in the qualifications of new recruits and a means for professional and skill development on the job.

Since the Ministry is short of personnel, it faces a period when vigorous recruitment must be undertaken. For that to be fully successful, salaries and wages should be more attractive. To improve productivity and raise the quality of output a system of incentive payments directly related to performance should be

instituted. At the same time all personnel need to be placed in positions of the highest priority use of their skills. If the Ministry is to rise to meet the demands it faces it will need to address all of these problems. Fortunately the MOI has a clear view of these needs and its top management is prepared to institute programs to deal with them. The next five years will present a real challenge in these critical areas.

5. Expertise in Selected Areas

The Ministry of Irrigation has need for engineering consultants from time to time on a variety of problems and issues they face in managing the Ministry and the Irrigation network. Recently, for example, the MOI became concerned about the structural soundness and safety of the old major structures (barrages) on the Nile. To assess the problem the MOI requested that AID and the World Bank provide a panel of experts. Similarly, the MOI has expressed interest in an expert to evaluate coastal erosion.

In addition to specialized technical needs in highly complex and specialized problem areas, there are also requirements, from time to time, for general advisory services in the operation and management of the Ministry and its irrigation facilities. There is also a need for consultation on the latest technology or "state of the art" to keep MOI staff abreast of recent development. None of these needs is being effectively met at the moment.

The problems stem from the mentioned shortages in Ministry staff and the limited funding that has been available. With limited manpower and financial resources, the MOI has not been able to recruit or train a complete range of highly specialized engineers. Nor would development of such an internal capacity necessarily have been cost-effective given the limited time such expertise would probably be needed. Rather, the use of outside or international experts on the special problems or to meet special needs is indicated. Unfortunately, the same above-mentioned funding constraints have limited the MOI's ability to contract with external experts to provide needed specialized expertise.

IV. Project Description

A. Overview

The Irrigation Management Systems project brings together a set of related activities to be carried out within several established organizational units of the MOI and under the management and direction of the respective heads of those departments, sectors, etc. The Ministry has established a Coordinating Committee responsible to the Minister to maintain continuing oversight and recommend actions and policies to appropriately integrate the various activities. They are related in several ways. Structure replacement is the investment component of O & M (in its larger sense) for which a planning system is to be developed; the contemplated system redesign may affect what is needed and/or the priorities of SR work; project analysis and preparation of feasibility studies must reflect field realities (priorities, personnel, costs, etc); training and manpower development need to be closely geared to existing programs and planned changes. The integration and direction of the program must be the task and the responsibility of the MOI while the expatriate personnel are to provide technical advisory services and operate under the administrative guidance and policy direction of the leaders of the respective units they serve. The "project" therefore, is a related set of Ministry activities to which advisory assistance, financial support and physical inputs are provided by AID. AID inputs become integrated into the Ministry programs through the understandings embodied in an agreement between AID and the MOI which reflects joint commitment to a set of defined objectives. In the ensuing discussion of the IMS project this is the context in which it is to be understood that action programs proceed.

As the primary party in this undertaking the MOI will provide a large input of financial and in-kind resources in activities which are components of this project, including office space, facilities, operating costs, salaries, allowances and also a major investment in structure replacement. The MOI input in cash is expected to be not less than \$ 119 million equivalent or 73.9 percent of the estimated \$ 161.0 million covered in this Project Paper. If additional funding for SR is provided the GOE input is projected at \$232 million equivalent of 67.2 percent of the estimated \$344 million total cost of the project.

B. Framework of the Project

1. Goal

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

2. Purpose

To improve the operating efficiency of the total irrigation system and strengthen the Ministry of Irrigation's operation, maintenance and planning capabilities.

To achieve this purpose the project will:

a. Provide assistance to the MOI in replacing and rehabilitating irrigation structures.

b. Plan an improved O/M/SR system in the Gharbia irrigation district with the intent to replicate in other districts.

c. Assist in the development of an expanded and improved MOI analytical planning capability.

d. Support the conduct of a feasibility analysis of a nationally replicable irrigation system redesign for one district taking account of potential productivity gains, energy savings (if any), the cost of O & M and required services and the relative cost of alternate water-saving approaches.

e. Establish MOI staff development program.

f. Supplement MOI capacity for review and analysis of problems and issues.

3. Strategy

to make water increasingly available for use beyond the old lands as demand increases in the next decade. It is likewise intended to eliminate sub optimal management of the irrigation system as a constraint to agricultural growth by the end of this decade so that a steadily improving set of agricultural support systems can have their full intended effect. The improvement of planning, O & M, system re- design (or betterment) and the strengthening of MOI staff capacity all are directed toward the same fundamental objectives.

In developing this strategy the Mission was fully aware that a major responsibility of the MOI is the maintenance and replacement of bridges associated with major and minor irrigation structures and that bridges are included in the MOI SR program. On careful consideration, the decision was reached that assistance to this facet of MOI responsibilities was fully justified, because: (1) bridges are, in fact, an integral component of many irrigation structures, such as intakes and head regulators; (2) bridges are essential to the maintenance of the canals. Without them, indiscriminate fording of canals by people and animals would accelerate the erosion of their banks and hasten the deterioration of the water distribution system; and (3) on the GOE side, funds allocated to the MOI for meeting all its responsibilities are fungible. Restricting AID funds to uses other than bridge work would merely skew the allocation of funds within the MOI budget so that its capacity to plan and implement the balanced budget required to institutionalize a capacity to meet all its responsibilities might, in fact be impaired as a result of a more narrowly focused grant.

To implement the strategy, the Mission proposes initially to fund the technical assistance elements of the program for the life of the project and the first two years of the planned SR effort. The decision to include life of project funding for technical assistance elements reflects the desirability of fully funding TA contracts and the judgement that the probability is very high this will proceed as planned. The total level of funding for TA is also relatively modest. The less than total funding for the SR component recognizes, although the analyses indicate the MOI has or is expected to develop capacity to carry out the enlarged SR program, that unforeseen difficulties may arise. Consequently, it is financially and managerially prudent to limit initial funding to a modest level with subsequent inputs dependent on implementation experience and evaluation of results. If the SR program proceeds as scheduled, the additional funding necessary to fully achieve the above described system upgrading objectives would be sought by

project amendment in year 2 or 3. Nevertheless, to maintain an overall perspective, and in recognition of the various linkages between components the Project Paper is presented in terms of the complete program for both capital and technical assistance, except in the financial sections and some of the tables.

4. Project Activity

a. Outputs

1. SR program accelerated to a level which significantly reduces the backlog during the life of the project and all construction meets MOI specifications.
2. System to plan for O/M/SR requirements in place.
3. Revised O/M/SR system in use in one or more Directorates.
4. Functioning Project Preparation Unit in place.
5. Feasibility analysis of system redesign completed and appropriate consideration given to next steps indicated by results of the study.
6. Studies presented to funding agencies for needed and feasible irrigation system improvements.
7. Additional MOI staff engaged in planning.
8. Quantity and quality improvements in MOI personnel.
9. Advisory services provided to MOI management on key problems and issues.

b. Inputs

AID

1. Technical assistance advisors and consultants (long and short term).
2. Equipment, supplies, vehicles to support TA activities and upgraded program of O/M/SR.

3. Support costs (partial), in-country training and some local support staff.

4. Participant Training abroad.

5. Dollar financing of local costs (and possibly off-shore materials) of SR program.

GOE

1. MOI staff time, salaries, per diem and incentives payment.

2. Office space, laboratory and other facilities, furniture, operating costs for vehicles and other local costs.

3. Expanded investment in SR.

4. Access to all available data and information or planning.

C. Detailed Project Description

1. Structure Replacement:

With a backlog of small structures to be replaced the MOI and AID (with the advice of a technical design team) have agreed to undertake a joint effort to substantially reduce the dimensions of that problem over the next five years. In response to U.S. funding support, the MOI is undertaking to expand its own budget steadily over the next five fiscal years to a level nearly 3 times the current SR budget of LE 7 million which it recognizes to be below the current rate of structure depreciation. It has further undertaken to bring the standards of construction up to meet established MOI designs and specifications. This program can thus be expected to bring within the MOI capacity the elimination of the SR backlog by the end of the decade. More importantly this will enable the MOI to manage and control the irrigation system with greater efficiency and effectiveness. The principal benefits to be anticipated from this are: (1) reduction of problems of high and rising water tables so that productivity can be increased, and (2) the reduction of waste so that water will become available to meet other demands.

The MOI is aware of the limits of its present staff capacity and has therefore undertaken 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 will be accelerated at a moderate pace covering the five Directorates with the most severe SR problem for the first two years before being expanded nationwide to 20 Directorates.

In addition, while the MOI will make every effort to meet specifications throughout the system, the MOI commitment to meet specifications will, in the first two years, be limited to 5 Directorates in the Delta (out of 20). The MOI staff will direct special efforts there to achieve a high level of quality control and to ensure full compliance with MOI specifications. MOI will certify that all structures for which they request AID reimbursement have been built to MOI specifications.

AID capital support for SR will be in the form of reimbursing the MOI for 90 percent of their SR expenditure with an annual specified maximum AID expenditure. The estimated total amount AID will reimburse over the 5 year life of the project is \$ 93 million (\$23 millions in years 1 and 2). SR funds are expected to be used for local costs. Only if materials shortages should arise would funds be used to finance imports. These arrangements, AID funding, and other details will be specified in special agreements between AID and the MOI for SR activity in each upcoming EFY to be negotiated annually as each year's budget is being finalized.

In order to support the accelerated investment program for SR, provision is made for the services of an engineer advisor in the areas of design and materials. He/she will be expected to devote a substantial part of his/her time to assisting field personnel in the Directorates and to assist and advise in programs to train personnel in the short courses and on the job (OTJ). Such OTJ will focus on analysis of alternate design options, use of new materials, quality control and development of in-house capacity for primary structure maintenance. There will also be available 30 person months of short term advisory services in addition to equipment and vehicle support. Office equipment and vehicles for this component and other will be procured in advance of the arrival of the contract for the TA services in order to make their services as effective as possible on arrival. AID funding provides \$ 985,000 for contract services, including \$10,000 for commodities, and \$ 45,000 for commodities outside the contract.

2. O & M Planning for Gharbia Directorate 1/

With a view to developing an integrated system for upgraded O & M work, a planning effort is to be undertaken for the Gharbia Directorate in the central Delta area. It is expected to require about one year to complete the plan which is intended to serve as a model for implementation throughout the system. The planning will encompass the full range of steps in a sustained O & M process: budget, funds release and control, structure and canal maintenance; work scheduling, contracting, inspection, design, quality control and survey; staffing and administration; communications and complaints; water duties, control and management; work accomplishment reporting, etc. A project director in the Irrigation Sector will have responsibility for the development of this plan with the advisory support of an engineer/planner for one year. AID funding provides \$ 200,000 for contract services and \$ 55,000 for commodities outside the contract.

Closely tied to the plan itself is provision for funding of workshop equipment for Gharbia. It is to be procured mainly for delivery soon after the plan is completed with full specifications to be prepared as early in the planning process as feasible (a limited portion of this equipment may be subject to advanced procurement See 7 below).

3. Project Preparation Unit Development

The MOI has a Planning Department but in recognition of the need to prepare full feasibility analyses and reports for new projects the Minister has issued a decree establishing a Project Preparation Unit (see Chart 2). The PPU will have a staff (as it develops) in the range of 10 to 20 MOI professional personnel plus administrative staff. Its functions will be similar to those enumerated in the suggested organization chart but it may have fewer sub-units with some functions in combined offices (see Chart 3). The Unit will have capacity to prepare feasibility analyses to standards that will satisfy the requirements of international financing agencies and will turn out full report documents with all necessary technical materials prepared and produced within the

1/ Gharbia Directorate was selected for this effort because it is reasonably typical and accessible and there are administrative advantages to undertaking the planning of an improved O+M system in the Directorate also having jurisdiction over the proposed system redesign and improvement activity in the North Zifta District.

Unit. It will be directed by a senior engineer/planner already designated who has a thorough knowledge and established working relations with the Water Master Plan (WMP) from his work there over the past four years.

U.S. technical assistance inputs will include 16 1/ person years of long term and 48 person months of short term advisory assistance. A senior technical advisor (irrigation project planner) will directly assist the Director of the Unit. In addition, an Agricultural Economist and an Engineer (Project Evaluation) will work in the Unit. AID support is projected at \$ 4.7 million including \$ 3.8 million for contract services including \$390,000 for commodities, plus \$ 350,000 for commodities and \$ 572,000 for participant training outside the contract. In addition, the IBRD is providing 9 person years of long term personnel in fields complementary to those in the U.S. team. If possible, both AID and IBRD personnel will be provided by a single contractor. This component of the project also includes funding to extend the terms (by 2 years each) for two economists for the Water Master Plan. Funding for the first 12 months of their services is already provided under another project. There will be close links between the WMP and the PPU.

A special program of training on the PPU premises is contemplated for staff development using closed circuit TV, special materials and senior Egyptians and the expatriate advisors as instructors. Long term training abroad is also included along with short term overseas training and observation programs to give the staff maximum exposure to the best standards and techniques.

4. North Zifta System Redesign Feasibility Study

Within the PPU described above and as one of its first analyses, a feasibility study will be prepared to define a plan for system redesign (or betterment) by analyzing the needs of the North Zifta District, Gharbia Directorate in the Delta 2/. The study will focus on needs of irrigation system redesign/improvement and associated service requirements to adequately meet the needs for increased farm productivity and farmer incomes. Emphasis will be

1/ Includes 2 economists for 2 years for the Master Water Plan.

2/ Selected because it is in Gharbia Directorate and because the irrigation system in the District is largely self-contained and the possibility of exercising control over the system exists.

given to the replicability of such a pilot program for ultimate national application by examining the cost of services and O & M in relation to benefits including farm output, energy savings, relative cost of water saved vs other alternative means to obtain such supplies, etc. A draft scope of work for the study is included as Annex XIV and provision is made for any required refinements by arrival of two specialists in advance of the rest of the TA team.

The following specialists are included for technical assistance: planning engineer, civil engineer, and agriculture economist for a total of 3.5 person years of long term technical assistance. Forty-eight person months of short term personnel, including sociologists, environmentalists, hydrologists, program engineers, etc. are also provided. Total costs of the TA support for the study is projected at \$ 2.1 million of which \$ 1.98 million is for contract services, including \$410,000 for commodities and a topographic survey, and \$ 123,000 for commodities outside the contract.

5. Manpower Development and Training

The MOI has agreed to establish a manpower development and training program as an adjunct of the National Irrigation Training Institute to serve the whole Ministry. A Director is to be designated in the near future. He/she will operate under the Water Research Center. Policy guidance and coordination with other Departments of the MOI will be provided by the MOI Coordinating Committee composed of senior officials of the Ministry (see Section V A. 5.).

Training is to include short courses for engineers and technicians in the fields of : (1) irrigation design and construction, (2) administration and management, (3) operation and maintenance (4) on-farm water management and (5) construction management methods and quality control. Instructors are to be selected and approved for training abroad by December 1, 1981. They will depart for training as soon thereafter as appropriate programs can be arranged. They will return by mid-1982 to work in the development and presentation of short courses in collaboration with a short term AID advisor. Such courses will be of one to three weeks duration and designed to provide practical skills and knowledge of importance to improved O/M/SR performance. From 120 to 360 persons per year are expected to take the short courses depending on the capacity of available facilities.

Management seminars are to be scheduled for middle and upper level managers with the support of consultants. Their work will be given overall direction by the Director of Training within terms of reference approved by the MOI Coordinating Committee.

Twenty Seven person months of short-course training advisory services and 10 person months of management consultant/training service are to be by short term advisors. Support costs are also to be provided to facilitate the start-up implementation of the programs. The total cost of this component of the project is \$1,944,000. It consists of \$ 1,245,000 for contract services, including \$324,000 of commodities, \$80,000 for commodities outside the contract, \$ 100,000 for other costs outside the contract and \$519,000 for participant training abroad.

6. Consulting Services to the MOI

The MOI faces a period when a large volume of investment activity is to be planned, designed, contracted and executed. At the same time many changes and improvements are contemplated in the modes of operation and program content. In order to facilitate the review and analysis processes for which top managers of the MOI are responsible, this project will provide consultant services for a broad range of activities including screening proposals, analyzing bids, engineering problem solving, etc. The consultant services would be available to address any issue or problem for which MOI senior managers believed the services of the contractor might be useful. Consultants obtained under this component would be solely responsible to the MOI and would receive instructions from and report to a senior official of the MOI to be designated.

The services contemplated under this component of the project include 45 person months of long or short term consultant services. The total contract cost is \$ 710,000 mainly for personnel services but includes \$10,000 for commodities. A total of \$ 13,000 for commodities to be procured outside the contract is also provided.

7. Commodities

In addition to the funding for commodities identified in each of the above components, the project includes \$ 2,986,000 for procurement of commodities less directly tied to technical assistance activities. These commodities include: (1) office equipment, professional equipment and vehicles at the district/directorate field levels; and (2) other items to support MOI activities which are integral parts of this project such as

books, periodicals and drafting supplies and equipment for the Irrigation Sector and field units and workshop and communications equipment for the Directorates.

8. Evaluation

Evaluation, which is an integral part of this project, is described in more detail elsewhere. It is mentioned here to complete the picture. There will be created a special task force of MOI personnel to work over the first year of the project (with short term consultant participation late in the year) to establish a set of baseline data on structures, water flows, water tables, production etc. At the end of the second year of project operations, a contract group will conduct a 1.5 month mid term evaluation. This evaluation will cover all aspects of the project but in particular it will examine the SR program. The results of the evaluation will be a major determinant in the decision to seek or not to seek additional funding for the SR program. A thorough appraisal will also be made again in 1986 as the project nears completion by an outside contract group. Funding for the services of U.S. personnel and possibly a sub contract with an Egyptian group is provided with the total for evaluation contract services being \$302,000.

D. Relationship to Program Objectives

1. Relation to Objectives of the Government of Egypt:

Egypt has set as objectives of major importance in development and strategic terms the achievement of a greater measure of food security and the reclamation of 2.8 million feddans of new lands for settlement and cultivation by the end of the twentieth century. The Government is also stressing the need for increased rural employment.

a. Importance of the Government's Objectives:

Since agricultural production has grown very slowly in the past decade (at less than the rate of growth in population) and the nation has become steadily more dependent on imports of food, the importance of the food security objective is readily apparent. The Government does not define food security strictly in terms of reducing dependence on or eliminating food imports. Rather it is seen as being achieved through a mix of greater production of food for domestic consumption and an increased surplus of agricultural products for export. This might come about in a variety of ways, including: higher yields, a shift in cropping patterns involving more efficient use of available land, a larger area under cultivation or combinations of these things.

Reclamation has always been important for Egypt for a number of reasons. Perhaps the most apparent is the need for additional living space and a larger area for farm employment of the burgeoning population. Hardly less critical is the desire for more land area as a basis for increased production. Finally in recent times it has been increasingly stressed that the nation needs to reclaim and settle new lands as a means of occupying the area more effectively for strategic reasons. This is especially seen as important for areas east of the Delta and beyond the Suez Canal.

Rural employment growth is vital to a better life for rural people and an essential feature of the policy of attempting to slow urban growth. As a result it becomes of the utmost significance to raise the

potential for farm productivity in the old lands. While better water control and management will have little impact on labor requirements in the short run it is essential for the long-term both as a means to avoid output declines from waterlogging and to give a positive boost to productivity and hence to employment as water tables are lowered in areas now threatened by high water tables.

b. Means of Achieving the Government's Major Objectives:

If agricultural production is to be expanded as a means to achieve greater food security it is clear that efforts must be undertaken on many fronts. Better, broader programs are needed to make inputs, credit and marketing service more accessible to farms. Work along these lines is underway. Mechanization must be encouraged where it can improve efficiency. Research into better adapted varieties of crops for use in Egypt needs to be accelerated. These and various other programs (extension, better price incentives etc.) are under active analysis or being implemented. Nevertheless water must be managed and controlled more effectively so that lands will not be threatened with waterlogging because this could thwart the best efforts in other farmer support programs. The distribution of water should be made more equitable to give every farmer the best possible opportunity to make the most of other scarce resources which are available. Hence the Government sees the need to improve water management and control as an element in sustaining and increasing production on old lands already under cultivation. The structure replacement program can be a significant contributor to this objective. A redesign of the irrigation system is another means seen by Government as a potential way to increase farm productivity and efficiency. Redesign could also improve on-farm water use efficiency and prevent over watering resulting in improvements to soil and crop conditions as well as saving water for other uses.

The results of better potential water control through structure replacement or through system redesign will only be fully realized if the system is operated

efficiently. Hence the planning of more effective O & M systems for subsequent implementation is an appropriate component of this project. It will help to ensure that economic returns on the SR investment are realized, but in so doing will also have the following beneficial effects as the plans are implemented: (1) reduce wastage of water; (2) minimize the need for drainage investments through increased water use efficiency; (3) strengthen the basis for farmer cooperation in meska O & M by making water delivery more reliable and hence a subject of less competition and controversy; and (4) improving the potential for production on lands endangered by waterlogging. All of these are further contributions to the realization of the government's key food security and horizontal expansion objectives.

Indirectly all the foregoing measures can also have a favorable effect on employment in the old lands. Only if those lands reach their maximum productivity per feddan can they absorb the maximum input of labor. Good water control and management are key factors in obtaining higher yield. Hence employment will be maximized under optimized water use. It is an important objective of the Government of Egypt to hold labor on the land and discourage movement to urban areas. These actions support that objective by increasing the farm employment potential. They can thus be seen to have favorable overall social effects as well as improving the quality of life of rural people whose employment opportunities are enhanced.

2. Relation to CDSS:

In the setting of priorities for the agricultural sector AID has given primary emphasis to generating growth in production, in labor productivity, in output per unit of scarce resources and in employment. A number of activities attack these problems directly. The irrigation system is the basis of virtually all agriculture in Egypt but its role is supportive in these fields. It is not likely that the upgrading of the control and management of water will make any dramatic favorable impact on agricultural output or employment in the short run. Water generally speaking, is not a scarce resource at the present time in Egypt though it threatens to become increasingly scarce. The problems of

the present water management regime stem from its abundance, consequent misuse, waste and overuse and the impact (or potential impact) of such actions on production, productivity and employment. There is also a need to prepare farmers and water users for the day when water will be scarce. This is a task which will need to be addressed in this decade in order to realize the full benefits of system improvement and MOI institutional development achieved in the course of this project.

The primary justifications for a multi-faceted attack on water management at this time are the need to avoid damage to presently productive areas threatened by high water tables and to prepare now for the period a decade ahead when water may well become a scarce resource.

The various efforts to improve input delivery systems, bring better crop varieties into use, enhance incentives and strengthen institutional performance could be materially undercut if irrigation system deterioration were allowed to continue. At present the physical facilities, planning and management capacity, operational systems and staff serving the irrigation sector are distinctly sub-optimal and in need of upgrading. The irrigation network functions well enough to sustain current production only because water is available in abundance relative to aggregate irrigation demand. But it also is so inadequately distributed that in some areas production suffers significantly. The problems of the "tail ender" on the maskas, the overuse of water to the detriment of land in other areas, and the wastage at considerable cost for drainage and pumping from drains are all current problems. The less obvious potential problems are the rising water tables which could thwart otherwise successful agricultural development programs and the looming scarcity and increasing cost of water. For these reasons it is not too soon to address the acute problems of structure deterioration and lay plans for more extensive action as proves feasible in the upcoming years. Work to avoid acute problems now foreseeable in this field may be as critical to future farm production, productivity and employment as a variety of other programs whose impacts are more readily discernible in the short run. The means to better water management and control applied in this project in the coming years are likely to be of great importance to a satisfactory long term outcome of the broader array of agricultural development strategies.

3. Other Donor Activities and Related Projects:

Since the latter part of 1979 the MOI has been engaged in a dialogue with the IBRD and AID with the objective of defining the problems and needs of the irrigation system and of obtaining the required assistance. The fact that this dialogue was initiated by the MOI is clear proof of its concern for the problems it faced. The areas of primary attention in these discussions were: (1) the deteriorated state of major structures (dams and large barrages); (2) the backlog of structure replacement for the smaller structures; (3) the need to upgrade O & M throughout the system; and (4) the desire to explore the feasibility of improved design for the irrigation system. The subject of training for MOI staff was also raised by the MOI. As discussions progressed it also became apparent that planning and feasibility analysis was an area in which the MOI was deficient.

In earlier years both AID and the IBRD were engaged in work related to irrigation. On the IBRD side major attention was given to the provision of drainage in farmers' fields while the areas in which AID was engaged were in rehabilitating of pumping facilities for irrigation and drainage, the provision of equipment for canal cleaning and maintenance and facilities for production of PVC pipe for field tile drainage.

Since 1977 the UNDP has funded a project called the Water Master Plan for analysis and long range planning regarding water availability, management, use and disposal as well as irrigation system development. The World Bank is the executing agent for the project which has provided a group of expatriate advisors to work with the Egyptian staff. Initially the group was responsible to the Minister of Irrigation but has more recently been attached to the Water Research Center. The project had originally been expected to conclude its work in 1980 but it has been extended to the end of 1981. AID has agreed to provide the services of two advisors to facilitate "bridging" to the initiation of a new phase which has been firmed up to begin in January 1982. The arrival of the two AID-funded advisors has been delayed but the WMP has indicated that their services will nevertheless be required. Further, the Director of WMP has requested that these services be extended to completion of phase II. The WMP has produced a comprehensive report on the Nile basin, Egypt's irrigation system needs, costs and future availability options as well as covering ground water, water quality and water demand for various uses. Its work will continue to be an invaluable resource to planning and fortunately one of its key staff

members has been selected to head the Project Preparation Unit. The work of the WMP will continue in the new phase with UNDP/IBRD support.

The work of extending tile drainage is projected to continue in several phases with IBRD funding throughout the rest of this decade. The estimated total cost for the program in this decade is LE 652 million (at 1981 prices). It is closely related to this project inasmuch as the extent of the need for tile drainage in the fields is at least partially a function of the effectiveness of water control and management. If those can be improved it can be expected to reduce the required investment in drainage. The IBRD also expects to fund a program of drainage pump station rehabilitation costing LE 147 million between 1982 and 1985.

The area of project analysis, planning and preparation of feasibility studies is one in which the IBRD and AID are jointly interested. Discussions of support for the PPU have been proceeding in parallel. The Bank will provide some of the needed advisors in 2 or 3 fields (complementary to those funded by AID) for a total of nine (9) person years. It is contemplated that the same American contractor will be used to supply services of Bank and AID funded personnel if this can be arranged. This should help to ensure the closest possible integration of the Unit and its expatriate advisors.

AID has also for some years been supporting the Egypt Water Use and Management Project (EWUP) under the Water Research Center of the MOI. Its applied research into the impact of water delivery systems, different irrigation arrangements and on-farm water use are providing an extensive body of data and information valuable to this and other programs. Its results now available as well as its continuing work will be integrated into the planning and execution of this program.

V. Project Analysis

A. Administrative Feasibility

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.

The main components of the Ministry with which the project is concerned are:

- The Irrigation Department with operational responsibility for all Nile River activities on behalf of the GOE both within Egypt and on the upper Nile:
 - o The Irrigation Sector with operational responsibility for water distribution and management (other than main dams and barrages) and for technical liaison with the Directorates on water control and irrigation;
 - o The Directorates (20) with local responsibility for irrigation and drainage in areas with an average of approximately 300,000 feddans net irrigated acreage. Ten Undersecretaries (field) are administratively responsible directly to the Vice Minister and/or the Minister.
- The Department of Planning and Follow-up with responsibility for budget, statistics and planning:
 - o The Project Preparation Unit, a new group with the function of preparing feasibility studies and reports for projects to be financed.
- The Water Research Center with a group of specialized Institutes for research in various fields, an Institute for Training and a group for long range planning and research on water problems. Those entities related to this project are:

- o The National Irrigation Training Institute which is to provide training primarily for MOI personnel
- o The Water Master Plan, a group with responsibility for research on long range issues relating to the Nile, groundwater, waste water re-use, etc. (See organization of MOI at Chart 1).

2. The Irrigation Department:

The Irrigation Department is the operational wing with responsibility for providing technical guidance to and supervision of the field organization of this centralized Ministry. Within the Department, the Irrigation Sector under the direction of a Senior Undersecretary, is the organization most central to major portions of the proposed Irrigation Management Systems project (SR and Gharbia O & M). 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. Lines of authority are defined to reflect the complex structure and the system appears to function satisfactorily.

The field operations are conducted under the supervision of undersecretaries who report direct 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 Governors of the respective 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 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. All these personnel are evidently bound by rules requiring them to continue to serve in the Ministry. They generally hold the view that the Ministry is capable of performing a larger volume of work than is called for under current budgetary levels. Junior engineers reflect a view that they in particular are heavily overworked at present. At the very least there appears to be a 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 Department:

Headed by an Undersecretary, the Planning Department consists of a Statistics Unit, a Planning and Follow-up Unit and the newly-created but as yet only partially staffed Project Preparation Unit (PPU). The PPU is expected to be ready to undertake operations at the beginning of January 1982.

The Planning Department 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 as well as for monitoring of the physical progress and reporting for investment projects. The newly-created PPU is now being readied to discharge a new responsibility to carry out identification, multi-disciplinary analysis and preparation of feasibility studies for projects to be funded within the budget of the MOI and/or by external donors.

Under the leadership of an Undersecretary, this Department 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 Department. Monthly budget expenditures on investment activities which includes structure replacement are prepared by each Directorate as of the twenty-fifth of each month. The Undersecretary has provided assurance that the fiscal control/system has the capacity to manage SR funding and maintain accounting records showing allocations, contract commitments, expenditures and unexpended balances on a monthly or quarterly basis. The reporting and control system identifies all structure replacement by category and by Directorate.

4. The Water Research Center:

The Water Research Center administers a research program through a group of Institutes. It has also been given responsibility for training of MOI staff. The Center intends to develop a Training Institute with a program mainly serving Egypt but eventually to serve other countries using Nile water for irrigation as well. This project is concerned exclusively with training programs to meet the manpower needs within the MOI in Egypt.

The Training Institute is a very appropriate focus for the administrative responsibility for an irrigation training program. There are some useful linkages between a research institution and the requirements of training. Some other important linkages are also highly essential to give proper direction and focus to training, e.g. with Universities, Technical Institutes, etc.

Training is a major vehicle for achieving the goals of an institution such as the MOI. It must therefore be firmly rooted in its established goals, program emphases and the future skill needs of the organization. For this reason policies governing training should reflect a broad consensus of the management leadership for the organization. It is therefore most useful that the MOI has formed a top level Coordinating Committee composed of Undersecretaries from several Departments and project leaders in several fields which can serve as a policy advisory and administrative planning group. With this source of direction the training program can be expected to reflect the broad manpower development needs and long range aspirations and goals of a multi-faceted set of Ministry programs.

To assist this body in defining its objectives and strengthening its policy direction of the training program, opportunities could be provided for key members of the policy committee to make short study tours abroad to examine options and approaches to evolving the most effective training and manpower development program possible.

A Director of Training is to be designated in the near future to provide administrative supervision and day-to-day direction of the program.

Also within the WRC is the Water Master Plan group which is responsible for data collection and analysis regarding long range issues relating to the availability and use of water in Egypt. The research output and analytical work will be an invaluable resource to several components of this project especially the PPU and the North Zifta System Re-design.

5. The Coordination Committee:

Recognizing the interrelationship of the various activities within the IMI project, yet wishing to execute them within the existing units of the MOI organization, the Ministry has decided to create a formal Coordinating Committee. This group will include key people of Undersecretary and project director level with

responsibilities in the areas where IMS activities will be carried out. Operational responsibility will lie in the respective units but the Committee will provide a means of developing coordinated policies which it will recommend to the Minister. In this way coordination should be achieved while keeping normal lines of authority and responsibility intact.

The Committee will consist of the following:

<u>Member</u>	<u>Project Area of Responsibility</u>
1. Senior Undersecretary, Irrigation Sector	Structure replacement and Gharbia O & M
2. Undersecretary Planning Dept.	Development of the PPU and North Zifta System Redesign
3. Chairman, Water Research Center	Training (also has responsi- bility for Water Master Plan an important source of data and information)
4. Director SR Program (Undersecretary level within Irrigation Sector)	SR Program
5. Director, PPU	PPU development and N. Zifta
6. Director, Irrigation Training Institute	Training
7. Three others to be designated by the Minister of Irrigation	Not project related
8. AID Representative	Observer only

The Coordinating Committee will identify priority needs for training in light of the SR and O & M requirements, 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 should therefore facilitate more effective operations.

6. Conclusion:

The Ministry will have a major task in gearing up to meet the needs of the IMS project. It will need to deploy its available resources efficiently, mobilize all its capacities and make a full scale effort to expand those capacities as rapidly as possible. It does have the organizational means to do so and gives every indication that it has the will as well. The Mission believes that with the support the project provides it can succeed.

B. Technical Feasibility

1. Overview:

During the past decades as described more fully elsewhere in this paper, the long established system of canals and structures making up the irrigation system in Egypt has been allowed to deteriorate. Many structures have not been replaced despite reaching the end of their useful life. The system has deteriorated badly but is not in imminent danger of collapse. The primary cause of this deteriorating trend has been the shortage of funds to make timely repairs and replacements. But staff shortages in the MOI, the absence of an in-house capacity to do first echelon maintenance as problems arise and the availability at present of ample overall quantities of water also deterred the Ministry from dealing with these problems or prevented actions which could have slowed the deterioration.

In order to spread out limited funds to replace as many structures as possible, the view has been taken that small structure do not require a full measure of quality control. Specifications have continued to be written according to existing standards. But contracts are let and structures completed at a funding level which has made adherence to specifications difficult. This is acknowledged by the MOI. The result is that many newer structures have a short life expectancy adding to the problem in the years just ahead. It will also require a new approach and a re-education of the staff to correct these practices.

The shortage of engineering staff and technicians deriving from shortfalls in recruiting is a constraint of some significance both to structure replacement and improved O & M. But a substantial reservoir of capacity exists nevertheless. It is capable of performing a larger volume of work and of better quality than is at present being performed.

2. Plans and Designs:

The design team has reviewed the standard design criteria, design manuals and specifications of the MOI and discussed them fully with senior officials of the MOI. The criteria, standards and specifications are entirely adequate, when fully complied with, to assure sound structures. Similarly, cost estimating procedures used by the MOI provide a reasonably firm cost projection. Existing fiscal procedures and contractor financing arrangements provide a good basis for estimating periodic fund requirements.

3. The Planning and Supervision Capacity:

The CH₂M Hill design and appraisal team travelled widely in 10 Delta and Middle Egypt Directorates. They discussed, with MOI personnel at all levels in the field, their capacity to plan, design, contract and supervise structure replacement work. The team also observed numerous jobs in progress, engaged the responsible personnel in discussions of their role and mode of operation and examined many recently completed structures. They reviewed designs and specifications, observed drafting operations, visited workshops, analyzed specifications and checked MOI costing procedures and estimates. As a result the Mission believes their appraisal of MOI capacity is well founded. It is therefore appropriate to quote a key passage from the CH₂M Hill report of May, 1981.

"With a gradual implementation of the project, it will be possible and within the capability of the MOI to re-adjust and increase the engineering and technical staff levels. An active training program has been proposed by the USAID Design Team to serve as a catalyst to provide the needed qualified personnel and is presented as a separate document. This training program outlines the programs needed. The program proposed will offer a long term solution to some of the problems within the MOI. However, the rate at which the program can be implemented will limit the impact of the training upon the first part of the structural replacement work. To meet the overall objectives of enhanced irrigation management, it will be necessary to begin implementation of the structural replacement before a large number of trainees can complete the courses of instruction. Since some engineers are already highly skilled, they can be used during the project startup period. Lack of trained engineers cannot be accepted as justification to delay project implementation".^{1/}

1/ Egyptian Irrigation Systems Operation, Maintenance and Structural Replacement, Main Report, CH₂M Hill, R.V. Naapala, R.B. Conklin M. J. Morgan, May 1981, p6,7.

It is apparent from the foregoing that the team concludes that the MOI faces a number of key constraints and needs to strengthen its capacity in a number of areas in order to carry out larger programs, improve its efficiency and achieve better quality control. Nevertheless the team concluded that with incentives, training and a more efficient deployment of its professional and technical talent it can undertake an increased workload if not accelerated too rapidly.

With these constraints in mind SR work will begin with USAID support in only a few Directorates with adequate funding and expand into the rest of the country in the third year of the project, assuming the initial effort proceeds as planned. MOI capacity should grow steadily with incentives and a well-directed training effort. It should therefore be able with good deployment of talent to meet the demands placed upon it for design and supervision of the structure replacement program at an accelerating pace with the necessary quality control. The MOI believes this is feasible and has indicated that it will take the necessary steps to meet the increased requirements including budgeting the necessary funds to meet full specifications. The Mission therefore concludes that, insofar as MOI technical constraints are concerned, it is feasible to proceed with the SR program. This is the only element of this project which imposes major technical demands on the Ministry at this stage.

4. Contractor Capacity:

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

The Design Team inquired into the contractor capacity and an examination was made of the field surveys of contractor capability undertaken in connection with the design of the Basic Village Services project in 1980. Both lead to the conclusion that contractors have a substantial capacity to undertake work in the outlying areas such as would be required to proceed with an accelerated SR program.

Contractors located in the outlying areas where structure replacement work will be carried out are generally small private companies though their numbers are substantial. Like such entities

everywhere, they are constrained by lack of capital and will find some difficulty in increasing their capacity. They are, nevertheless, in a position to expand to meet demands if given some time. Thus capacity of those firms in the Governorates already doing SR for the MOI and similar work for other institutions either have or will develop the capacity to absorb some additional work.

The larger volume of work contemplated in the expanded SR program opens up new possibilities for contracting. Larger private and public sector firms which would not be interested in scattered small structure work are in fact quite interested when larger numbers of such jobs are available within a limited radius. This enables them to cover the costs of mobilization and to undertake work in more remote areas. This will open up substantial contractor capacity not previously tapped for SR activity. If properly managed to take advantage of this potential, there should be no serious problem in obtaining competitive bids and successfully awarding contracts for the increasing volume of SR construction contemplated. Even skilled labor is not expected to be a constraint as the public as well as private sector companies pay competitive wages and on that basis no serious constraint exists.

5. Maintenance:

There is no doubt that the maintenance of the irrigation system and its structures poses a problem. The staff and organizational constraints of the MOI constitute one set of limitations. The scarcity of labor and facilities including workshops for the conduct of urgent first line maintenance by in-house work is another. The need for a streamlined system to anticipate and identify problems as well as to carry out preventive maintenance is apparent. Funds too have been a constraint.

It would therefore be a serious issue to be launching an accelerated SR program if measures were not being undertaken to overcome these difficulties. The Gharbia O & M planning effort and the provision of equipment in this project to enhance the capacity of that Directorate to do in-house maintenance are but the first steps in an anticipated drive to overcome maintenance constraints on an ever widening scale. In this context it seems reasonable to assume that training, incentives, well-planned programs and the likelihood of external funding for support of improved capacity to do maintenance leaves only one issue, namely: the size of future MOI budgets for O & M. It is contemplated that (aside from commitments on future SR budget levels) the MOI will be asked to enter into a covenant on

O&M budgets. It will be asked to agree to provide O & M budgets in future years sufficient to support the implementation of the newly planned O & M program systems (as worked out for Gharbia) as rapidly as personnel will be available to implement such a program in all Directorates.

6. Conclusion:

USAID concludes that the Ministry has basic capacity to undertake all the elements of this project with the various support components which are provided in the project. Structure replacement will pose problems but with a concerted effort the MOI can carry out the accelerated design, contracting and supervision, but only if it takes all the steps contemplated to concentrate its resources, mobilize its staff to make a maximum effort and expands its staff numbers through vigorous recruitment. With the support AID proposes to commit, these measures become feasible for the Ministry and it appears to have the will and support from other elements of the GOE to accomplish the task. The contractor community also has sufficient resources to undertake the expanded SR work especially by bringing in the larger contracting companies.

As the system is put in better shape the MOI will need to provide more maintenance to keep it in good condition. With better planning, a well organized system of operations and expanding staff it will be able to bring the personnel to bear to do the job. As its workshops are re-equipped (first in Gharbia and later presumably in other Directorates) it will be in a position to do much more in-house maintenance and deal with problems while they are still small. With those resources the MOI should be able to attain a maintenance standard compatible with the effort to rebuild and improve the infrastructure.

C. Financial Plan and Analysis

1. Financial Plan

The total cost of this five-year project, including the additional 3 years for the SR Program, is estimated at \$344 million, of which \$112 million will be provided by AID in the form of a grant and \$232 million equivalent in LE by the Government of Egypt.

The tables shown in Annex X illustrate the financial aspects of the project with funding for a 5 year SR Program. A table showing funding requirements for the project with only 2 years of the SR program is shown on page 53.

Table 1: The Summary Cost Estimate and Financial Plan for the project indicates AID will finance 33% of total project cost and the remaining 67% will be Government of Egypt counterpart contribution. As reflected in this table all foreign exchange requirements (\$16.8 million) will be financed by AID. These requirements which comprise over 4% of the total project will be primarily associated with the financing of one or more TA contractors, the procurement of commodities and the financing of costs relating to participant training.

Table II is an annually time phased presentation of project expenditures. As indicated in this table 59% of project expenditures (outside of Structure Replacements) will occur during the middle three years because of the timing of start up activities and related costs. Expenditures for structure replacements are estimated to occur on an incremental basis in the following percentages:

<u>Year</u>	<u>Percent</u>
1	8
2	15
3	20
4	26
5	31

Table III provides a further breakdown of project costs by: Contributor (AID-GOE), Cost Component, Foreign exchange and Local Currency, Inputs and specific elements within each input.

Table IV provides a detail breakdown of AID's inputs by Foreign Exchange and Local Currency Costs as they relate to each component of the project. A summary of these costs by component follow:

<u>Component</u>	<u>Cost (In US\$000)</u>
Structure Replacement	66,090
Gharbia O+M	255
Preparation Unit	4,718
North Zifta	2,094
Manpower Development	1,944
Consultant to MOI	733
Evaluation	302
Commodities	<u>2,319</u> 1/
Subtotal	78,460
Contingency	<u>1,774</u> 2/
Inflation	<u>31,766</u>
Total	<u>112,000</u>

An inflation provision was made for each of the project cost categories. Tables I and II reflect an estimated cost to AID of \$31.8 million and GOE of \$70.2 million, respectively. The inflation provision was based on the following allowances:

<u>Type of Costs</u>	<u>Compounded Rate</u>
<u>AID</u>	
Capital (LC)	15% applied mid-year
Other Costs:	
(FX)	10% applied each-year
(LC)	15%
<u>GOE</u>	
Capital and Other (LC)	15% applied mid-year.

In addition to inflation a \$1.8 million contingency fund is allocated to all other costs elements of the project. The contingency factor is based on a conservative rate of 10% of cost plus inflation.

1/ Includes only those commodities to be purchased outside the above components.

2/ As noted previously, no separate contingency allowance is included for the Structure Replacement Component. The SR total of \$66,065,000 plus inflation reflects the total AID will provide for the program. This amount is judged adequate to cover the costs of the program.

Even though the Financial Plan includes funding estimates for the full life of the Project (five years) (Annex X Tables I through III) the Mission recommends initially to fund the other cost elements (Technical Assistance and other) for the life of the project and the first two years of the planned capital costs (Structure Replacement). The Mission has initially restricted funding for the Structure Replacement element of the project to two years only (1982-1983) because of the unforeseen effects the required upgrading in construction standards and the projected enlarged construction program will have on the existing implementing and monitoring capabilities within the construction sector and MOI.

Following are AID's initial funding requirements for this project.

(In US \$ Millions)

<u>Year</u>	<u>Capital</u>			<u>Other</u>			<u>Total</u>		
	<u>FX</u>	<u>Lc</u>	<u>Total</u>	<u>FX</u>	<u>Lc</u>	<u>Total</u>	<u>FX</u>	<u>Lc</u>	<u>Total</u>
1982	-	5.5	5.5	3.0	.3	3.3	3.0	5.8	8.8
1983	-	17.5	17.5	4.1	.5	4.6	4.1	18.0	22.1
1984	-	-	-	4.7	.6	5.3	4.7	.6	5.3
1985	-	-	-	2.7	.4	3.1	2.7	.4	3.1
1986	-	-	-	2.4	.3	2.7	2.4	.3	2.7
Total	-	23.0	23.0	16.9	2.1	19.0	16.9	25.1	42.0

Based on the analysis performed in costing out each element of this project and in determining its funding needs, the Mission requests an obligation in 1981 of \$42.0 million. Funding requirements in addition to those provided for Capital Costs in 1982 and 1983 above, will be requested through an amendment to this Project Paper. The basis for requesting additional funds will be the results obtained from an evaluation of MOI's actual performance (managerial as well as financial) during the first two years of project implementation. This evaluation has been scheduled for the latter part of Fiscal Year 1983.

2. Disbursement Schedule

a. General

Capital costs under this project will be disbursed through quarterly reimbursements. The first reimbursement will be made at the request of the MOI in U.S. FY 82. The final disbursement will be no later than the fourth quarter of 84. If additional SR funding is provided the final disbursement will be no later than the fourth quarter of 87. The other cost elements of the project will be disbursed over a five year period beginning in the second quarter of U.S. FY 82 and ending in the fourth quarter of FY 87. The disbursement mechanism for the project is shown in Section VI of this paper.

3. Section 611(a) Requirements:

Section 611(a) requires that no obligation of funds in excess of \$100,000 may be made for a project where substantive technical or financial planning is required until engineering, financial and other plans necessary to carry out such assistance and reasonably firm estimate of cost to the United States Government in providing such assistance have been completed.

For the purpose of determining whether the requirements of section 611(a) have been met it will be important to focus on the system of financial, engineering and other planning in the MOI with reference to SR and its ability to carry forward a program along the lines contemplated.

In the first place the Ministry is now carrying out a set of large scale investment programs for which it has engineering, financial and management planning systems. A program of structure replacement is among these activities. The current level of spending on SR (FY 80/81) is LE 7.0 million. The engineering team for design of this project has reviewed the systems and analyzed the capacity of the staff to design such structures. It found that the MOI has standards for site selection and preparation, basic plans for design of structures and staff with capacity to adapt standard plans and prepare specific designs for structures included in this program. The team also found that MOI has adopted specifications fully adequate for the guidance of contractors and for the preparation of contracts. These also are a sound basis for determination of cost of the structures which enable the development of accurate aggregate cost data.

While the Ministry has suffered some problems to entry level staff recruitment in recent years and hence is experiencing staff shortages in more junior engineering ranks, it has a cadre of personnel capable of performing the tasks. More specifically it is the estimate of the design team that the present staff capacity is sufficient to carry out its responsibilities on a satisfactory basis in all vital areas even at an increased level of activity. Its capacity for examining alternative designs and its knowledge of some modern material applications are amenable to being upgraded but constitute no deficiency in sound planning or design within existing criteria. This capacity will grow and improve through formal training and on-the-job experience during the project in line with projected growth in activity.

In all significant respects then the MOI has capacity which provides a basis for confidence in its planning and the estimates of cost it uses. Moreover, the basis of projecting the cost of overcoming the SR backlog and of maintaining the system have been fully reviewed. The cost projections are judged to be reasonably firm.

The IMS Project will provide a specified proportion (a limited absolute amount) of the cost of SR work to be accomplished during the life of the project. With total costs reasonably firm and a limit placed on the portion of the cost the U.S. Government will furnish, the cost of providing the assistance can be said to be estimated on a reasonably firm basis.

In summary, USAID/Cairo has reviewed the engineering and financial planning systems in use by the Ministry of Irrigation (MOI) for structure replacement (SR), the detailed criteria for site development, standard plans and designs for the erection of structures and the specifications used for all elements of the construction. The Mission finds these fully adequate to meet terms of Section 611(a) with respect to the existence of adequate plans and planning. The Ministry also uses criteria in the determination of cost which (with agreement to build all structures in full compliance with standard plans and specifications) constitute a satisfactory basis for determining the cost to the U.S. Government of providing the proposed SR assistance.

D. Economic Rationale

1. Overall

Optimally, economic justification of the project would be based on a comparison of economic benefits with the costs necessary to achieve these benefits. Benefits would include the value of water saved, the value of additional agricultural production, reductions in energy costs as less water is lifted and passes through the drainage system unused, lower transport costs as bridges are replaced/maintained, greater returns from irrigation investments made using better plans and the increased output of better trained people. Costs would be those associated with the project plus perhaps certain expenditures incurred by producers or consumers. Unfortunately, while the project costs can be calculated with some accuracy, the data are simply not available to precisely determine benefits. The production benefits of a better gate or a better turnout depend on the before and after situation and implies identification of the specific structures to be repaired/replaced. Similarly, the quantities of water that will be saved, the value of the water and energy saved or the reduction in transport costs cannot be projected.

In this situation the use of least cost analysis provides an alternative method of justification. But again the data for a clean-cut conclusion are inadequate. Generally, the proposed method of resolving the problems are the lowest cost than certain other alternatives. In fact, the solutions identified are the lowest cost methods judged to be capable of solving the problem. The uncertainty derives from the judgmental aspect which could be incorrect because not all alternatives can be considered or accurately costed.

Because of the above factors there is a certain amount of faith required that the project is economically justified. The evidence cited below makes a partial case but not an absolute one. Nevertheless, it is USAID judgment that the illustrative materials do establish an acceptable economic rationale.

2. Specific Components

(a) Planning and Training

The only identifiable direct beneficiaries of the Planning and Training elements are MOI personnel, although it is assumed that the work and outputs of the involved MOI staff will quickly impact on other groups as trained personnel improve performance and as plans are implemented. Levels of costs and benefits remain to be determined. The training strategy presented is considered to be more cost effective than other alternatives because it provides a needed mix of actual training of MOI engineers and technicians along with TA, equipment and supplies to establish an institutional capacity in the MOI. Together this meets immediate needs while also considering long-term requirements. Providing the bulk of the training in Egypt rather than outside Egypt is more cost effective.

Similarly, the planning strategy, which addresses short-term needs through TA while seeking to develop Egyptian capacity, seems cost effective. The provisions of TA for an extended time as an alternative appears much less economical. The inclusion of substantial training in the planning areas should help ensure that Egyptian capacities are truly developed. The provision of limiting commodities will help institutionalize planning at least in a physical sense. The lack of these commodities would reduce the effectiveness of both TA and Egyptian personnel.

(b) North Zifta

The North Zifta Feasibility Study will contain its own requirements for economic feasibility analysis. (See Scope of Work - Annex XIV). Attempting to make a detailed economic analysis at this time would be premature. The study, in particular, will need to address at the farm level the expected effect on production of each of the proposed interventions along with costs, to enable the identification of the most cost effective changes and the calculation of a benefit-cost ratio or rate of return.

(c) Structural Replacement/Operations and Maintenance

The only way in which a rigorous economic analysis could be made of these components would be to analyze separately the effects of each of the structures involved and then seek to weight appropriately each of these analyses in order to derive a meaningful general statement. Under circumstances where hundreds of separate

structures are involved with complex linkages not only within the overall system but below, at the meska and the farm level, such an effort would clearly be impractical. Nor, given that Egyptian farming depends wholly on the regulated supply of water from the Nile, would it seem necessary to go much beyond the descriptions that follow, to justify the economic cost of improving the efficiency of the irrigation system.

The principal areas of project impact from major repairs and replacement of structures in the irrigation system are: (1) increased control of water discharges and greater efficiency of the canal system, allowing increased agricultural production from the agricultural lands; (2) water saved and over time made available for alternate uses; (3) savings resulting from correcting minor maintenance problems before they develop into major problems; and (4) village to field and farm to market transportation cost saving resulting from replacement of unsafe or unusable bridges.

Deferral of routine maintenance of the canal system over the past 10-15 years has resulted in deterioration of parts of the system to the extent that it can no longer fully service all of the cultivated areas for which it was originally intended. In some instances lack of control of the system such as a headgate which will not properly close, has caused excess irrigation at the beginning of a canal or ditch and a shortage of water at the end of the conveyance. Water leakage through gates that do not close properly not only wastes water, but can contribute to waterlogging and lower agricultural production. Water lost at the head of canals and ditches prevent farmers at the end of the conveyance from receiving the full complement of water needed for year around cultivation according to the crop rotation norms of planting to winter, summer and nili crops. These areas, being short of water during the critical months of May through September when demand throughout Egypt is at its highest point, are sometimes left idle and thereby lower the multiple cropping intensity. A recent study by the Ministry of Agriculture on multiple cropping intensity (MCI) in Egyptian Agriculture found:

"There is much to suggest that factors associated with improved water control and improved soil and moisture conditions would lead to higher MCI. The increase in cropping intensity which accompanied the Aswan High Dam in the 1960's is indicative of this. Improved year around water availability served to decrease the amount of land

which had theretofore been temporarily idle during the summer period, and it permitted more double cropping."^{1/}

Work by the Egypt Water Use and Management Project (EWUP) suggests that yields can be increased even while using less water.^{2/} A field experiment to evaluate rice production under alternative methods of planting seeds or trnasplating seedlings was conducted. In this experiement, the application of irrigation water was controlled and the treatment areas using the least amount of water also had the greatest net returns per feddan. The water use and net returns per feddan for the four treatments in the experiment are shown below.

Item	Treatment			
	A	B	C	D
Return above cost per feddan in Egyptian Pounds	15.5	3.45	18.42	45.27
Cubic Meters of Water applied per feddan	8,000	10,000	9,000	7,000
Yield Grain (tonnes)	1.68	1.41	1.53	2.08
Straw (tonnes)	4.86	3.65	4.34	3.37

Another study^{3/} made by EWUP in the Mansouria area of the Giza Governorate, revealed that farmers at the end of a branch canal received less water than those at the beginning. They found both the cropping pattern and crop intensity ratio were affected. The

^{1/} James Fitch & Atef Abdel Aziz, Multiply Cropping Intensity in Egyptian Agriculture: A study of its Determinants, Oct 1966. Arab Republic of Egypt, Ministry of Agriculture.

^{2/}M. Samir Abdel Aziz, Ragy Darwish and Gene Quenemoen, Progress Report of Rice Planing Trials at Abou Raia, Kafr El Sheikh Governorate, 1979, Egypt Water Use and Management Project Staff Paper #7

^{3/} Egypt Water Use and Management Project, Staff Paper # 11, Economic costs of Water Shortages along Branch Canals, June, 1980.

intensity ration at the upper end of the branch canal was 2.20 compared to ratio of 2.13 at the lower end. This means over 3 percent more production could be expected simply because the land is more intensely cropped. On a nationwide basis, if one-third of the land were affected by water shortages, because it was at lower ends of canals, a one percent increase in total output would result.

Similar potential benefits to the agricultural output of the nation are indicated by the difference in cropping patterns. In the Mansouria area, lower-end farmers, without access to alternative sources of water have about 86 percent of their land in maize and 21 percent in vegetables during the summer season. Conversely, their peers with water have only about 54 percent of their land in maize and about 37 percent in the higher value crops of vegetables. The difference in net farm income per feddan of vegetables and that of maize ranged from LE 46 to LE 344. Assuming a difference of LE 200, the income foregone from not producing vegetables in the Mansouria district alone could amount to LE 296,000 per year. If this were to be projected to the nation the difference in the value of production would be LE 1100 million. However, it should be noted that in all probability, that the amount of vegetables grown would be constrained by labor availability and markets. Thus while this extrapolation is interesting and illustrative of possible benefits it should be interpreted with reservations. Nevertheless, the two examples do demonstrate the potential gains from higher yields and different cropping pattern which can be achieved by improving the efficiency of water distribution, and control.

Another type of benefit from an effective O and M effort are long-run savings in expenditures. The lack of a minor repair on a structure can result in the requirement for a major repair or even complete replacement of the structure. To illustrate, a head regulator that will have to be replaced at a cost of over L.E. 20,000 due to a foundation problem was viewed by the design team. The problem was caused by seepage under the foundation. Had this been corrected several years earlier at a cost of around L.E. 5,000 the structure could have been saved. Similarly, a bridge had been damaged by a vehicle to the point the steel reinforcing bar was exposed. The current estimated cost of repair is two thousand pounds. However, if left unrepaired the bridge will gradually deteriorate and within 5 years will probably become unsafe and have to be replaced. Without going into detail on each structure to be repaired, it would be impossible to make a firm analysis of how much would be saved in structure replacement if better O+M were performed. Nevertheless benefits will occur.

Finally, as indicated, the Ministry of Irrigation is responsible for bridges over canals and ditches except for major roads. These bridges are used by farmers to move equipment and agricultural products between their villages and between farms and markets. Should the bridges collapse or become unsafe, alternative longer routes of transportation will be required. The difference in time and costs required between using the existing system of bridges and alternative routes of transportation if the bridge fails, is a benefit. A calculation of the benefits for this purpose has not been made because it would require a study for each bridge to be replaced or repaired. The particular bridges have not been identified but it is obvious that some benefits will derive from project investments.

3. Conclusion:

In summary, a review of the Egyptian irrigation system reveals that the system is (1) in need of repair and possible redesign and (2) farm income and water conservation could be improved with improvements in the water distribution and control system. This project proposes to concentrate on developing the Ministry of Irrigation to the point where it can have full control of the water and manage its delivery effectively. With a more reliable water system, the farmer will be able to increase his production and receive a larger net return as well as conserve water. This should enhance the payoff of past assistance in canal maintenance. Also the institutionalization of the O M & S R system within the MOI should ensure its perpetuation. Therefore, it is concluded that the project is economically cost effective within the constraints assumed to exist.

4. Cost Recovery and User Charges:

There is no provision for irrigation water user charges in this project. Historically, Egyptians have rejected charges for water because it runs counter to Islamic religious tradition. Nevertheless, it may be possible to gain acceptance of a distinction between charges for water use, which have been rejected, and charges for water delivery. These latter are in fact applied, albeit on a token scale to urban consumers, and are implicit in the present distribution system for water to farmers' fields. As shown in the text of this PP, the annual cost of lifting water from the meskas to the land by pumps, and animal and hand powered waterwheels and other devices, may amount to as much as LE 100 million. The North Zifta Study component of this project will be investigating the

possibility of changing from lift to gravity irrigation, and will also explore the possibility of the covering some costs for water delivery. Currently, the Mission is carrying out preliminary discussions with the GOE on the subject with the intention of keeping the topic at the forefront. As the North Zifta study proceeds, we hope to develop greater Egyptian concern to deal with this difficult and sensitive issue in ways consistent with the requirements of the irrigation system redesign.

E. Social Soundness Analysis

1. Introduction:

The project, as a whole, is designed to improve the efficiency of water use by Egyptian farmers. This is to be achieved by strengthening the capacity of MOI staff to manage the existing irrigation system and to plan and test improvements of the system. In part--and indeed the greater part--of the project seeks to rehabilitate existing structures and upgrade their maintenance, in order to permit more efficient use of the present water distribution system. The project will create conditions for improved and potentially more equitable allocation of water to farmers. Improvement of irrigation structures will permit better control of water flows and hence more effective implementation of existing regulations on water management.

In practice, this will reduce the need for farmers to seek special water allocations without depriving those who now occasionally rely on special influence to ensure the water supply they need. This will permit improved allocations to those who, at present, for a variety of reasons have difficulties in obtaining the full amount of water required to sustain optimum production levels. In practice, these latter are the poorer of the small farmers and the project will benefit them most.

Turning to the specific components, the direct beneficiaries of the Planning and Training elements will be MOI personnel. There are no particular social issues related to this group as it participates in the activities. Nevertheless, the work and outputs of the involved MOI staff should quickly impact on other groups as plans are implemented. Sensitizing these staff to social concerns as they implement or plan activities will be a responsibility of the TA staff.

The North Zifta Feasibility study will contain a Social Soundness Analysis requirement (See Draft Scope of Work - Annex XIV). This feasibility study element will require a detailed examination of possible social effects and will make any current, more general discussion of the probable beneficiaries and impacts from a Phase II implementation phase rather speculative, and subject to wide error depending on the results of the feasibility effort and preliminary plans. The study will need to address in particular, the meska level and the important questions of farmer organization and farmer participation in irrigation scheduling, water allocations, etc. These questions will not be addressed in this paper but in the feasibility study.

The O&M and SR Components, while directly affecting farmers and irrigation water users, is quite imprecise on the actual impact or location of the improvements to be financed. Wide variations in social effect can be expected depending on the structure, the state of the current structure and the change resulting from a new or refurbished structure. Nevertheless it is appropriate to examine the setting in which the activities will be conducted, and their possible socio-cultural effects.

2. Minor Canals^{1/}

The minor canals distribute water to the field meskas which carry water to the farmer. These minor canals vary in length from several kilometers to 40 km in extreme cases, range from 2 to 4 meters wide and are primarily below field level. They are operated on a rotation system, a number of days on, a number of days off, varying with the seasons and crops.

The district engineer in charge of the canals is empowered to initiate the following actions concerning water regulations: (1) order both headgates and tailgates to be opened or closed at his/her discretion; (2) order any regulator on the minor canal to be adjusted at his/her discretion; (3) increase the water supply to one minor canal by decreasing the supply to another; (4) grant a particular farmer or group of farmers an extra rotation period if he

^{1/} Based largely on "A Field Study of the Water Delivery System of Middle and Upper Egypt", Henry R. Horsey and Mary C. Horsey, May, 1980.

can do so without exceeding his water budget; (5) appeal to his Inspector or General Director for permission to increase the allocated water supply by increasing the water level of a major canal; (6) supervise the irrigation guards (gatekeepers); (7) transfer the guards from one control point to another and; (8) supervise maintenance and construction activities within the district.

The District Engineer has irrigation guards who are responsible to him/her for ensuring proper water levels are maintained, reporting the water levels at the head, tail, and at any other regulatory structures along the minor canals from 2 to 5 times daily and for opening and closing regulators according to the irrigation schedule. In addition, they are responsible for reporting illegal weirs or dams, illegal regulation of the head and tail gates, and any farmer disputes over water.

The district engineer is responsible for recording and analyzing all data collected by the guards to determine if the correct volume of water is flowing into each maska, if the tail is receiving too little or too much water, or if a danger of flooding exists. He/She is also responsible for settling disputes between farmers so the general water supply is not disrupted and for investigating cases where the minor canals are illegally regulated.

In some areas the district engineers are unable to maintain continuous control of the regulation of the minor canals. Part of the problem is the scope of the district engineer's job. The extreme size of the irrigation districts--25,000 to 50,000 feddans--the time consuming administrative duties, and the poor communications system make it difficult for the district engineer to maintain an effective presence in the field. In addition, some district engineers are reportedly reluctant to go out and into the field for a variety of reasons including difficulty in reaching certain locations, the numerous office demands and a reluctance to deal with small farmers. Further, their training as engineers does not prepare them for the primarily management orientation of their jobs.

Because it is often difficult for the district engineer to maintain an effective presence in the field, the opportunities exist for the illegal regulation of the water management system. Such irregularities are rarely reported to the district engineer, either because the guard is responsible for the unapproved regulation in collusion with the farmer, because the guard is afraid of the farmers, or because the guard is away working on another minor

canal. Another problem is that the irrigation data are sometimes either not collected or falsified by the guards to cover up the following: (1) illegal regulation of the gates; (2) lack of regulation due to apathy or physical difficulty in regulating the headgates, tailgates, and regulator gates; (3) inability or unwillingness to travel to the regulatory structures because of distance, farmer hostility, or lack of transportation.

In discharging his duties the district engineer can also be influenced by people with political power and influence. When the Mohafez (Governor), the appointed Director or the Chairman of the Maglis al Markazi (District Council), the Leader of the Maglis al Mahali (Village Council), or the Umda (Mayor) calls on engineers to request an extra rotation on behalf of a farmer, they may find it difficult to refuse. Some farmers appear to take their requests directly to the Inspector or General Director who may grant these requests and order the district engineers to carry them out. In conclusion, the district engineer, with regard to the management of water and water control structures in his district, may at times be subject to outside or inside influence.

What the above also suggests is that although the MOI is theoretically in full control of the system there is actually a great deal of power sharing. Water users have unofficial and more regular means at their disposal to influence operation of the system. In practice, as described elsewhere in the paper, the poor condition of the control or regulatory structures also reduces the ability of the MOI to exercise full authority over the system.

3. Impact and Conclusions:

As indicated, the system operation is quite susceptible to individual farmer influence. Farmers who believe they did not or who actually did not receive adequate irrigation water can complain both to MOI officials and through political channels. Generally the MOI appears responsive to these types of pressure with all MOI levels acknowledging decisions made in response to farmer requests. Similarly District Engineers and irrigation guards often do not enforce MOI rules regarding numbers and sizes of turnouts, pumps, etc. because to do so would risk user dissatisfaction. The network is operating, perhaps at less than optimum, but the users and those controlling the system have worked out an operating method. Improving the control structures in the system will provide the possibility of upsetting the existing method. If the new gate can stop all leakages, those farmers irrigating during the "off" period will be forced to change their schedule or to arrange in some manner

for the leakage to continue. Alternatively there could be less water available to an individual during the on period as more people use the system. Generally, upgrading of structures does imply disadvantages for some farmers, particularly those now able to benefit from the poor water control. Nevertheless, better control should mean more equitable distribution of water and thus, on balance, have a positive, democratizing effect.

For the District Engineer and other MOI staff better control structures might mean additional pressure from various quarters for exceptions, etc. The structures could also put greater teeth in MOI efforts at control and encourage the MOI to exercise its legal authority. Making certain that the effects of additional, exercised control do not fall on specific, already disadvantaged groups, will be a responsibility of the MOI. The communication channels available to farmers should help ensure this occurs but it will also need to be a concern of those people planning O&M and SR. The USAID financed planners will be expected to help provide adequate consideration of this concern.

F. Environmental Concerns:

1. Environmental Assessment Requirements

The PID recommended a Scoped Environmental Assessment for the System Redesign and Operation Component. For other project components no specific assessments were recommended, although during implementation, actions are to be taken to maximize positive and minimize negative effects. The NE Environmental Coordinator concurred by memo dated March 10, 1981, and noted it was not necessary to provide a scope of work prior to the obligation of funds for the project.

2. Environmental Analysis

From an environmental standpoint the irrigation system as it now operates has several important characteristics. The ineffective control of water in the system and normal irrigation practices lead to problems of water logging, salinity and waste of the valuable water resource, particularly as one proceeds downstream where return flows cannot be re-used and drainage becomes more difficult. The thousands of kilometers of canals serve as reservoirs for bilharzia with limited possibility of control until the system can be better managed. Pesticides and fertilizers find their way into the irrigation network as excessive water quantities

are applied and drained off the land and as reflows re-enter the system. Weed growth in the system is encouraged by the inadequately maintained canals and the general inability to turn the water off. Weeds are spread between farms as water passes across fields and into drainage systems.

The proposed project consists of 6 components: (a) deferred maintenance/structure replacement; (b) project planning and preparation; (c) the feasibility and preliminary design of an irrigation system betterment program in one district; (d) planning an improved budgeting, programming and execution process for O + M in one Directorate; (e) training; and (f) consulting services.

The proposed project will not transform the irrigation network although it will positively affect some of the above identified system characteristics and have an overall positive effect on the environment. To maximize the positive effects and to address possible negative consequences different actions are planned for the relatively distinct components making up the project. Each project component and the proposed actions in achieving these objectives are outlined below.

(1) Structural Replacement:

The basic thrust of this component is to improve the operation of the system, thus improving water control and water use efficiency. Improved system operation has the potential of facilitating bilharzia control, of reducing water logging, salinity and run off as quantities of water applied are reduced and of facilitating canal maintenance. In performing the indicated work it will be necessary that the Ministry of Irrigation insure that good engineering design and construction practices are followed during implementation, for example, silt removed from canals is disposed of properly and construction sites are returned to the original or an improved state.

(2) System Redesign and Operation:

An element of the feasibility and preliminary design work for the North Zifta District, to be funded under this component, will be the conduct of the necessary environmental examination. It is planned that a Scoped Environmental Assessment in compliance with 22 CFRs 216 of 10/9/80 (AID Environmental Procedures) as amended will be performed. A Scope of work for this process will be developed as a part of the project and submitted in draft to NE/PD/PDS for review and comment. Topics to be addressed in the Scoped Environmental Assessment include construction impacts,

operation and maintenance activities, control of water born diseases, management of agriculture chemicals, and management of water application. The resulting report must indicate how any possible negative impacts of proposed changes can be ameliorated as well as identify any complementary activities that might be required, including action by other Ministries.

(3) Project Design and Planning:

It will be the responsibility of the contract personnel provided to factor environmental considerations into the planning process and to sensitize Egyptian personnel to those considerations. This will be specified in the consultant's scope of work. One or more of the team members will be required to have a basic background and understanding of environmental issues.

d. O + M Planning:

The objective of this component is to upgrade operation and maintenance through a better planning effort. The planning will encompass the full range of steps from budgeting to administration to canal maintenance. The improved system should improve operation control, thus environmental changes, if any, should be positive. It will be the responsibility of the contract advisor to make sure that MOI personnel give full consideration to environmental factors in the planning process.

(5) Training:

The training component will have no direct environmental impact. It is proposed that training courses on environmental issues be a part of the training package developed to assure that Ministry personnel become aware of environmental issues and measures available for their amelioration. As necessary, appropriate environmental training may also be provided for the personnel of other Ministries involved in the use of the irrigation system, i.e. Agriculture and land reclamation, and for personnel charged with protecting the Egyptian environment, i.e. Ministry of Health, and Environmental Office.

(6) Consulting Services:

No environmental impacts will result directly from consulting services. Any activities resulting from this service will require that full consideration be given to environmental impacts.

VI. Implementation:

A. Structure Replacement (SR)

The life of project proposed funding level for SR is \$93.0 million (equivalent to LE 65 million). This Project Paper includes funding of \$23 million for the first two years of the program. Implementation will be based on an annual program agreement (APA) between AID and MOI for SR to be executed prior to the beginning of each EFY with the exception of 81/2. For that year the agreement will be executed as soon as the basic conditions required under the project are met. Each agreement will set a projected total for MOI disbursements for the year and maximum amount of funds that AID will disburse. The MOI will be reimbursed 80 percent of their expenditures until the agreed upon annual expenditure is reached. Reimbursement will be made each quarter based on MOI reported disbursements.

The commitment of AID funds will be undertaken on the understanding that it is the intent of the Government of the A.R.E. to increase steadily the MOI budget for structure replacement (SR) year by year so that by EFY 83/4 the unreimbursed portion of the MOI budget will sustain the system once the backlog has been eliminated (Annex 10 Table V). 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 (as set forth in MOI Drainage Authority Tender No. 8/1979 N.M.D.3A for the Nubaria Main Drain).

Annual program agreements in the form of a memorandum of understanding will set forth the budget of the MOI for the upcoming year and specify the levels of total MOI and AID funding for eligible structures in each Directorate. Estimated Monetary Limits on AID Reimbursement under annual program agreements for each EFY follow:

Year	<u>In Millions</u>	<u>US\$</u>
1981/2	1.0	5.4
1982/3	12.2	17.5
1983/4	13.8	19.7
1984/5	16.8	24.0
1985/6	18.4	26.4
TOTAL	65.0	93.0

1/ Detail breakdown by year shown in Table VI of Annex X.

Quarterly reports of expenditures shall be provided reflecting the annual program agreements and showing disbursements by Directorates and category of structure for the quarter in question and for the year to date. Reimbursement to the MOI will be made quarterly within the limits set forth in the tabulation above, or as amended in the annual agreements.

Each quarterly report shall be accompanied by a certification from the Undersecretary in charge of each Directorate for which disbursement reports are submitted as follows:

"I _____ Undersecretary of State for Irrigation in the _____ Directorate hereby certify that all contracts executed in the EPY ----- covered by this report require the contractor to complete the structures in full compliance with standard MOI plans and specifications for each structures. I further certify that all structures reported herein as completed have been inspected and found to have been built in full compliance with the same standards and specifications".

Signed _____
Name _____
Directorate of _____
Date _____

The reports shall be consolidated and forward to AID by the Undersecretary for Planning with a request for reimbursement in accordance with the applicable Annual Program Agreement drawn up to implement these arrangements.

To provide senior responsible managers of the MOI and to AID assurance that a satisfactory level of quality control is being exercised to meet MOI specifications, a field review of SR performance will be carried out annually. The review will include one short term advisor under the project, a senior MOI engineer from outside the Irrigation Sector and, (if determined appropriate by the MOI) The SR Advisor from the project contractor staff. An impartial report will be submitted to the Coordinating Committee with a copy to AID.

In Contracting, the MOI will follow standard GOE procurement and regulations. These include competitive procurement of construction services.

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 advances with contract and progress payments at 15-day or 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 Director of Works who will make the decision on final acceptance and payment for a construction project. A five (5) 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 Director of Works before the final payment is released.

B. Contract Services, Commodities, Participant Training and Other Services:

1. Contract Services:

Technical assistance will be provided through one or two AID-financed host country contracts with U.S. firms selected through the competitive selection procedures set forth in AID Handbook 11, Chapter 1.

2. Commodities:

Project commodities, other than those included in TA contracts, will be procured by the Ministry of Irrigation utilizing AID-financed procurement procedures established in Handbook 11 Chapter 3. Approximately 50% of these commodities will be procured as soon as possible after funds are obligated because they are essential either to the effective operation of the TA personnel or to the enhancement of MOI operations or both. All office equipment and vehicles will be ordered with sufficient lead time to arrive and clear customs as soon as possible but no later than June 1982. Orders will therefore be placed no later than November, 1981. The second priority will be given to the procurement of half of the authorized books, catalogues and periodicals and all of the drafting equipment and supplies and communications facilities for the five Directorates in the Delta. This will require approximately \$1.5 million and will involve a substantial effort to prepare specifications, execute procurement documents and arrange for a procurement agent to expedite purchase and shipment.

In order to accomplish the above actions the services of a procurement specialist will be funded from the short term consultant allocation under the SR component of the project. A personal services contract or IQC will be used to bring the specialist to Egypt about October 1, 1981 for approximately 60-75 days. During that time it should be possible to set in motion all necessary action for the early procurement effort. With that the project should be well set to begin to function with all key equipment available when the contract advisors arrive about April 15, 1982.

The remaining commodities will require selection by the various specialists of needed types of equipment. Further orders for books etc., for the professional engineers and many items of training equipment can follow as work progresses. The same will be true for most of the workshop equipment for in-house O&M work in Gharbia. Its procurement will need to be closely geared to the plans for upgraded O&M to be defined by the project. Procurement can thus be timed to arrive as the operational phase would begin in mid 1983.

As indicated, all noncontract commodities will be procured by the ARE/MOI under regulations prescribed in Handbook II Chapter 3. This will include prior AID approval of all commodity procurements and awards in excess of \$100,000 or the Egyptian pound equivalent, whether by the MOI or a contractor. Procedures to be used will also be approved by AID for those host country or contractor commodity procurements under \$100,000. Contractors may assist and advise on procurement specifications, preparation of invitations for bid and bid evaluations.

3. Participant Training:

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

For Local Training funds will be advanced in amounts not exceeding 25 percent of the budget for the year submitted annually by the MOI as a component of the Annual Program Agreements. Advances will be replenished upon the submission of quarterly certified reports by the Director of Training to USAID/Cairo. The reports will be presented in the form and manner established by the Mission for funding local currency costs. Senior level management training will be administered by the main TA contractor and funding handled accordingly. Funds provided under the project for Miscellaneous Services will be disbursed directly by USAID/Cairo as needed using mechanisms established within the Mission for US\$ and local currency financing.

C. GOE Responsibilities:

As indicated above the GOE/MOI will have overall responsibility for implementing the various project elements. 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; (2) providing necessary staff and budget for each project component; (c) reporting to AID on the implementation of the SR and other programs; (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 within existing units of th MOI organization. The Irrigation Department will supervise and manage the structural replacement, and Gharbia O & M components; the Planning Department will be responsible for the North Zifta and Project Preparation Unit component; and Training and the Water Master Plan Group will be under the jurisdiction of the Water Research Center. Recognizing the interrelationship of the various activities the Ministry will create a formal 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 the consultant services component will be under the general direction of this committee. A more complete discussion is in the Project Analysis, Administrative Feasibility portion of this paper.

D. Technical Services Contractor(s) Responsibilities:

Technical assistance staff will provide necessary technical advice in planning and implementing activities, in preparing work plans and reports, in identifying and planning trainees and in evaluating activities. 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 in excess of \$100,000 or the Egyptian pound equivalent will be required. Contracting procedures will also be approved by AID for those host-country procurements under \$100,000. Annex XII identifies the positions to be supplied under the contract and briefly describes the duties and responsibilities of each position .

E. Specific AID Responsibilities:

The USAID/Egypt Assistant Director for Agricultural Resources or his designee, will have general AID management responsibilities. Day-to-day monitoring will be performed by the appointed AID project officer. This will include regular visits to work sites and specific spot checks on structures being replaced under the SR program. Management and monitoring will be facilitated by project implementation plans to be prepared by the MOI and the technical services contractor. In addition to general guidance on project implementation provided by the project officer he/she will also be responsible for direct involvement with the training activities outside Egypt which are to be handled using normal AID-participant training procedures.

F. 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 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.

G. Implementation Plan:

An implementation plan is shown in the following table.

(continued from previous page)

C. IMS IMPLEMENTATION SCHEDULE (Key Dates)

ACTION	Dates of Action									
	Project General	SR Capital Activity	SR	Charbia O&M	Technical Assistance				Commodity Procurement	Evaluation
					Project Preparation Unit	North Zifta Study	Manpower Development & Training	Consultant to MOI		
1983										
33. Mid-Term Evaluation Conducted				Apr. 15						4/15-5/30
34. Charbia O & M Plan Completed										
35. Third SR Agreement (IFY 82/3) Executed		June 15								
36. Long Term Participants Depart (FYU and Manpower)					Aug. 25		Aug. 25			
37. North Zifta Feasibility Study Completed						Dec. 30				
1984										
38. FP Amendment (North Zifta, O&M, SR)	Mar. 15									
39. NEAC Approves FP Amendment	Apr. 10									
40. Authorization Signed	Mar. 20			Apr. 20		Apr. 20				
41. Mission/COE Sign Agreement Amendment	May 10			May 10		May 10				
42. Fourth SR Agreement Executed (IFY 84/5)		June 15								1/5-2/20
43. Long Term Participants Depart					Aug. 25		Aug. 25			
1985										
44. SR Agreement for IFY 85/86 Signed		June 15		July 15						
45. SR Engineer Advisor Departs										
46. Long Term Participants Depart (FYU-MIT)					Aug. 25		Aug. 25			
1986										
47. Final Evaluation Begins										Jan. 3
48. Final Evaluation Ends					July 15		July 15			Feb. 28
49. FYU Team Concludes Work										
50. MOI Consultant Concludes Work										
51. Project End		July 11								

VII. Evaluation Plan

A. Data Collection

Inasmuch as the basic objective within the management control of the project is to raise the efficiency of the irrigation system primary emphasis in evaluation should be given to judging accomplishment on that level. For this purpose it is essential as a first undertaking to develop a body of baseline data on the 1980/81 situation with regard to system efficiency. For the purpose of developing baseline information it is planned that the MOI will constitute an Evaluation Study Committee composed of the following:

- Senior Research Engineer, Water Research Center, Chairman
- Senior Engineer Analyst, Project Preparation Unit
- Senior Engineer Analyst, Water Master Plan
- Senior Engineer, Irrigation, Irrigation Sector
- Senior Engineer, Analyst, Planning Department

This Committee will be charged with assembling and/or developing a comprehensive set of baseline data on the current situation (as of the end of EFY 1980/81) covering the following topics and such other matters as the Committee deems relevant to a complete picture of the current state of the facilities, operating conditions and system efficiency of Nile-based old lands irrigation in Egypt: along the lines illustratively outlined below:

1. <u>Structures</u>	<u>Number</u>	<u>with life expectancy</u>		
		<u>(Years)</u>		
		<u>0-5</u>	<u>5-10</u>	<u>over 10</u>
<u>Total</u>				
Intake regulators				
Head regulators				
Weirs				
Tail escapes				
Spillways				
Bridges				
Crossing works				

2. <u>Canals</u>	<u>Total</u>	<u>Condition (by echelon)</u>		
		A	B	C
A	B	C		

3. <u>Water Duty</u>	<u>Irrigated Area</u>	<u>Winter Summer Nili</u>	
-			

- 4. Other data defining system condition (including bridges).
- 5. Other data defining system efficiency.

The Committee with the support and participation of a short-term engineer consultant under the SR segment of the Project will prepare a report summarizing this baseline information. The target completion date is August 31, 1982. This data shall then form a part of the information needed for assessment of progress of the program to improve water control and water management efficiency. The report will also assess the need for further data and information collection in succeeding years.

B. Interim Evaluation

In the second quarter of CY 83 a 1.5 month interim evaluation will be carried out by an outside independent contract team with support and participation from MOI, A.I.D. and project advisory technical personnel. The evaluation contract is funded under the project and contemplates use of four specialists: an engineer, an economist, a rural sociologist and an evaluation specialist.

This evaluation is timed to review progress related to the several components of the program and to assist in the determination of the suitability of proceeding with additional work and/or further commitments. The circumstances relating to these components at that time are expected to be as briefly outlined below:

SR The SR component will have been in operation in 5 Directorates for nearly two years. A determination will be required as to whether the project should be amended to provide funds and authority for the SR program to be operated nationally for 3 years. This determination will depend on the results of the evaluation.

O&M The planning for O&M for Charbia Directorate should have been completed, or nearly completed, and work may be underway to implement the plan. It will be a useful opportunity therefore to review the results and assess prospects before generalizing the plan or funding support elsewhere.

North Zifta The feasibility analysis should be complete and the review of its results reaching final stages so that the impact of its results and implications for future programs can be appraised.

P.P.U. The Unit will have been in operation and undergoing substantial development over two years with a further period of two years of technical assistance ahead. It should therefore be possible to make significant judgments about its progress and future directions of its work and development.

Training The short courses will have been in operation for up to one and one half years and an examination of their impact and effectiveness will be most appropriate. Management training should similarly have accumulated enough experience for a very meaningful assessment. Many participants will also have returned in various field and assessment of their place in the organizations should give meaningful insight into whether they are making their expected contribution.

MOI Consultant An appraisal should be made of the accomplishments and utility to the MOI of the consultant and in particular whether the services are fulfilling an essential role in making sound decisions on major issues and resource commitments.

Overall then the financial, physical, technical and organizational aspects of the program can be assessed as well as its effectiveness in reaching defined purposes. In addition those purposes can be reviewed to determine whether they are as appropriate as they are now thought to be. Special attention will need to be given to the observance by the MOI of its undertakings designed to alleviate various constraints in the organization such as recruitment, staffing patterns, incentives etc., and whether they have met expenditure and quality of construction objectives in the SR program. In particular the evaluation should examine the Ministry's performance in moving toward long term goals in the SR area.

Some attention should be given to the external economic, social and environmental effects of the program and in particular collect and assess available information on the impact on farmers, the question of whether water is or is not available more equitably in areas of priority SR effort and whether appropriate emphasis has been given to the highest priority structures, the role and impact of bridges and the willingness of farmers to collaborate on meska O&M where significantly better water control has been achieved.

C. The Final Evaluation

As the project approaches its conclusion, but before the activities have been completed as far as external funding and advisory support are concerned, a second in-depth evaluation is to be carried out. It will employ the same basic skills as the interim evaluation and examine the same issues but will be in somewhat greater depth. It should also give greater attention to the longer run goals toward which the Project is directed and seek for example to assess whether:

-water savings are being effected through more efficient consumptive use;

-water management is significantly improved so that farmers feel they have a reliable and timely supply and if so whether they are more prepared to cooperate to further improve its on-farm use and efficiency;

-there is evidence that water tables have been lowered in areas threatened with waterlogging;

-there is evidence of less water flowing to drains than had been the case while at the same time farmers have an adequate dependable supply;

-there is evidence that productivity has improved in areas where measurement indicates significantly better management has been achieved.

Well documented answers to the above and other similar questions should provide convincing evidence as to whether investment in sustained structure replacement and efforts to achieve efficient water management are matters deserving of high priority in government resource allocation. If it could be shown that positive results are being achieved to a significant degree the GOE should be more prepared to continue supporting the programs built up under this project well beyond the confines of the life of this Project. In this sense a review emphasizing these issues could have far reaching impact.

At the same time the more specific questions suggested as a focus of attention for the interim evaluation should be assessed and used to determine the significance of the various project components and their contribution to overall project purpose.

The results of this evaluation should hold important lessons for the shape and emphasis of future programs in irrigation with or without further commitments of external resources.

VIII. Conditions, Covenants and Negotiating Status:

A. 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 AID, the Cooperating Country shall furnish, except as the parties may otherwise agree in writing, in form and substance satisfactory to AID, 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 AID 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 AID:

- a. Assurance that all structure replacement initiated in Directorates for which AID 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 cost,
- 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.

B. Covenants:

Standard provision in the Grant agreement will specify AID's right to conduct evaluations and approve all the Contracts in advance and will require the GOE to provide local currency and in-kind support as agreed upon on a timely basis.

The Grantee shall covenant as follows:

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

(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 individuals available for necessary training, including overseas training, for project purposes.

(4) The Grantee shall introduce a performance-based incentive payments system satisfactory to AID for MOI project staff.

(5) The Grantee shall in its annual budget requests include sufficient funds to adopt and apply the 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 AID reimbursement for structure replacement for that Fiscal year.

C. Negotiating Status:

The Project as outlined in this paper has been thoroughly discussed with the Minister of Irrigation, specifically with a committee, appointed by the Minister, headed by the Senior Undersecretary. The Committee has reviewed the draft and is in full agreement with the proposed design. The Minister has stated that he wants the project implemented as soon as possible. The Mission expects to proceed to signature of the grant agreement immediately following authorization.

ANNEX I
CHARTS

LIST OF CHARTS

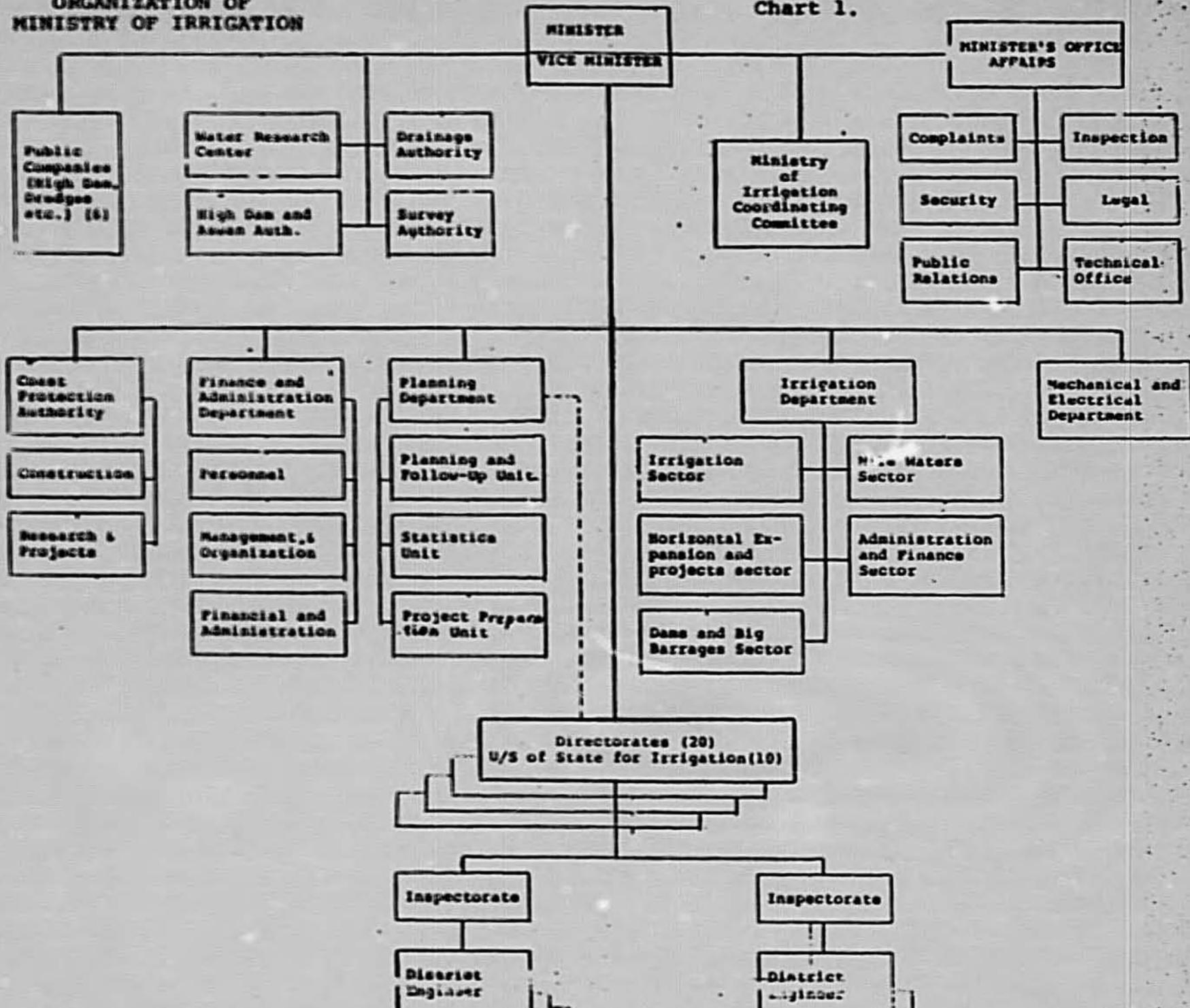
Number

Title

1. Organization of Ministry of Irrigation
2. Ministerial Decree Establishing Project Preparation Unit
3. Proposed Organizational Table of Project Preparation Unit
4. Cost of Rehabilitation/Replacement of Irrigation Structures by Directorate
5. Annual Replacement Cost for Irrigation Structures
6. MOI Directorate Level Tatio Communications Network
8. Equipment recommended for Directorate, Inspectorate and District Level Workshops

**ORGANIZATION OF
MINISTRY OF IRRIGATION**

Chart 1.



Ministerial Decree
No. 344 for 1980

* After reading the Law No. 47 of the year 1978 concerning the role of civilian workers in the country,
* And after reading the letter No. 1946 from Chief of the Central Authority for Organization and Administration dated 11/3/1980 and which is concerned with organizing the General Department of MOI,
After reading the above, the Minister of Irrigation and Minister of State for Sudan Affairs decided:

Article 1

Establishing a General Department, for feasibility studies and evaluation of projects, as part of the organizational structure of the Undersecretariat of the Ministry for Planning, Follow-Up and Feasibility Studies.

Article 2

The organizational structure of the General Department for Feasibility Studies consists of:

- A. Department of Civil Projects
- B. Department of Mechanical and Electrical Projects
- C. Department of Loans and Foreign Aid

Article 3

The General Department (mentioned in Article 1) is specialized in:

- Analyzing the technical sides of the projects proposed by the technical concerned bodies.
- Making the necessary technical, economic, and social feasibility studies for the projects.
- Putting the proposed projects in a proper way of presentation to the concerned financial bodies to discuss the funding possibilities of these projects.

- Comparing in all aspects among the different projects to put the priorities in implementation.
- Evaluating the projects before, during, and after implementation.
- Studying the suggestions and requirements of the bodies under the Ministry, concerning hard currency necessary for projects and discuss, organize, and prepare a complete report about these requirements.
- Putting one-year and 5-year plans for hard currency necessary for implementing the projects.
- Participating in the study of the international agreements between the Ministry and the different countries and foreign agencies in the field of technical and economic cooperation.
- Following up the used currency of the loans and foreign aids.

Article 4

The agencies of the Ministry would inform the General Department (mentioned in Article 1) with the preliminary feasibility studies of the projects which are suggested to have feasibility studies of, and nevertheless, to include all the information needed for these studies. Also the agencies have to provide all related data to that matter.

Article 5

The General Department would give its recommendations concerning courses and training programs offered by the World Bank or any other body in the field of feasibility studies of projects.

Article 6

This Decree is effective upon issuance date and all the responsible officials have to execute it.

En. M. Abdel Wady Samaha

11/10/53

PROJECT PREPARATION UNIT / MOI
PROPOSED ORGANIZATION AND FUNCTIONS

Chart 3.

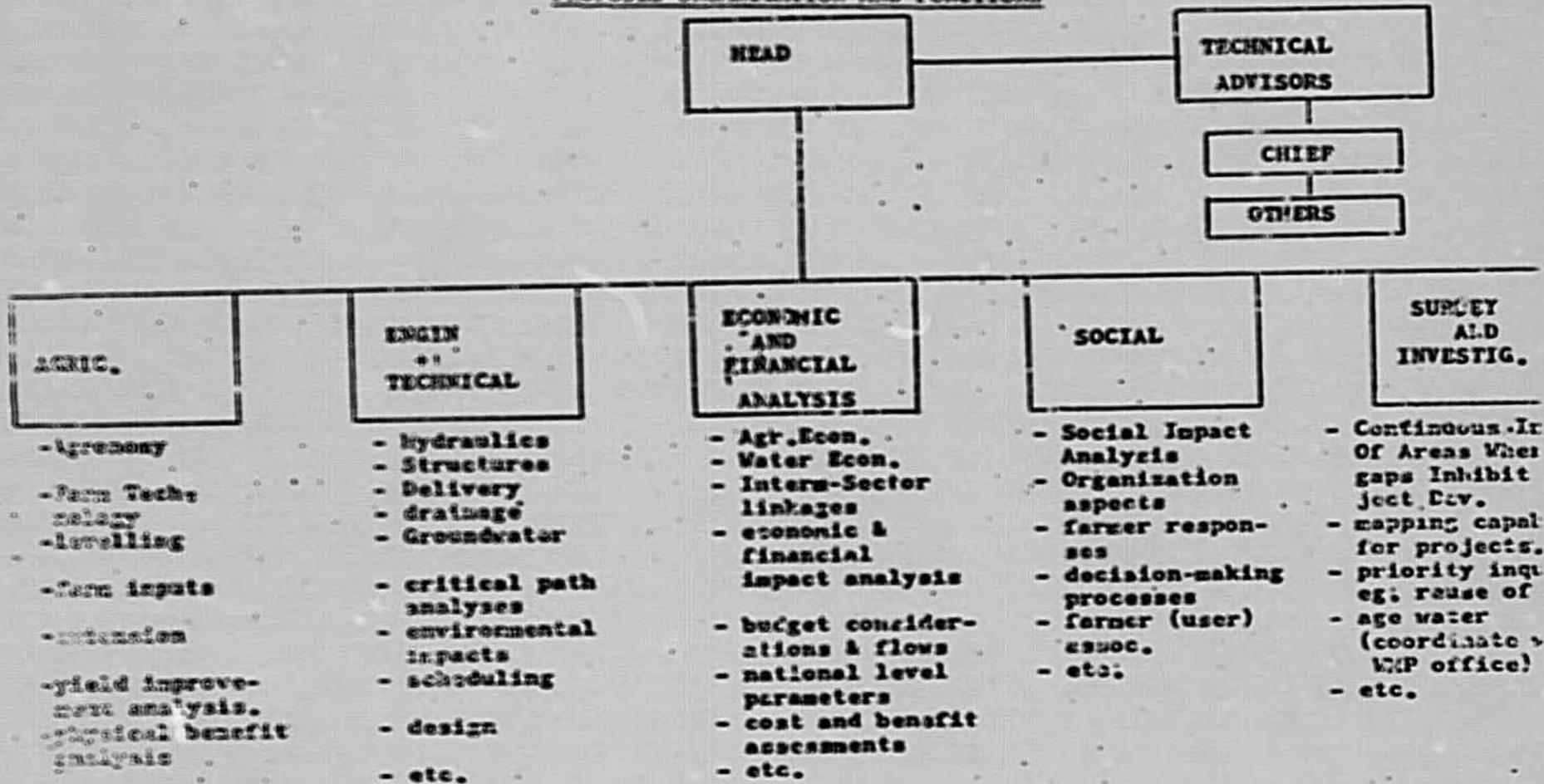


Chart 4.

COST OF PERMANENT REPLACEMENT
OF
IRRIGATION STRUCTURES BY DIRECTORATE

(1981 Prices)

Thousands of Egyptian Pounds

DESCRIPTION	BRIDGES		ENTRANCE & HEAD REGULATORS		STEEL GATES		TAIL ESCAPES		WEIRS		SYPHONS & AQUEDUCTS		TOTAL COST
	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	
1. BRIDGE	33	219.2	3	28.0	61	254.0	5	15.0	-	-	9	13.5	532.2
2. BRIDGE	17	141.0	19	219.0	-	-	12	54.0	-	-	-	-	536.0
3. BRIDGE	205	213.0	29	250.0	133	600.5	47	170.0	-	-	203	195.0	2345.0
4. BRIDGE	245	3795.0	85	154.0	174	752.0	147	427.0	-	-	18	51.0	5120.0
5. BRIDGE	123	2741.0	39	2532.2	72	300.0	72	673.0	-	-	48	169.0	4511.0
6. BRIDGE	64	1825.0	9	345.0	125	555.0	20	70.0	-	-	26	25.0	2335.0
7. BRIDGE	72	2827.0	43	4733.0	57	286.0	21	152.0	-	-	-	-	2870.0
8. BRIDGE	407	2273.0	41	214.5	129	523.0	54	244.0	-	-	47	141.0	3096.0
9. BRIDGE	204	2624.0	79	1800.0	241	1144.0	40	234.0	-	-	14	110.0	5352.0
10. BRIDGE	104	1479.0	13	130.0	150	787.0	31	152.0	4	13.0	15	61.0	2491.0
11. BRIDGE	76	1117.0	1	203.0	22	162.0	-	-	-	-	28	212.0	1770.0
12. BRIDGE	90	110.0	72	623.0	152	637.0	-	-	-	-	8	62.0	2052.0
13. BRIDGE	44	539.0	5	91.0	-	-	2	7.0	19	145.0	17	36.3	812.3
14. BRIDGE	26	671.5	-	-	43	48.0	59	78.0	-	-	-	-	1097.5
15. BRIDGE	73	1212.0	-	-	50	242.0	4	18.0	-	-	16	24.0	1534.0
16. BRIDGE	2	27.3	-	-	22	49.5	21	37.0	-	-	-	-	103.5
17. BRIDGE	32	1220.0	31	300.0	39	181.0	-	-	-	-	-	-	1601.0
18. BRIDGE	13	211.0	-	-	37	49.0	6	26.0	-	-	5	7.5	325.5
19. BRIDGE	28	182.0	-	-	5	708.0	15	26.0	-	-	31	46.5	757.5
TOTAL	3725	24202.5	401	1011.0	1065	6926.5	592	2389.0	23	158.0	385	1276.6	44609.6 ^{1/}

^{1/} After consultation with MOI the total cost estimate has been adjusted to L.E. 57.2 million based on CH₂M Hill observation that many structures now are being built to standards not fully reflecting MOI specifications. To cover cost of building to those standards a 30 percent addition was agreed on.

Chart 5.

Annual Replacement Cost For Irrigation Structures

Type Structure	Hydraulic Area M ²					Unit Replace Cost	Total Cost		
	BC	N	P	S	T		RC+N+P	S	T
						LE/M ²	LE mill	LE mill	LE mill
Inlet Regulators	2405	8880	3479	--	--	3000	65.25	--	--
Head Regulators	6472	5322	1383	--	--	2500	32.94	--	--
Canals	1039	879	26	--	--	1500	2.91	--	--
Head Escapes	285	154	3250	--	--	1500	5.54	--	--
Syphons	285	229	252	--	--	1500	1.15	--	--
Structures	47265	5010	3718	1001	9757	2500	203.48	2.50	24.39
Grading Works	250	--	482	3	--	3000	3.67	0.02	--
							320.98	2.52	24.39
	50	50	50	30	15				
Annual Replace							12.84	0.17	3.25
							16.26 ^{1/}		

- 1. Reinforced Concrete
- 2. Masonry
- 3. Steel
- 4. Timber

^{1/} Total annual cost is for reaching state by 2005 where the oldest structure would be 25 years. To achieve a stable state where the average age is 25 years the annual cost at 1980 prices is about L.E. 9 million. But this must be raised by 15 percent to bring to 1981 prices and by an additional 30 percent to cover full compliance with MOI specs.

Sourced from Technical Report 20, Water Master Plan, Page 32, Table 7

^{1/} (continued) Hence $9 \times 1.15 = 10.35 \times 1.3 = 13.46$ million annual expenditure at 1981 prices.

Chart 6.

Ministry of Irrigation

Irrigation Department

Chapter I, Salaries & Wages Budgets (1)

(Thousands of Egyptian Pounds)

	1978 (2)	1979 (2)	Trans. 1980 (3)	1980/81 (4)
Salaries Wages	11,654.0	12,333.0	6,501.0	13,453.0

Chapter II, Current Expenses & Project (1)

(Thousands of Egyptian Pounds)

	1978 (2)	1979 (2)	Trans. 1980 (3)	1980/81 (4)
Current Expenses and Projects	22,033.0	22,067.0	11,761.6	20,337.0

- (1) Data from MDI Planning Department
- (2) Full calendar year 1 July through 31 December
- (3) Fiscal year was changed mid year. These figures are shown for 6-month period 31 December, 1979 through 30 June, 1980.
- (4) 1 July, 1980 through 30 June, 1981 fiscal year

Chart 6. (2)

Ministry of Irrigation

Irrigation Department

Chapter III, Capital Budgets (1)

(Thousands of Egyptian Pounds)

	1978 (2)	1979 (2)	Trans. 1980 (3)	1980/81 (4)
Horizontal Expansion	16,184.5	16,002.7	15,050.0	22,150.0
Upper Nile	3,977.0	3,500.0	2,800.0	10,600.0
Rehabilitation and Modernization	4,905.0	7,313.0	5,307.8	12,300.0
Erosion Protection	87.5	165.5	450.0	900.0
Dike Barrage Studies	926.0	514.6	517.2	497.0
Alternate Water Supply Studies	741.0	650.0	150.0	-
Aquatic Weed Control	3,855.0	2,354.3	950.0	1,500.0
TOTAL BUDGET (Chapter III)	30,676.0	30,500.0	25,225.0	47,947.0

(1) Data from MOI Planning Department

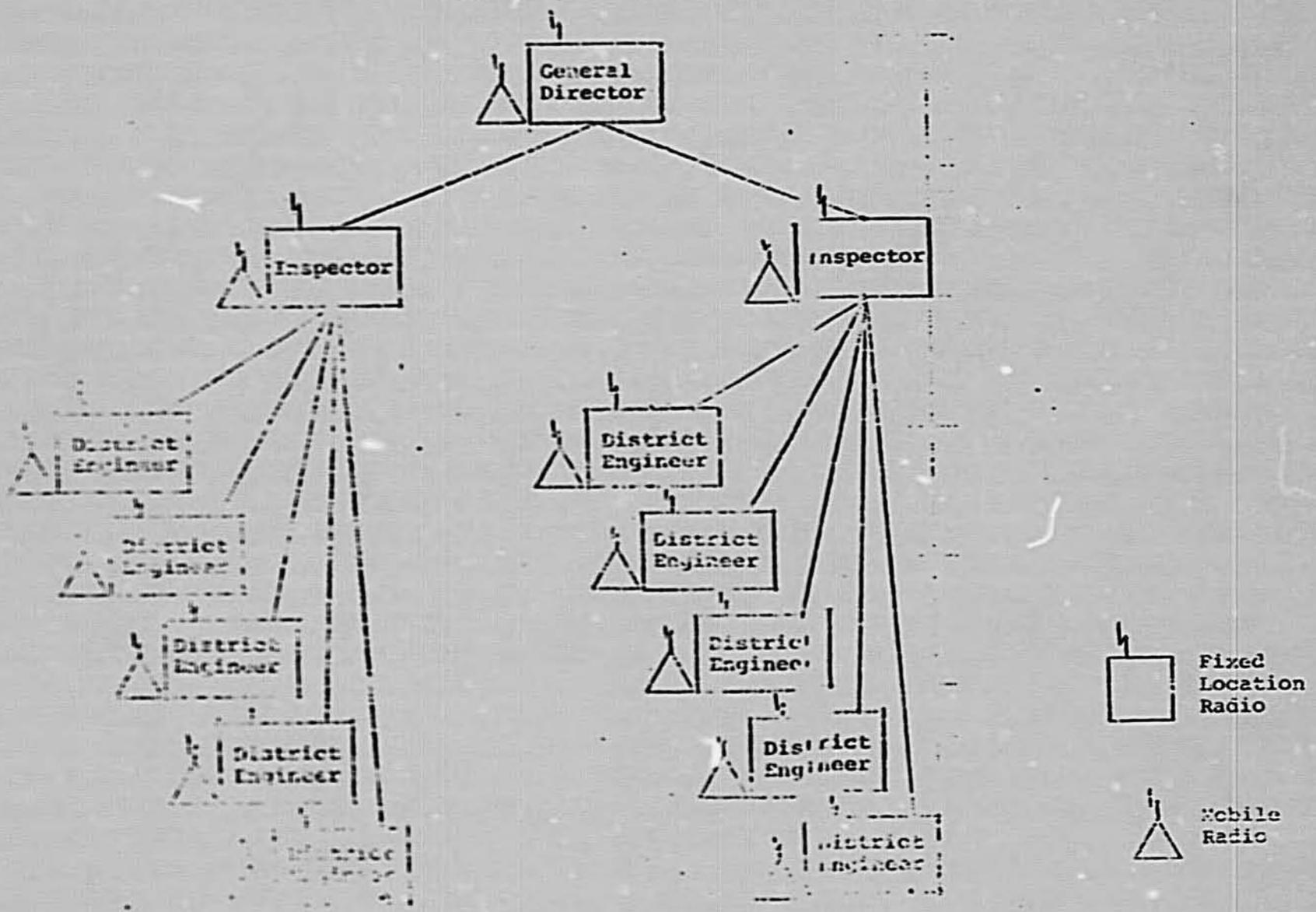
(2) Full calendar year 1 January through 31 December

(3) Fiscal year was changed mid-year. These figures are shown
for 6-month period from 31 December, 1979 through 30 June, 1980

(4) 1 July, 1980 through 30 June, 1981 fiscal year

Chart 7.

Directorate Level
Radio Communications Network



Equipment Recommended

For

Directorate Level Workshop

<u>Quantity</u>	<u>Item</u>
4	Pickup (3/4 Ton)
2	Medium duty truck (2 Ton)
1	Heavy-duty truck w/winch (5 Ton) and small midship mounted hydraulic crane
1	Concrete Compression test equipment
4	Materials testing equipment (sets)
	Sieves
	Balance
	Slump Cone
	Soils Testing Equipment
	Paint thickness gauge
4	1/3 m ³ concrete mixer (gas engine driven)
4	Concrete finishing tools (sets)
4	Spirit level
2	Woodworking hand tools (sets)
2	Water pump (gas engine driven)
2	Concrete vibrator (electric powered w/cords)
2	Portable welding machine (gas engine driven)

<u>Quantity</u>	<u>Item</u>
2	Oxy-acetylene torch (sets)
2	Mechanics hard tools (sets)
4	Earthwork hand tools (sets)
2	Soil compactor (wacker)
2	2Kw portable generator (gas engine driven)
4	Survey Equipment (sets)
	Level
	Transit
	Chain
	Rod
4	Power Drill and Saw (electric)
2	Power Hacksaw (electric)
1	Forge

Equipment Recommended
For
Inspectorate Level Workshop

<u>Quantity</u>	<u>Item</u>
2	Pickups (3/4 Ton)
1	Medium-duty truck (2 Ton)
1	Heavy-duty truck w/winch and small midship mounted hydraulic crane
2	Materials Testing Equipment (sets) Sieves Balance Slump Cone Soils Testing Equipment Paint thickness gauge
2	1/3 m ³ concrete mixer (gas engine driven)
2	Concrete finishing tools (sets)
2	Spirit level
1	Wood working hand tools (set)
1	Water pump (gas engine driven)
1	Concrete vibrator (electric powered w/cord)
1	Portable welding machine (gas engine driven)
1	Oxy-acetylene torch (set)

Chart 8. (4)

<u>Quantity</u>	<u>Item</u>
1	Mechanics hand tools (set)
2	Earthwork hand tools (sets)
1	Soil compactor (wacker)
1	2Kw portable generator (gas engine driven)
2	Survey Equipment (sets)
	Level
	Transit
	Chain
	Rod
2	Power Drill and Saw (electric)
1	Power Hacksaw (electric)

Equipment RecommendedForDistrict Level Workshop

<u>Quantity</u>	<u>Item</u>
1	Pickup (3/4 Ton)
1	Medium-duty truck w/winch (2 Ton) and small midship mounted hydraulic crane
1	Materials Testing Equipment
	Sieves
	Balances
	Slump Cone
	Soils Testing Equipment
	Paint thickness gauge
1	1/3 m ³ concrete mixer (gas engine driven)
1	Concrete finishing tools (set)
1	Spirit level
1	Wood working hand tools (set)
1	Water pump (gas engine driven)
1	Concrete vibrator (electric powered w/cords)
1	Portable welding machine (gas engine driven)
1	Oxy-acetylene torch (set)
1	Mechanics hand tools (set)

<u>Quantity</u>	<u>Item</u>
1	Earthwork hand tools (set)
1	Soil compactor (wacker)
1	2Kw portable generator (gas engine driven)
1	Survey Equipment (set)
	Level
	Transit
	Chain
	Rod
1	Power Drill and Saw (electric)

ANNEX II
LOGICAL FRAMEWORK

IMS LOGICAL FRAMEWORK

Annex II

I. GOAL:	<u>Objectively Verifiable Indicators</u>	<u>Means of Verification</u>	<u>Important Assumptions</u>
<u>Goal Statement</u>	a. Crop area under Nile water irrigation	a. GOE data on water use	a. GOE will continue to pursue horizontal expansion as a basic objective for development and strategic reasons
Effective control of Nile waters for all uses and particularly their optimal allocation to and within agriculture as a means of helping production and productivity.	b. Industrial water use	b. Special surveys	b. Water demand will grow to make water a genuinely scarce resource in aggregate in the 1990's.
	c. Domestic water consumption	c. Canal water flow and level readings	c. Agricultural technology improvements will be made so that efficient water management will become an increasingly significant factor in determining agricultural sector growth.
	d. Navigation	d. Changes in water table	d. GOE remains committed to formulation and implementation of water use plans.
	e. Hydro electric power generation	e. Physical observation	e. International agreements on cooperative use of Nile waters

Objectively
Verifiable Indicators

- f. Acreage of New Lands in production

- g. Crop distribution and yields on Nile valley lands and New Lands.

Means of Verification

- f. Ministry of Agriculture and Ministry of Land Reclamation data on yields, economic value, and production of major crops

- g. Agricultural import and export statistics

Important Assumptions

II. PURPOSE:	<u>End of Project Status (EOPS)</u>	<u>Means of Verification</u>	<u>Important Assumptions</u>
<p>1. To improve the operating efficiency of the total irrigation system and strengthen the Ministry of Irrigation's operation, maintenance and planning capabilities. To achieve this purpose the project contains the following components:</p> <p>a. To improve the operating efficiency of the irrigation system and of the structure maintenance program</p>	<p>a. Irrigation infrastructure replacement exceeds rate of depreciation.</p> <p>b. Backlog of SR reduced elimination with MOI resources alone feasible within five years of end of project.</p> <p>c. MOI funding for SR exceeds depreciation rate and MOI agrees to sustain SR investments at levels to eliminate the backlog by 1990.</p> <p>d. O/M/SR planning, budgeting and implementation systems developed and ready for use in one or more Directorates.</p> <p>e. Basis is laid for determination by a potential external donor (including possibility of</p>	<p>a. Gharbia O & M project makes detailed analysis of water use efficiency as baseline and analytical tool.</p> <p>b. Spot checks carried out in selected locations on water use efficiency before and after SR efforts of significant proportions.</p> <p>c. Drainage flows checked periodically to determine impact through better water control/management.</p>	<p>a. A careful survey and setting of priorities for SR will result in early improved water control capability.</p> <p>b. The MOI will be successful in working out incentive pay arrangements to improve productivity of present staff and prospects for recruitment.</p>

End of Project Status (EOPS)	Means of Verification	Assumptions
<p>amending the present project) to fund a modernized O&M program in one or more Directorates.</p> <p>f. Improved state of bridges permits efficient O&M and facilitates traffic movement.</p> <p>g. Workshop equipment in place to permit in-house maintenance work to be undertaken by MOI in Gharbia irrespective of other O&M financing which may be required.</p> <p>h. Library materials and drafting equipment in all Directorates and Districts improves design/quality control/O&M throughout MOI.</p>	<p>d. Proportion of functioning bridges in system improves steadily during life of project.</p>	<p>c. Plans for improved O&M will be adopted by the MOI and applied as rapidly as resources can be mobilized to implement them in successive Directorates.</p>

II. PURPOSE: (cont'd)

Page 3

	<u>End of Project Status (EOPS)</u>	<u>Means of Verification</u>	<u>Assumptions</u>
b. Expand and improve MOI planning/analytic capability.	a. Project Preparation Unit actively operating. b. System in place to plan for O/M/SR activities. c. Additional data on micro and macro issues related to water conveyance and use. d. Prepared analytic materials being utilized in project and program design. e. Funding secured for new irrigation sector projects. f. Additional MOI personnel engaged in planning activities. g. Additional linkages between planning, budget preparation & O/M/SR.	a. Successful completion of project feasibility studies by PPU leading to external or domestic project financing. b. Budget-funded investment programs subjected to feasibility screening process similar to externally funded projects.	a. The IBRD will provide advisors in fields complementary to those projected to be supplied by AID. b. Engineering-oriented management leadership will accept the important role of other disciplines in reaching

End of Project Status (EOPS)	Means of Verification	Assumptions
<p>c. To identify a plan for re-design of the</p>	<p>a. Problem scope and issues defined regarding irrigation system redesign.</p>	<p>a. N.Zifta study reaches definitive, well-reasoned</p>
		<p>feasibility decisions.</p> <p>c. Well-prepared studies will lead to early financing of needed irrigation works projects and of enhancing/the status of the PPU group in the MOI.</p>
		<p>a. All background studies</p>

	End of Project Status (EOPS)	Means of Verification	Assumptions
irrigation system (to be tested in one District) which is judged feasible for ultimate national implementation.	b. Irrigation system redesign feasibility study completed. c. Preliminary plans developed for a model of a redesigned system. d. Basis laid for a decision of "go/no go" with respect to preparation of detailed plans/drawings to implement a redesign program. e. Costs of O&M and optimal service mix determined and measured against benefits to farmers and to economy. f. Alternative methods and costs of making needed water available determined and used	conclusions on feasibility of redesign. b. Study forms basis for MOI/GOE decisions regarding approaches to long term water balance, irrigation system modification and farm service/support programs.	and their findings with relevance for the N. Zifta study will be accessible and used whether prepared by other Ministries and/or with the support of AID or other donors. b. The purposes and requirements of the

<u>End of Project Status (EOPS)</u>	<u>Means of Verification</u>	<u>Assumptions</u>
<p>as partial basis for decision whether to implement redesign.</p>		<p>N. Zifta study will be</p>
<p>g. Energy savings measured in economic terms as partial means of determining redesign feasibility.</p>		<p>reviewed by the Cabinet of the GOE & its broad</p>
<p>h. Social cooperation requirement for improved meska operation defined and feasibility analyzed as partial basis for redesign decision.</p>		<p>aims adopted as a Government effort rather than</p>
<p>i. Degree of water use efficiency achievable from redesign is defined and measured as a partial basis for redesign decision.</p>		<p>just a MOI effort.</p>

	<u>End of Project Status (ECPS)</u>	<u>Means of Verfication</u>	<u>Assumptions</u>
d. Establish MOI staff development program.	a. Engineers at all levels participate in training and apply significantly improved knowledge and practices.	a. MOI develops well-rounded manpower development program	a. The MOI will bring a manpower and training organization rapidly into being to plan and administer the program.
	b. Technicians apply new and improved skills contributing to greater MOI operational efficiency and freeing professional engineers to perform tasks demanding exercise of higher level skills.	b. Training courses offered regularly for engineers and technicians bringing important modern skills use in MOI.	b. Staff will be released as needed for training in short courses and abroad.
	c. Managers apply knowledge gained in improved organization/direction of programs and achieve better performance in meeting MOI program goals including O/M/SR areas.	c. Management training brings significant improvements in MOI operations, e.g. cost reductions greater productivity per worker, and	c. Salaries of staff will

	End of Project Status (EOPS)	Means of Verification	Assumptions
	d. Training programs established and functioning for continuing upgrading of managers, engineers and technicians.	budget operations reflect program needs and priorities.	be continued during training.
e. Supplement MOI capacity for review and analysis of irrigation development and water management problems by consultant services during "build up" while IMS project operating.	<p>a. Consultant contractor services provided to MOI during project life to facilitate the making of major investment decisions.</p> <p>b. Analysis of Ministry operational and management problems facilitates effective financial personnel and facilities deployment.</p> <p>c. Review of operating procedures within MOI helps top management improve efficiency.</p>	<p>a. MOI uses consultant in reaching key decisions.</p> <p>b. Consultant provides useful appraisal of key issues, problems or proposals under review by MOI.</p> <p>c. MOI uses consultant to obtain key data on system efficiency and identification of investment priorities.</p>	<p>a. MOI management will recognize the utility of having top level consultancy services available during the upcoming period of intensified planning/</p>

<u>End of Project Status (EOPS)</u>	<u>Means of Verification:</u>	<u>Assumptions</u>
		construction activity.
		b. A respected firm will be contracted to provide wholly objective and confidential advice to the MOI.

III. OUTPUTS:

1. SR Program accelerated to level which significantly reduces the backlog during the life of the project and all construction meets MOI specifications.
2. System to plan for O/M/SR requirements in place.

Magnitude of Outputs	Means of Verification	Assumptions
1. a. SR program expenditure by MOI and AID combined exceeds depreciation rate in second year and is more than twice that rate in final project year. All structures fully comply with MOI specifications.	1. a. Review of MOI budgets b. MOI Directorate and Planning Department reports. c. Field reviews and spot checks of SR work accomplished.	1. MOI remains committed to and receives GOE support for all elements of project including quality control and compliance with MOI specifications.
b. MOI expenditure alone exceeds depreciation rate in third year & projected to be nearly 50 percent	2. Major evaluations of project by external review process. 3. a. Review of studies produced. b. Funding agency response. 4. Review of feasibility report.	2. Availability/accessability of data and information for planning on N. Zifta, Gharbia O&M and other projects to be developed. 3. MOI believes PPU is essential to

	Magnitude of Outputs	Means of Verification	Assumptions
<p>3. Functioning Project Pre-paration Unit in place with increased staff.</p>	<p>above that level in final year of the project.</p> <p>c. Approximately 85% of backlog</p>	<p>5. a. MOI Manpower & Training reports.</p> <p>b. Advisor reports.</p> <p>c. Evaluations.</p> <p>d. Observation/</p>	<p>more effective relations with financing agencies and will support its efforts fully.</p>
<p>4. Feasibility analysis of system re-design completed and if results of analysis are favorable, appropriate consideration given to preparing project designs.</p>	<p>eliminated by end of project so that MOI alone can completely eliminate the backlog by the end of the decade.</p> <p>2. Plan covers one Directorate and suitable for use in others.</p>	<p>review by outsiders.</p> <p>6. a. Review of consultant reports.</p> <p>b. Interviews with MOI officials.</p>	<p>4. MOI will be prepared to accept and act on results of feasibility analysis regardless of its outcome.</p> <p>5. a. MOI will carry out review of staffing patterns and be prepared to redeploy</p>

	<u>Magnitude of Outputs</u>	<u>Means of Verification</u>	<u>Assumptions</u>
5. Quantity and quality improvements in MOI personnel.	3. PPU capable of preparing complete feasibility reports to meet requirements of international financing agencies at a rate to meet MOI needs.		personnel to meet highest priority needs.
6. Advisory services provided to MOI management on key problems and issues.	4. N. Zifta feasibility study and preliminary plans completed in under two years.		b. Incentive payment system will be authorized and implemented.
	5. MOI manpower development and training program handles 120-360 short course trainees per year,		c. Staff recruitment drive will be carried out successfully.
			6. MOI will find consultant services a useful addition to its resources and make use of

III. OUTPUTS: (cont'd)

Page 4

<u>Magnitude of Outputs</u>	<u>Means of Verification</u>	<u>Assumptions</u>
reaches all upper & many Middle Managers and meets skills training and pro- fessional develop- ment needs of the whole MOI staff.		it increasingly as time passes.
6. Consultant services meet need of MOI for engineering analysis and review during periods of peak demand.		

IV. INPUTS:

	<u>Magnitude of Inputs</u>	<u>Means of Verification</u>	<u>Assumptions</u>
<u>AID</u>	<u>AID</u>	<u>AID</u>	<u>Statement</u>
1. Technical assistance advisors and consultants (long & short term).	(See Annex 10).	1. Project Accounts. 2. AID and Contractor records. 3. Evaluation reports. 4. Contractor reports.	(Assumptions for providing inputs are made explicit in the text of project description).
2. Equipment, supplies, vehicles to support TA activities and up-graded program of Q/M/SR.	<u>GOE</u> (See Annex 10).	<u>GOE</u> 1. MOI budget. 2. MOI reports. 3. Evaluation reports.	
3. Support costs (partial) in-country training & some local support staff.			

Magnitude of Inputs Means of Verification Assumptions

4. Participant Training abroad
5. Dollar financing of local costs (and possibly off-shore materials) of SR program.

COE

1. NOI staff time, salaries, per diem
2. Office space, laboratory and other facilities, furniture, operating costs for vehicles and other local costs.

Magnitude of Inputs Means of Verification Assumptions

1. Expanded

investment in SR.

4. Access to all

available data and

information for

planning.

ANNEX III
PID APPROVAL CABLE

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 OR 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.

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 TRIPARTITE 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 ASSESSMENT OF ANY NORTH ZIFTA RE-DESIGN EFFORT BE DONE AS A PART OF THE PROJECT RATHER THAN NECESSARILY BEING SUBMITTED WITH THE PP. HAIG

BT

#4626

NNNN

V70ZCEG0915
 PP RUEHHC
 DE RUEHC #4626 7842337
 ZNR UUUUU ZZ#
 P 242744Z MAR 81
 FM SFCSTATE WASHDC
 TO AMEMBASSY CAIRO PRIORITY 664Z
 BT
 UNCLAS STATE 074626

Annex III

3/25

25 MAR 81
 TOR: 0348
 CN: 16334
 CERGE: AID
 ACTION AID6

INFO AMB DCM ADM CHRN 10 JA

ADM AID

E.O. 12065: N/A

TAGS:

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. 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 (I.E. BRIDGES V.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 MORTE ZIFTA A TRADITIONAL BENEFIT/COST ANALYSIS IS ESSENTIAL AND THUS IS EXPECTED.

ANNEX IV
RESPONSE TO PID CABLE

Response to PID Cable

The following response to the PID approval cable for project 263-0132, Irrigation Management Systems deals with the issues raised and refers to the PP as appropriate. The references are to numbered paragraphs of State 074626.

Re. 2. Deferred Maintenance: The PP in Section III, The Problem, has defined the constraints which have led to the current situation. Clearly funding has been the major problem arising from the overall scarcity of capital in the economy which has in turn been influenced throughout the budget in less funding than needed to maintain infrastructure. In the MOI this has been complicated by acute staff recruitment problems for both professional engineers and technicians resulting in the MOI having about one half the engineers and slightly over one third the number of technicians needed. The staff problems are most acute at the junior grade levels and fall most heavily on the periphery of the system where structure work is managed. Over the years the absence of in-house capacity to do maintenance has resulted in problems becoming major before being addressed (by contractor). There appear to be no major problems with the organizational structure but its deployment of scarce resources is a subject for management attention to achieve the best results by various means including incentive pay, staff allocation to the highest priority tasks, development of a MOI training program, tighter work scheduling procedures, etc.

The PP has taken account of the sustainability by an agreed strategy for capital funding for SR for the decade of the eighties to eliminate the backlog of SR by 1990. This will be accomplished through sharply increased MOI funding levels exceeding the structure depreciation rate (exclusive of AID support). At the same time establishment of a training center, improved O & M planning, staff recruitment and incentive payments, full compliance with MOI standards and specifications for construction and the provision of in-house maintenance capacity should greatly improve the capacity of the MOI at all levels to carry out its work related to future maintenance.

To Implement the strategy, the Mission proposes initially to fund only the first two years of the planned SR effort. The less than total funding for the SR component recognizes, although the analyses indicate the MOI has or is expected to develop capacity to carry out the enlarged SR program, that unforeseen difficulties may arise. Consequently, it is financially and managerially prudent to limit initial funding to a modest level with subsequent inputs dependent on implementation experience and evaluation of results. If the SR program proceeds as scheduled, the additional funding necessary to fully achieve the above described system upgrading objectives would be sought by project amendment in year 2 or 3. Nevertheless, to maintain an overall perspective, and in recognition of the various linkages between components the Project Paper is presented in terms of the complete program for both capital and technical assistance, except in the financial sections and some of the tables.

Re. 3. Bridges: The PP has developed the rationale for bridges and included their role in the logical framework. They are a significant part of the program basically because they are integral to the infrastructure of an irrigation system and essential to the life and productive process (including system O & M itself) of a rural community whose agriculture is irrigated. Bridges must be functional for irrigation work and agricultural activities to continue so that without bridges there can be no life. From a priority standpoint the water control structures per se are accorded to the highest priority in the accelerated SR effort by agreement with the MOI. Overtime bridges must be given the attention their critical functional role in the community's productive life requires. Their maintenance and replacement are an integral component of efficient operation of the irrigation system itself and in the final analysis they play a decisive role in water management.

Re. 4. Economic Analysis: The PP contains an economic discussion and rationale for the project. In the intermediate term the costs are basically justified by the gains to be realized and/or the losses to be avoided in continuing production on the old lands. If the control structures were allowed to deteriorate productivity declines can be clearly foreseen as rising water table at the beginning of canals, and shortages of water at the tail end of the canals and ditches would steadily reduce yields.

Bringing control to a more nearly optimal and dependable level on the other hand reduces the spillage and seepage from the system and encourages better on-farm water use. Both better system operation and on-farm practices reduce the additions to ground water, lower the water table and demonstrably improve output and/or output potential. This comes not only from keeping water tables below the root zone but also from improved assurance of timely water availability at the farm turn-out so that high value crops can be raised and cropping intensity increased.

The feasibility of redesign/betterment work for North Zifta is being undertaken as a component of this project's contemplated effort. The scope of work, as presented in Annex XIV, requires an economic analysis be made as an integral part of the feasibility study.

Re. 5. Farmer Participation: This issue is discussed in the Social Soundness Analysis and the conclusion is reached that system improvement and greater reliability of water delivery should encourage farmer collaboration as well as improved equity. Since completion of the PID, the MOI has been given responsibilities for maintenance at the meska level. The actual maintenance work is being phased-in over a period of several years and will require much closer relationships between the MOI and farmer. The North Zifta program will draw heavily on the work of the EWUP whose work has included extensive attention to issues relating to farmer participation. Fortunately, the MOI is also anxious to link these efforts. The Director of the EWUP project has been an active participant in the design discussions for IMS and a strong advocate of linkage.

At the same time the Director of the PPU is a former member of the senior staff of the Water Master Plan which also is part of the Water Research Center. Good working relations exist among these entities and professional commitment is strong to assure close interactions and reliance on the findings of EWUP as the North Zifta efforts are undertaken.

Re. 6. Commitment: There has been extensive interaction and discussion with the MOI in the course of the design of this proposed project. Agreement on the project's strategy has grown out of these discussions. A strong commitment exists to the various key elements of the program at top management levels of the MOI. Covenants are proposed to formalize the understandings on funding levels, recruiting,

incentives, priorities, etc., so that AID and MOI have a clear agreement on the scope of action and resource commitments. These will be further reinforced by annual agreements on SR funding when specific targets will be agreed in relation to each year's budget and AID funding for SR. The commitment of the MOI will therefore be formalized and embodied in bilateral understandings.

Re. 7. Purpose: USAID/Cairo has re-examined the purpose statement in the PID and concurs in the comments in the cable from AID/Washington. The purpose has therefore been expanded and made more explicit concerning the several elements of the program.

Re. 8. Training: The training components scope and focus have been defined but specific content will be more fully defined by MOI as the project gets underway with participation of the designated course leaders (then just back from training), course design advisers and other knowledgeable professionals available from the technical assistance contract and from local institutions.

Re. 9. Disbursement: The PP discusses the financial disbursement plan in detail. Disbursement for technical assistance, participant training and commodities will follow normal AID procedures. Disbursement for structural replacement will be based upon annual program agreements which will set forth the budget of the MOI for the upcoming year and specify the levels of the total MOI and AID funding for eligible structures in each directorate. On a quarterly basis, the MOI will be reimbursed 80 percent of their expenditures until the agreed upon annual AID fund limitation is reached. This approach will provide flexibility for the MOI to expand the program as rapidly as they have capability. Also, the SR program will be limited to 5 directorates for the first 2 years. This will allow time

for problem areas to be resolved prior to expanding to program nationwide in the third year of the project.

Re. 10. Environment: Concur that the environmental assessment be an integral part of the North Zifta feasibility study. Accordingly, the scope of work for the North Zifta study includes a requirement for complete review of its environmental implications.

ANNEX V

MODIFIED PID FACESHEET

1. TRANSACTION CODE
 A = Add
 C = Change
 D = Delete
 C

DOCUMENT CODE
 1

2. COUNTRY/ENTITY

3. PROJECT NUMBER
 263-0132

4. BUREAU/OFFICE
 A. Symbol B. Code

5. PROJECT TITLE (maximum 40 characters)
 Irrigation Management Systems

6. ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION
 A. Initial FY 81
 B. Final FY 84
 C. PACD 86

7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 =)

FUNDING SOURCE		LIFE OF PROJECT
A. AID		42,000
B. Other U.S.	1.	
	2.	
C. Host Country		119,000
D. Other Donor(s)		
TOTAL		161,000

8. PROPOSED BUDGET AID FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH CODE		D. 1ST FY		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1)				42,000			
(2)							
(3)							
(4)							
TOTALS				42,000			

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

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

A. Code	BS	DEL	TNG
B. Amount	60,000	0	2,000

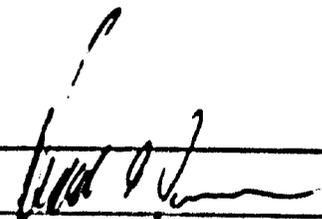
12. PROJECT PURPOSE (maximum 480 characters)

Improve the operating efficiency of the total irrigation system and strengthen the Ministry of Irrigation operation, maintenance and planning capabilities.

13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT

Staff:

Funds:

4. ORIGINATING OFFICE CLEARANCE
 Signature: 
 Title: Donald S. Brown, Director
 Date Signed: MM DD YY 07 28 81

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
 MM DD YY

6. PROJECT DOCUMENT ACTION TAKEN
 S = Suspended CA = Conditionally Approved
 A = Approved DD = Decision Deferred
 D = Disapproved

17. COMMENTS

8. ACTION APPROVED BY
 Signature: _____
 Title: _____
 19. ACTION REFERENCE
 20. ACTION DATE
 MM DD YY

INSTRUCTIONS

- Block 1** - Enter the appropriate letter code in the box, if a change, indicate the revision number.
- Block 2** - Enter the name of the Country, Regional, or other Entity.
- Block 3** - Enter the Project Number assigned by the field mission or an AID/W bureau.
- Block 4** - Enter the sponsoring Bureau/Office Symbol and Code. *(See Handbook 3, Appendix 3, Table 1, Page 1 for guidance.)*
- Block 5** - Enter the Project Title *(stay within brackets; limit to 40 characters).*
- Block 6** - Enter the estimated Initial (A) and Final (B) FY of the Authorization/Obligation, and Project Assistance Completion Date (PACD) (C).
- Block 7** - Enter the information taken from the 'Estimated Cost Table' in the PID.
- Block 8A.** - Use the 'Alpha Code'. *(See Handbook 3, Appendix 5B, Table 2, Page 2 for guidance.)*
- Block 8B.** - See Handbook 3, Appendix 5B for guidance.
- Blocks 8C, D., & E.,** - Enter all amounts in thousands of U.S. dollars.
- Blocks 9 & 10** - See Handbook 3, Appendix 5B for guidance.
- Block 11** - Enter the code and amounts attributable to each concern for 'Life of Project'. For coding see Handbook 3, Appendix 5B, Attachment C.
- Block 12** - Enter the 'Project Purpose' from the PID. If more than one (1), list each one (1) in order of priority *(stay within brackets; limit to 480 characters).*
- Block 13** - Summarize any planning resources needed to develop the project in terms of staff and funding required. For staff, indicate whether direct hire or contract staff. Indicate the established amount and source of funding required (operative expenses or Mission funds).
- Block 14** - This block is to be signed and dated by the Authorizing Official of the originating office. The PID will not be reviewed if the PID Facesheet is not signed and dated. Do not initial.
- Block 15** - This date is to be provided by the office or bureau responsible for the processing of the PID.
- Block 16** - This block is to be completed by the authorized representative of the office or bureau responsible for the processing of the PID.
- Block 17** - Enter any comments on the action taken.
- Block 18** - This block is to be signed and dated by the Approving Official. Do not initial.
- Block 19** - Identify the action document i.e., memorandum, cable.
- Block 20** - Enter the date of the action document.

ANNEX VI
STATUTORY CHECK LIST

STATUTORY CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual funding sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? Yes.
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT? Yes.

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FY 80 App. Act Unnumbered; FAA Sec. 632A; Sec. 653(b);

(a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)?

(a) Congressional notification will be submitted following AID/W approval, if needed

(b) yes

2. FAA Sec. 611(a) (1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and 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, MOI systems and procedures are judged to be adequate to carry out the SR portion of the project.

(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?

Not required

4. FAA Sec. 611(b); FY 79 App. Act Sec. 101; FY 80 App. Act Sec. (501.) If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

N/A

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 of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

Not susceptible of execution as part of regional project. Multilateral funding is closely associated in the PPU component.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, 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.

This project will encourage the strengthening of Egypt private enterprise, providing a significant part of the services required to execute SR construction. Project will improve the technical efficiency of irrigation and agriculture.

8. FAA Sec. 601(b). Information and conclusion 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 enterprise)

U.S. private enterprises will provide the bulk of the technical services required for the project. Because of the small value of individual subprojects its local procurement will be utilized.

9. FAA Sec. 612(b); Sec. 636(h). 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 services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The GOE will provide the larger portion of the cost and steadily increase its input through the life of the project. It would be impractical to attempt to fund the activity from U.S. owned local currency.

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?

Yes, but it is not feasible to use the excess currency. See Annex IX.

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 79 App. Act, Sec. 608; FY 80 App. Act Sec. (521). 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

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b): 111; 112; 281a.

Extent to which activity will

(a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts

N/A

of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

N/A

b. FAA Sec. 103, 103A, 104, 105, 106, 107.
Is assistance being made available:
(include only applicable paragraph which corresponds to source of funds used.
If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food

reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, (a.) extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and (b.) extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: (i) (a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves.

- (ii) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;
- (iii) research into, and evaluation of, economic development processes and techniques;
- (iv) reconstruction after natural or manmade disaster;
- (v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;
- (vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. [107] Is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor.)

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country)?

GOE will provide more than 25% of cost of the activity in the project.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

Yes

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's

Program responds to needs of farmers for more timely and reliable delivery of water for irrigation.

intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? Yes

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. N/A

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?

By contributing more efficient water use and conservation the project will promote economic growth and stability and improve prospects for political stability.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

Yes

(b) No.

5C(3) - STANDARD ITEM CHECKLIST

Listed below are 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) P
(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?

Goods and services will be procured to the greatest extent possible through competitive procedures which will encourage participation by U.S. small business.

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 U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do marine insurance business in the U.S.

Egypt does not so discriminate

4. FAA Sec. 604(e). If offshore 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?

No such procurement is planned.

5. FAA Sec. 603 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 that such vessels are available at fair and reasonable rates.

Transport of goods will be in accordance with regulation

6. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?

Yes

7. FAA Sec. 621. If technical assistance is financed, to the fullest extent practicable will such assistance, goods and professional and other services from private enterprise, be furnished on a

Yes

contract basis? 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?

8. International Air Transport. Fair Competitive Practices Act, 1974.

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes

9. FY 79 App. Act, Sec. 105; FY 80 App. Act Sec. [505.] Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

The contract will so provide

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

Yes

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

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?

Aggregate value of construction will not exceed \$ 100 Million

C. Other Restriction

1. FAA Sec. 177(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

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, sale, longterm lease, exchange or guaranty of motor vehicles manufactured outside the U.S.? Yes

5. Will arrangements preclude use of financing?

a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization? Yes

b. FAA Sec. 620(e). To compensate owners for expropriated nationalized property? Yes

c. 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

d. FAA Sec. 662. For CIA activities? Yes

e. FY 79 App. Act, Sec. 104; FY 80 App. Act Sec. (504.) To pay pensions, etc., for military personnel? Yes

f. FY 79 App. Act, Sec. 106; FY 80 App. Act, Sec. (506.) To pay U.N. assessments? Yes

g. FY 79 App. Act, Sec. 107; FY 80 App. Act. Sec. [507.] To carry out provisions of FAA section 209(d)? (Transfer of FAA funds to multilateral organizations for lending.) **Yes**

h. FY 79 App. Act, Sec. 112; FY 80 App. Act Sec. [511.] To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? **Yes**

i. FY 79 App. Act, Sec. 601; FY 80 App. Act Sec. [515.] To be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes**

ANNEX VII

DRAFT PROJECT DESCRIPTION FOR GRANT AGREEMENT

ANNEX VII

Draft Project Description for Grant Agreement

Over a five-year period this project will support the Ministry of Irrigation in operating, maintaining, rehabilitating, and planning for the irrigation network of Egypt. Through capital support and technical assistance, capabilities of the MOI in the above areas will be strengthened while the physical condition of the irrigation system is raised to a level where efficient control of water is possible. The fundamental goals of the improvement of planning for operations and maintenance, the conduct of a system redesign (or betterment) effort, the strengthening of MOI staff capacity, the replacement of depreciated structures and the development of a project preparation unit are to increase agricultural output and provide ample Nile water for multiple uses.

Implementation will be via several components administered by existing units of the MOI. The units to be involved are the Irrigation Department, Planning Department and Water Research Center. Because the various activities are interrelated, the Ministry will create a formal coordinating committee for the project. Operational responsibility will be in the respective units but the committee will provide a means of developing coordinated policies for project implementation.

The specific components of the project are:

1. A grant program to reimburse the MOI for structure replacement (SR). The program will start slowly and be limited during the first 2 years to five irrigation directorates in the Delta with an expected expansion by project amendment, dependent upon a successful program the first 2 years, to cover the entire country for the last 3 years. The GOE on its part will improve quality control for the structures and take steps to eliminate the SR backlog by the end of the decade. At completion of the Project, MOI will be in a position to manage and control irrigation water with greater efficiency and effectiveness.
2. Contract technical assistance for:
 - a. A consulting service to supplement the capacity of the MOI to review problems, analyze proposals and recommend solutions to senior managers of the Ministry.

b. Planning and design assistance in connection with the SR program outlined above.

c. Assistance in planning an improved budgeting, programming and execution process for operation and maintenance (O & M) in the Gharbia Directorate of Central Delta. The upgraded process will serve as a model for implementation, as feasible, throughout the system.

d. Support and technical advisory services to launch and bring to full operational effectiveness a Project Preparation Unit in the MOI capable of preparing analytical studies and feasibility reports to a standard meeting the needs of review by international agencies; this effort will be strengthened by a two year extension of two economists in the Water Master Plan.

e. Conduct of a feasibility study concerning requirements for redesign of the irrigation system and provision of supporting services for agricultural growth in one District (North Zifta). A proposed redesign will be developed in a manner and at a cost for initial investment and future maintenance so that generalization to the whole of Egypt in due time on an economic basis would be possible.

f. Development and implementation of a training program for managers, engineers and technicians to strengthen the manpower pool and the manpower development system of the MOI as an essential part of meeting its goals and program requirements.

3. Procurement of maintenance equipment needed for implementation of an improved program of O & M for the Gharbia Directorate (see c. above), of office and miscellaneous commodities necessary for the establishment of the Project Preparation Unit (see d. above) and of various commodities and materials needed for the implementation of the other components.

4. Limited operational support for within country training programs and funding for overseas training to raise the skills of MOI manpower and to develop an MOI capability to operate a manpower development system.

Draft Project Description -3-

Under the project it would be expected that an accelerated level of structural replacement (SR) will significantly reduce SR backlog, a system to plan for operation maintenance and SR will be prepared for implementation in one or more directorates, a feasibility study for redesigning and/or improving an irrigation district will be completed, more MOI personnel will be involved in planning, a new project preparation unit will be in place and preparing project feasibility reports meeting the standards of international financing agencies and that the quantity and quality in MOI personnel will be improved.

ANNEX VIII
APPLICATION for ASSISTANCE

7762
1417
July, 15, 1981

Mr. Donal S. Brown
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 fully aware some of AID staff together with their counterparts from the Ministry of Irrigation have been holding condensed discussions on possibilities of AID support for our irrigation development activities.

As a result of these discussions, a project identification document for an Irrigation Management Systems Project was jointly developed and approved early this year. This was followed up by the arrival of a project design team from the engineering consulting firm of CH₂M Hill. Our staff worked very closely with this team and members of the AID staff in further developing proposed assistance activities. As a result of this joint effort we now request that AID support a project called Irrigation Management Systems.

The purpose of the project, as you know, is to strengthen the capabilities of the Ministry of Irrigation in operating, maintaining and planning for the irrigation network. We hope that the project will be initiated as soon as possible and continue for a duration of five years.

We suggest that the project provide up to \$ 100 million to support our small structure replacement program so that we can reduce the backlog of defective structures now hampering effective water management and control.

We also desire that technical assistance in an amount of approximately \$ 20 million be provided to:

- (a) plan an improved operation/maintenance and structural replacement system for the Gharbia Directorate,
- (b) assist in the development of a Project Preparation Unit in the Planning Department, (c) support the conduct of a feasibility analysis of a nationally replicable

irrigation system redesign for the North Zifta District, (d) support the execution of the structural replacement program with upgraded performance, (e) support in-country management and technical training and participant training abroad, and (f) provide funding for an engineering consultant service to the MOI. In addition, commodities are also needed to support improved operations, maintenance, and structure replacement performance.

Since the project was developed jointly by our staffs, the Ministry of Irrigation strongly supports the project. The Government of the Arab Republic of Egypt will provide its contribution both in cash and in kind according to amounts to be agreed upon for structural replacements, operating costs, salaries and allowances. In addition, we will also provide office furniture, besides using the Ministry's existing facilities -whenever possible- for project activities.

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

Sincerely yours,

A. H. Samaha

Eng. Abdel Hady Samaha
Minister of Irrigation
& State
for Sudan Affairs

ANNEX IX
DETERMINATION and WAIVER JUSTIFICATIONS

Annex IX

A. Recommendation for Dollar Funding of Local Costs

The total AID funding for this project (including allowance for inflation and contingency) is \$ 42 million. The major part of this funding (an estimated \$ 25,134,000 or 60 percent) is for local costs. The overwhelming portion of the local cost element (\$ 23,000,000) is for the capital cost of structure replacement (SR) in the irrigation system operated by the MOI. The balance of local cost funding is to cover local expenditures in connection with technical assistance (estimated \$ 2,134,000).

The financing of \$ 25.1 million equivalent in local costs has two significant effects: 1) it represents a transfer of resources to the Egyptian economy, and, 2) it provides an incentive to the Government of Egypt to undertake a set of programs which it would not otherwise be able to initiate. In recognition of the undertakings by the GOE/MOI to expand funding and intensify efforts to meet the needs of the irrigation system in regard to SR, AID proposes to fund up to \$ 23,000,000 of local costs to support this work.

The MOI is expected to commit LE 23.9 million (equivalent to \$ 32.8 million) from its own budget resources for SR during the first two years of the Project, including an allowance for a 15 percent inflation rate. For other project elements the MOI will provide LE 60.5 (equivalent to 86.4) million during the 5-year life of the project. The total GOE commitment of LE 83.5 or 74 percent of total project costs is a major burden in the face of a tight set of budget constraints and demands. It would be unrealistic to expect the GOE to undertake any larger share of the total funding requirement for the Project.

The source of the AID-provided local currency will be dollar purchases from AID-furnished dollars. At present the projected availability of excess-currency pounds is fully programmed for other high priority activities. Due to the high level of AID activity in Egypt excess currency cannot cover the needs for project costs and other purposes.

It is therefore, recommended that up to \$ 25,134,000 be allocated for dollar purchases of Egyptian pounds to help meet the local currency costs of SR and other elements of the Project. The necessary determination required under FAA Section 612(b) is included in the Project Authorization.

B. Request for Waiver of Local Cost Financing Limitations

The Project contemplates a significant amount of commodity procurement from local stocks to be made by the GOE-participating entities and by Egyptian construction contractors with Egyptian pounds purchased with Project furnished dollars. These purchases will be made in accordance with standard AID procedures set forth in AID Handbook 1, supplement B, Chapter 18, "Local Cost Financing."

In order to make effective use of the local cost financing feature of this project it will be necessary to waive at the outset on a blanket basis two restrictions pertaining to the purchase of shelf items of AID Code 935 origin otherwise permitted under AID Handbook 1, supplement B, Chapter 18. First, Chapter 18A, 4b of Chapter 18 limits such purchases to \$ 5,000 per diem. It is expected that many items to be purchased in Egypt will exceed this limitation. Second, commodities procured locally off the shelf will far exceed the limitation of 250,000 dollars established in that Section.

Chapter 18 requires that source waivers be obtained when either of these limitations is exceeded. Under AID Handbook 1, supplement B, Chapter 5, blanket waivers may be granted by the Administrator to Code 935 when the cumulative value of such expected payments is \$ 500,000 or more. It is expected that the total costs of such Code 935 commodities to be procured locally will exceed \$ 500,000 for the Project. Chapter 5 establishes criteria upon which a source waiver may be granted. For the reasons explained below, a blanket source waiver appears justifiable as recognition of a circumstance critical to the success of Project objectives, one criterion (Chapter 5B 467) established by AID as justification for a source waiver.

The supporting rationale for the blanket waivers includes the rationale set forth above concerning the necessity for a 612(b) waiver to finance local costs, i.e., the major emphasis on local procurement of services and commodities by the Ministry of Irrigation utilizing (1) standard GOE procurement procedures and (2) standard building and facility designs. The nature of the project which involves hundreds of procurement actions in implementation of many subactivities makes it necessary to pass on a wide range of procurement actions. For AID to pass on to the GOE a set of local cost limitations would not be consistent with the scope of this project. Moreover,

there is a practical reason to waive the limitations for local cost financing. Egypt has had little commercial contact with the United States over the last 25 years, thus Egypt has not been a traditional trading partner of the United States, and U.S. origin material of the type which would be purchased locally, off the shelf, under the Project is not generally available here. We expect that a majority of the goods and services procured will have Egyptian source and origin but a significant number of transactions would undoubtedly involve goods having their origin but not source in AID Code 935 countries, as Western Europe and Japan both constitute major suppliers of goods to Egypt. Thus, given the nature of emphasis of project procurement, and the types of commodity procurement contemplated, both the item price limitation and the total amount limitation must be waived if the Project is to proceed in effective fashion. If this is not done the Mission will be faced with a requirement of making literally hundreds of special transaction by transaction waivers. Waiving in blanket fashion the enumerated limitations will enable the Project procurement to proceed expeditiously with the greatest possible emphasis upon the Egyptian procurement procedures.

Recommendation:

We recommend at the outset of the Project that recognition be given to the complex, procurement requirements of this activity and that a waiver be granted to Chapter 18 of AID Handbook 1, supplement B, by (1) permitting the \$ 5,000/ item limitation and (2) the total local currency costs limitation to be exceeded.

The waiver and necessary certification have been included in the authorization for the Project.

C. Request for a Waiver of Nationality Requirements for Three Vehicles

It is recommended that a waiver be granted to allow the procurement in Egypt from an Egyptian dealer of three U.S. manufactured vehicles. This waiver is necessary to allow immediate inauguration of selected project activities prior to the arrival of other vehicles which will be ordered from the U.S. Immediate availability of transportation will be particularly important: (a) for the short-term contractor responsible to assist in developing specifications for the majority of the equipment; (b) for the inauguration of field work related to the feasibility study for North Zifta; and (c) for beginning the structural replacement program. The Ministry does not currently have sufficient vehicles to allow the assignment of vehicles exclusively for these tasks

and, while the three vehicles will be inadequate to meet needs over the long run, does not wish to delay the start-up activities due to lack of transportation. The estimated cost of the three vehicles is \$ 35,000.

AID's source and origin requirements, and Section 636(i) of the FAA act, are satisfied by the facts that the vehicles will be of U.S. manufacture and will be purchased from bonded storage to which they were shipped from the United States. The supplier, however, will be an Egyptian firm, and hence a waiver of the nationality provisions of Handbook 1, supplement B, Chapter 5C, is required in order to permit payment to the supplier in U.S. dollars. Waiver of the requirement must be based upon one or more of the criteria set forth in the Handbook, the relevant one of which is that such procurement is critical to the success of the project objectives.

It is, therefore, recommended that a waiver of the nationality requirements for three vehicles be granted. Signature on the project authorization containing this waiver in accordance with AID requirements will constitute certification that exclusion of procurement of U.S. origin vehicles from a cooperating country source would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program.

ANNEX X
DETAILED BUDGETS

Table I
Page 1 of 1

IRRIGATION MANAGEMENT SYSTEMS

SUMMARY COST ESTIMATE
and
FINANCIAL PLAN
(In U.S. \$000)

INPUTS	AID			GOE	Project		
	FX	LC	Total	LC ^{1/}	FX	LC	Total
CAPITAL COSTS							
Structure Replacements	-	65,065	65,065	101,530	-	166,595	166,595
Inflation	-	27,935	27,935	44,100	-	72,035	72,035
Total	-	93,000	93,000	145,630	-	238,630	238,630
OTHER COSTS							
Contract Services	7,936	1,153	9,089	-	7,936	1,153	9,089
Commodities	2,985	10	2,995	-	2,985	10	2,995
Participant Training	1,091	-	1,091	-	1,091	-	1,091
Miscellaneous Services	20	200	220	-	20	200	220
Salaries and Allowances	-	-	-	25,070	-	25,070	25,070
Operating Costs	-	-	-	35,200	-	35,200	35,200
Subtotal	12,032	1,363	13,395	60,270	12,032	61,633	73,665
Contingencies	1,574	200	1,774	-	1,574	200	1,774
Inflation	3,254	577	3,831	26,100	3,254	26,677	29,931
Total	16,860	2,140	19,000	86,370	16,860	88,510	105,370
Project Total	16,860	95,140	112,000	232,000	16,860	327,140	344,000

^{1/} In addition to this contribution the GOE input will include inputs in kind such as offices, classrooms, libraries, laboratories and other facilities, furniture, fixtures and equipment.

IRRIGATION MANAGEMENT SYSTEMS

PROJECTION OF EXPENDITURES

(In U.S. \$ 000)

INPUTS	Fiscal Years					Total
	1982	1983	1984	1985	1986	
AID						
<u>Capital Costs</u>						
Structure Replacement	5,000	14,302	14,303	15,730	15,730	65,065
Inflation	377	3,216	5,360	8,347	10,635	27,935
Total Capital	<u>5,377</u>	<u>17,518</u>	<u>19,663</u>	<u>24,077</u>	<u>26,365</u>	<u>93,000</u>
<u>Other Costs</u>						
Contract Services	1,200	2,500	2,300	1,700	1,389	9,089
Commodities	1,210	600	1,000	100	85	2,995
Participant Training	300	300	300	100	91	1,091
Miscellaneous Services	40	40	70	30	40	220
Subtotal Other	<u>2,750</u>	<u>3,440</u>	<u>3,670</u>	<u>1,930</u>	<u>1,605</u>	<u>13,395</u>
Contingencies	304	416	483	300	271	1,774
Inflation	288	722	1,155	818	848	3,831
Total Other	<u>3,342</u>	<u>4,578</u>	<u>5,308</u>	<u>3,048</u>	<u>2,724</u>	<u>19,000</u>
Total AID	<u>8,719</u>	<u>22,096</u>	<u>24,971</u>	<u>27,125</u>	<u>29,089</u>	<u>112,000</u>
GOE						
<u>Capital Costs</u>						
Structure Replacement	13,199	15,230	20,306	24,367	28,428	101,530
Inflation	990	3,427	7,615	12,915	19,153	44,100
Total Capital	<u>14,189</u>	<u>18,657</u>	<u>27,921</u>	<u>37,282</u>	<u>47,581</u>	<u>145,630</u>
<u>Other Costs</u>						
Salaries & Allowances	3,259	3,761	5,014	6,017	7,019	25,070
Operating Costs	4,576	5,280	7,040	8,448	9,856	35,200
Subtotal Other	<u>7,835</u>	<u>9,041</u>	<u>12,054</u>	<u>14,465</u>	<u>16,875</u>	<u>60,270</u>
Inflation	588	2,014	4,490	7,616	11,392	26,100
Total Other	<u>8,423</u>	<u>11,055</u>	<u>16,544</u>	<u>22,081</u>	<u>28,267</u>	<u>86,370</u>
Total GOE	<u>22,612</u>	<u>29,712</u>	<u>44,465</u>	<u>59,363</u>	<u>75,848</u>	<u>232,000</u>
Project Total	<u>31,331</u>	<u>51,808</u>	<u>69,436</u>	<u>86,488</u>	<u>104,937</u>	<u>344,000</u>

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component

STRUCTURE REPLACEMENT
(In U.S. \$ 000)

Project Input	A I D			G O E			
	Local Costs	FX	Total	Salaries	Operating Cost	Capital Expenditures	TOTAL
I. Contract (technical assistance)							
A. Personnel (Salaries, allowances, etc.)							
1. Long Term							
Engineer (design, materials, training)	3 PY	--	450				
2. Short Term							
Consultants	30 PM	--	390	23,775	34,145	--	57,920 ^{1/}
3. Support personnel (local hire)		18	18				
B. Support costs							
1. Travel and per diem (in-country)		35	35				
2. Communications and reports		10	20				
3. Other local costs		12	12				
4. Home office backstop (all components)		--	50				
C. Commodities (professional equipment)-U.S.		--	10				
Subtotal Contract		75	910				
II. Commodities							
A. Office Equipment - U.S.		--	20				
B. Vehicles - U.S.		--	25				
Subtotal Commodities		--	45	23,775	34,145	--	57,920
III. Structure Replacement (at constant 1981 prices)	65,065	--	65,065	--	--	101,530	101,530
TOTAL	65,140	955	66,095	23,775	34,145	101,530	159,450

^{1/} Includes SM and Cherbia O & M based on partial inclusion of Irrigation Dept. budget.

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component
GHARBIA O & M PLANNING
(In U.S. \$ 000)

Project Input	A I D			G O E		
	Local Cost	FX	Total	Salaries	Operating Costs	Total
I. Contract (TA)						
A. Personnel						
1. Long Term						
Engineer Planner 1 PY	--	150	150	(23,775)	(34,145)	(57,920) ^{1/}
2. Support Staff (local hire)	5	--	5			
B. Support Costs						
1. Travel and per diem	10	--	10			
2. Communications, etc.	15	10	25			
3. Other local costs	--	10	10			
Subtotal Contract	30	170	200			
II. Commodities (non-contract)						
1. Office equipment	--	20	20			
2. Professional equipment	--	10	10			
3. Vehicles	--	25	25			
Subtotal Commodities	--	55	55			
TOTAL	<u>30</u>	<u>225</u>	<u>255</u>	<u>(23,775)</u>	<u>(34,145)</u>	<u>57,920)^{1/}</u>

^{1/} Non-add since already included under SR component.
Components cannot be readily separated.

Table III
Page 3 of 8

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component

PROJECT PREPARATION UNIT
(In U.S. \$ 000)

Project Input	A I D			G O E		
	Local Cost	FX	Total	Salaries	Operating Cost	Total
I. Contract (TA)						
A. Personnel						
1. Long Term						
Senior Technical Advisor (Irrigation Project Planner) 4 PY	--	600	600)			
Agricultural Economist 4 PY	--	600	600)	600	500	1,100
Engineer (Project Evaluation) 4 PY	--	600	600)			
Economists (2-for Water Master Plan) 4 PY	--	600	600			
2. Short Term						
Specialist consultants 48 PM		624	624			
3. Support personnel (local hire)						
Administrative Assistant 4 PY	27	--	27			
Bilingual Secretary 8 PY	30	--	30			
Other 48 PY	60	--	60			
B. Commodities						
1. Professional & Training Equipment		350	350			
2. Library materials		40	40			
C. Support Costs						
1. Communications, reports, etc.	30	15	45			
2. Travel and per diem	150	--	150			
3. Other local costs	70	--	70			
Subtotal Contract	367	3,429	3,796			
II. Commodities						
1. Office Equipment	--	200	200			
2. Professional & Training Equip.	--	50	50			
3. Library materials	--	10	10			
4. Vehicles (3 vans, 2 pickups, 2 sedans)	--	90	90			
Subtotal Commodities	--	350	350			
III. Training (participants)						
1. Long Term academic (10 PY)	--	198	198			
2. Short Term non-academic (100 PM)	--	340	340			
3. Study tours (10 PM)	--	34	34			
Subtotal Training	--	572	572			
GRAND TOTAL PPU	<u>367</u>	<u>4,351</u>	<u>4,718</u>	<u>600</u>	<u>500</u>	<u>1,100</u>

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component
NORTH ZIITA FEASIBILITY STUDY FOR SYSTEM REDESIGN
(In U.S. \$ 000)

Project Input	A I D			G O E		
	Local Cost	FX	Total	Salaries	Operating Cost	Total
I. Contract (TA)						
A. Personnel						
1. Long Term						
Sr. TA Advisor (Planning Eng.)	2PY	--	300			
Civil Engineer	1-5PY	--	225			
Natural Resources Economist	2 PY	--	300			
2. Short Term Consultants	48 PM	--	625	100	100	200
3. Support Personnel (local Hire)						
Bilingual Secretary		10	--			10
Other		6	--			6
B. Commodities						
1. Professional equipment		5	5			10
2. Topographic survey		--	400			400
C. Support costs						
1. Communications & reports		15	10			25
2. Travel & per diem		50	--			50
3. Other local costs		20	--			20
Subtotal Contract		106	1,865			1,971
II. Commodities						
1. Professional equipment		--	15			15
2. Office equipment		--	60			60
3. Vehicles (2 vans, 2 pickups).		--	48			48
Subtotal Commodities		--	123			123
GRAND TOTAL		<u>106</u>	<u>1,988</u>	<u>100</u>	<u>100</u>	<u>200</u>

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component
MANPOWER DEVELOPMENT AND TRAINING
(5000)

Project Input	A.I.D.			G.O.E.		
	Local Cost	FX	Total	Salaries	Operating Cost	Total
I. Contract						
A. Personnel - Short Term						
-Tech-advisors for short courses 27 PM	--	351	351)			
-Consultants for management seminars 10 PM	--	130	130)			
				570	430	1,000
B. Egyptian Subcontractor for Management Training	375	--	375)			
C. Commodities						
1. Training Materials and Equipment	50	100	150)			
2. Vehicles	--	174	174)			
D. Support Costs						
1. Communications & Reports	20	20	40)			
2. Other local costs	25	--	25)			
Grand Total Contract	470	775	1,245			
II. Commodities						
A. Training materials & equipment	10	70	80			
III. Miscellaneous Services						
Local support costs of Management Training and Technical Courses	100	--	100			
IV. Participant training						
A. Long Term academic	--	381	381			
B. Short Term non-academic	--	138	138			
	--	519	519			
Grand Total Manpower Development and Training	580	1,364	1,944	570	430	1,000

Table III
Page 6 of 8

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component
CONSULTANT SERVICES FOR MOI

		(\$000)					
		A.I.D.			G.O.E.		
<u>Project Input</u>		<u>Local Cost</u>	<u>FX</u>	<u>Total</u>	<u>Salaries</u>	<u>Operating Costs</u>	<u>Total</u>
I.	Contract						
	A. Personnel						
	1. Short or long term Consultants 45 PM	--	585	585	25	25	50
	2. Support personnel (local hire)	35	--	35			
	B. Support Costs						
	1. Travel and per diem	10	--	10			
	2. Communications & reports	10	10	20			
	3. Other local costs	50	--	50			
	C. Commodities						
	1. Professional equipment	--	10	10			
	Subtotal contract	105	605	710			
II.	Commodities						
	1. Office equipment	--	10	10			
	2. Vehicles (1 van, 1 sedan)	--	13	13			
	Subtotal commodities	--	23	23			
	Grand Total	<u>105</u>	<u>628</u>	<u>733</u>	<u>25</u>	<u>25</u>	<u>50</u>

Table III
Page 7 of 8

IRRIGATION MANAGEMENT SYSTEMS
Line Item Breakdown of Costs by Component
EVALUATION

(\$000)

	A.I.D.		
	Local Cost	FX	Total
I. Contract			
A. Personnel short term	3.5	PM	
Irrigation Engineer	3.5	PM	
Resource Economist	3.5	PM	
Rural Sociologist	3.5	PM	
Evaluation specialist	3.5	PM	
Total	14.0	PM --	182
B. Miscellaneous Services	<u>100</u>	<u>20</u>	<u>120</u>
Grand Total Evaluation	100	202	302

COMMODITY and EQUIPMENT PROCUREMENT

		<u>AID (FX)</u>
1.	Library Materials	
	A. Books	
	1. Irrigation Sector Cairo	\$ 25,000
	2. Directorates (20 x 5,000)	100,000
	3. Districts (167 x 1,000)	<u>167,000</u>
		\$ 292,000
	B. Periodicals and Catalogues	
	1. Irrigation Sector Cairo	20,000
	2. Directorates (20 x 1,000)	20,000
	3. Districts (167 x 400)	<u>67,000</u>
		107,000
	C. Equipment	<u>20,000</u>
	Subtotal	\$ 419,000
2.	Drafting Equipment and Materials	300,000
3.	Gharbia Directorate O & M Workshop Equipment, Vehicles and Field Equipment (to implement O&M Plan)	
	-Directorate Level	250,000
	-Inspectorate Level (2)	350,000
	-District Level (10)	<u>500,000</u>
	Subtotal	1,100,000
4.	Transceivers for 5 Directorates (15 units each)	500,000
	Grand Total	<u><u>\$ 2,319,000</u></u>

Table IV
Page 1 of 2

IRRIGATION MANAGEMENT SYSTEMS
AID Project Cost by Component
(\$000 at 1981 Prices)

<u>Cost Component</u>	<u>Cost Elements</u>						
	<u>Other Costs</u>				<u>Capital Costs</u>		
	<u>Contract</u>	<u>Commodities</u>	<u>Local Services</u>	<u>Participant Training</u>	<u>Total</u>	<u>Structure Replacement</u>	<u>Project TOTAL</u>
<u>Structure Replacement</u>							
Local Currency	75	--	--	--	75	65,065	65,140
Foreign Exchange	<u>910</u>	<u>45</u>	<u>--</u>	<u>--</u>	<u>955</u>	<u>--</u>	<u>955</u>
Total	985	45	--	--	1,030	65,065	65,095
<u>Gharbia O & M</u>							
Local Currency	30	--	--	--	30	--	30
Foreign Exchange	<u>170</u>	<u>55</u>	<u>--</u>	<u>--</u>	<u>225</u>	<u>--</u>	<u>225</u>
Total	200	55	--	--	255	--	255
<u>Project Preparation Unit</u>							
Local Currency	367	--	--	--	367	--	367
Foreign Exchange	<u>3,429</u>	<u>350</u>	<u>--</u>	<u>572</u>	<u>4,351</u>	<u>--</u>	<u>4,351</u>
Total	3,796	350	--	572	4,718	--	4,718
<u>North Zifta</u>							
Local Currency	106	--	--	--	106	--	106
Foreign Exchange	<u>1,865</u>	<u>123</u>	<u>--</u>	<u>--</u>	<u>1,988</u>	<u>--</u>	<u>1,988</u>
Total	1,971	123	--	--	2,094	--	2,094

Table IV
Page 2 of 2

Cost Component	Cost Elements						Structure Replacement	Project TOTAL
	Other Costs					Capital Costs		
	Contract	Commodities	Local Services	Participant Training	Total			
<u>Manpower Development and Training</u>								
Local Currency	470	10	100	--	580	--	580	
Foreign Exchange	<u>775</u>	<u>70</u>	<u>--</u>	<u>519</u>	<u>1,364</u>	<u>--</u>	<u>1,364</u>	
Total	1245	80	100	519	1,944	--	1,944	
<u>Consultant to MOI</u>								
Local Currency	105	--	--	--	105	--	105	
Foreign Exchange	<u>605</u>	<u>23</u>	<u>--</u>	<u>--</u>	<u>628</u>	<u>--</u>	<u>628</u>	
Total	710	23	--	--	733	--	733	
<u>Evaluation</u>								
Local Currency	--	--	100	--	100	--	100	
Foreign Exchange	<u>182</u>	<u>--</u>	<u>20</u>	<u>--</u>	<u>202</u>	<u>--</u>	<u>202</u>	
Total	182	--	120	--	302	--	302	
<u>Commodities</u>								
Local Currency	--	--	--	--	--	--	--	
Foreign Exchange	<u>--</u>	<u>2,319</u>	<u>--</u>	<u>--</u>	<u>2,319</u>	<u>--</u>	<u>2,319</u>	
Total	--	2,319	--	--	2,319	--	2,319	
<u>Total</u>								
Local Currency	1,153	10	200	--	1,363	65,065	66,428	
Foreign Exchange	<u>7,936</u>	<u>2,985</u>	<u>20</u>	<u>1,091</u>	<u>12,032</u>	<u>--</u>	<u>12,032</u>	
GRAND TOTAL	<u>9,089</u>	<u>2,995</u>	<u>220</u>	<u>1,091</u>	<u>13,395</u>	<u>65,065</u>	<u>78,460</u>	

Table VI
Page 1 of 1

IMS PROJECT
STRUCTURE REPLACEMENT PROGRAM^{1/}
(AT CONSTANT 1981 PRICES)

	Current Actual 80/81	Project Levels									TOTAL (9 Yrs)
		IMS Project						Post Project			
		81/2	82/3	83/4	84/5	85/6	86/7	87/8	88/9	89/90	
L.E. Million											
1. Sustaining Investment Requirement ^{2/}	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	121.14
2. MOI Budget for SR	7.00	12.50	21.00	24.00	28.00	31.00	16.00	16.00	16.00	13.84	178.34
3. AID Re- imbursement	-	3.50	10.00	10.00	11.00	11.00	-	-	-	-	45.50
4. Unreimbursed MOI ^{3/}	7.00	9.00	11.00	14.00	17.00	20.00	16.00	16.00	16.00	13.84	132.84
5. Shortfall(-) Surplus(+) 1.-2.	-6.46	-0.96	+7.54	+10.54	+14.54	+17.54	2.54	2.54	2.54	0.38	57.21
6. SR Backlog (end of year)	17.20 ^{4/}	18.16	10.62	40.00	25.54	0.00	5.46	2.92	0.38	0.00	-

^{1/} Designed to eliminate SR backlog by 1990

^{2/} Derived from estimates of Water Master Plan Technical Report 20, Table 7 (reproduced in CH M Hill Report, Annex B, Table 4). As explained by MOI the WMP estimate of LE 16.26 million² assumed average life of structures in 1980 to be 25 years and projected funding needed to eliminate the backlog and have the oldest structure in the system no more than 25 years by 2005. The "perpetual" sustaining investment is thus $16.26 \times 0.554 \times 1.15 \times 1.30$ to construct to full MOI specs at 1981 prices = LE 13.46 million.

^{3/} CH M Hill, Annex B, Table 3, Line 3, Col. 4 less modernization = LE 7.0 in 1980/81 for SR according to Planning Department, MOI.

^{4/} Backlog reported by MOI in 1981 (LE 46 M) \times 1.30 to build to MOI specs per MOI est. = LE 57.2 M

ANNEX XI
DRAFT PROJECT AUTHORIZATION REQUEST

DRAFT PROJECT AUTHORIZATION

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.

(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 cost,
- (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 cost. .
- (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 NOI 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 AID reimbursement for structure replacement for that Fiscal year.

4. Section 612(b) Determination

Based on the justification set forth in Annex IX, 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 AID H.B 1, Supp B., Ch 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 Annex IX B of 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, Ch. 5B 4b (7) for the purposes of carrying out activities under the Project.

M. Peter McPherson
Administrator
Agency for International
Development

ANNEX XII

BRIEF POSITION DESCRIPTIONS FOR TA PERSONNEL

BRIEF POSITION DESCRIPTIONS FOR TECHNICAL ASSISTANCE PERSONNEL**Engineer Advisor - Design and Materials**

The incumbent will support the Irrigation Department in carrying out the small structure replacement program. While he/she will provide advice to the Senior Undersecretary, Irrigation Department, on implementation of the program, the major part of his/her time will be devoted to assisting field personnel in the Directorates with implementation and to assisting and advising on programs to train personnel in short courses and on the job. Such on-the-job training will focus on analysis of alternative design options, use of new materials, quality control and development of in-house capacity for primary structure maintenance. The incumbent should have a minimum of a BS degree in engineering or agricultural engineering with graduate training desirable. Experience with an organization maintaining irrigation structures is required with a strong preference for an individual with developing countries experience. Capability to deal effectively with senior level personnel is important.

Operation & Maintenance Planning Engineer

The incumbent will serve as a senior advisor to the MOI project director responsible for developing an upgraded O & M planning effort for the Charbia Directorate. The plan is to serve as a model for implementation throughout the Egyptian irrigation system as it becomes feasible. The incumbent will advise on a full range of O & M activities including budgets; funds release and control, structure and canal maintenance; work scheduling; contracting, inspection, design, quality control, and surveying; staffing and administration; and control and management of water. The incumbent should have, as a minimum, a BS degree in engineering or agricultural engineering with graduate training desirable. O & M experience with an organization maintaining an irrigation system is required. Capability to deal effectively with senior level personnel is important.

Senior Water Resources Engineer/Planning

The incumbent will directly assist the director of the newly established Project Preparation Unit. The Unit, which is being assisted by both the World Bank and AID, is in the process of developing capability to prepare project feasibility reports to standards that will satisfy the requirements of international financing agencies.

The incumbent will provide technical assistance on the overall aspects of preparing project plans and analyses including procedures for project formulation and evaluation. It is desirable that the incumbent have a graduate degree or, as a minimum, a BS degree in engineering plus training and/or experience in economic and environmental analysis. Experience as the head of a water resources project planning unit is required. Capability to deal effectively with senior level personnel, economists, environmentalists and related professions is necessary.

Water Resources Engineer/Evaluations

The incumbent will be assigned to the Project Preparation Unit and will be the principal advisor on the engineering aspects of project formulation, design and evaluation. He/She will help develop procedures for use in developing project feasibility reports that will meet the standards of international financing agencies. It is desirable for the incumbent to have a graduate degree in engineering. Progressively responsible experience in plan formulation and evaluation of water resources projects is required. Capability to work effectively with an interdisciplinary staff and senior level personnel is important. A general knowledge of economics and environmental aspects of plan formulation and evaluation is highly desirable.

Agricultural Economist

The incumbent assigned to the Project Preparation Unit will be the principal advisor for economic aspects of developing project feasibility reports. The incumbent will assist in the plan formulation and evaluation, determine project benefits and develop the project benefit/cost ratio or rate of return. A graduate degree in agricultural economics plus progressively responsible experience in planning irrigation projects is required. Experience with developing countries is highly preferred. A knowledge of appropriate environmental considerations to be taken in developing a project would be helpful. Capability to deal effectively with senior level engineers and staff of other disciplines is very important.

Planning Engineer for Irrigation Systems Redesign and Improvement

The incumbent will report directly to the MOI project manager and share responsibility for preparing a comprehensive feasibility report and preliminary plan to improve water control activities and increase farm production and income in the North Sifta Irrigation District. The report will cover the redesign, rehabilitation and

improvement of the irrigation system including on-farm water management and the timely provision of other off-farm inputs and services, i.e., credit, fertilizer, marketing, etc., necessary to increase agricultural production or reduce costs to translate any changes into higher farm income. The incumbent will have responsibilities for developing the final scope of work and must ensure that the findings in the final report contain adequate engineering, financial, social, technical, environmental and economic analyses. The incumbent must have as a minimum a BS degree in engineering with graduate training in engineering or another field desirable.

Irrigation Engineer for Irrigation Systems Redesign and Improvement

The incumbent will be the principal technical engineer assisting the MOI project manager in developing a feasibility report for redesigning and improving the operation of the North Zifta Irrigation District. He/She will be primarily responsible for the segment of the report concerning redesign, rehabilitation and improvement of the irrigation system, including on-farm water management. A degree in civil or agricultural engineering is required. Experience with developing countries is desirable. Ability to work effectively with an interdisciplinary staff and senior level officials is necessary.

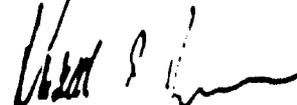
Agricultural Economist for Irrigation Systems Redesign and Improvement

The incumbent will be the principal non-engineering technical staff member assisting the MOI project manager in developing a comprehensive feasibility report to improve water control activities and increase farm production for the North Zifta Irrigation District. He/She will be primarily responsible for the overall economic, financial and social analyses of the study and the segment of the report concerning the provision of off-farm inputs and services necessary to complement the redesign and improvement of irrigation systems required to increase agricultural production or reduce costs for higher net farm income. The incumbent is required to have a graduate degree in agricultural economics and increasingly responsible experience in economic and financial analyses of proposed water resources projects. Ability to work effectively with an interdisciplinary staff and senior level officials is necessary.

ANNEX XIII
611(e) CERTIFICATION

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

I, Donald S. Brown, 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 and technical assistance and training planned under this Project 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 to the Ministry of Irrigation under the Irrigation Management Systems project.



Donald S. Brown
Director

ANNEX XIV

NORTH ZIFTA FEASIBILITY SCOPE OF WORK

Feasibility Report and Preliminary PlanForIrrigation Redesign and Water ManagementNorth Zifta Irrigation DistrictI. General:A. Nature of Services:

The Consultant should prepare a comprehensive feasibility report and preliminary plan for farmer productivity and income increasing and water control activities in the North Zifta District of Gharbiya Governorate. The report and plan will cover: (a) the redesign, rehabilitation and improvement of the irrigation system, including on-farm water management, and (b) the timely provision of other off-farm inputs and services, i.e. credit, fertilizer, information, marketing, etc. necessary to increase agricultural production or reduce costs and to translate any changes into higher farmer incomes. This report and, if feasible, plan are expected to constitute the basis for a follow-on phase of detailed design and construction of improvement works, of necessary upgrading of input and support systems and of operating the improved package when physical works are completed and modified programs are underway.

B. Project Area:

The North Zifta Irrigation District is located about 80 kilometers (km) north of Cairo and 20 km west of Tanta, the administrative headquarters of Gharbiya Governorate.

1/ This scope of work is subject to modification. The contractor will prepare a final scope of work in cooperation with and subject to approval of the Director of the Project Preparation Unit, Ministry of Irrigation.

Feasibility Report and Preliminary Plan

For

Irrigation Redesign and Water Management

North Zifta Irrigation District

I. General:

A. Nature of Services:

The Consultant should prepare a comprehensive feasibility report and preliminary plan for farmer productivity and income increasing and water control activities in the North Zifta District of Gharbiya Governorate. The report and plan will cover: (a) the redesign, rehabilitation and improvement of the irrigation system, including on-farm water management, and (b) the timely provision of other off-farm inputs and services, i.e. credit, fertilizer, information, marketing, etc. necessary to increase agricultural production or reduce costs and to translate any changes into higher farmer incomes. This report and, if feasible, plan are expected to constitute the basis for a follow-on phase of detailed design and construction of improvement works, of necessary upgrading of input and support systems and of operating the improved package when physical works are completed and modified programs are underway.

B. Project Area:

The North Zifta Irrigation District is located about 80 kilometers (km) north of Cairo and 20 km west of Tanta, the administrative headquarters of Gharbiya Governorate.

The North Zifta District is one of the ten districts in the Charbiya Governorate, and one of the five districts under the Inspectorate of Mahalla. All operate under the authority of the Ministry of Irrigation (MOI).

The District encompassing approximately 43,000 feddans (one feddan = 1.04 acres) is bounded on the West by the large canal known as Bahr Shebin from which approximately ten laterals serve the North Zifta District. On the North the boundary is the same canal as it bends to the east at the north end of the North Zifta District. The South boundary is the large feeder canal known as El Rayah El Abbasy which heads at the Nile River just upstream of the Zifta Barrage. The East Boundary is the Damiette Branch of the Nile River.

II. The Existing Agricultural Support System:

To be completed.

III. The Existing Irrigation System:

The present system is composed of some 160 km of canals and laterals serving 43,000 feddans. None of the waterways are lined. The main canals are Omar Bey, approximately 13.7 km. in length, serving 24,750 feddans with a capacity of approximately 1,000,000 cubic meters per day (m³/day) at the head and Bahr Shershaba, approximately 500,000 m³/day at the head.

The remainder of the canals are of much smaller size with laterals of various sizes and lengths. See Attachment B for details and specific names. Part of Bahr Shershaba serves the Santa Irrigation District which is not included in the Project. The area so served is about 3,200 feddans of land out of the total of 12,500 served by Bahr Sheshaba.

There are approximately 106 km. of open drains in the North Zifta District, serving approximately 56,000 feddans. Some of these lands are outside of the district but the drainage passes through the district. See Attachment C for details and specific names.

The majority of the irrigation facilities have been in service for 35 to 75 years and are in need of physical improvement to adapt the system to present day conditions and requirements.

Present problems are the results of physical and economic changes which have taken place since original construction, causing the system to become inefficient with high maintenance cost and leading eventually to inability to deliver water as needed.

The present system is basically designed to operate below the level of adjacent land; however, some areas are served by a gravity system, or partial gravity system. All operate on a rotation system that may vary with the season: generally 4 or 7 days "on" or 4 or 7 days "off". With the existing system there is virtually no ability to measure water discharges and therefore very little control can be exercised over the quantity passing through the system. The control

to the extent it is exercised is by water levels (stage) only. There are excessive water losses into the drainage system as 24 hour per day irrigation of farms is not practiced or required by system management. The canals and sub-systems continue to run 24 hours per day during the "on" period but the farmers generally discontinue irrigation during the nighttime hours. Consequently, large volumes of water end up in the drainage system contributing to additional maintenance costs, pumping costs, erosion of banks and seepage losses which contribute to waterlogging of some areas. The Ministry of Irrigation (MOI) is presently in a program of draining areas with high water tables, and those which are water-logged, by installing underground pipe drains.

The North Zifta district presently has 1,000 feddans in underground tile drainage with a program to install additional drains. There are plans to install additional pipe drains to 60,000 feddans in the Gharbiya area, some of which will be in the North Zifta district. The exact quantity for North Zifta is unknown at this time.

Additional present day problems with the operation of the system include the inability at times to make deliveries at the end of the laterals and canals as the upstream users utilize the majority of the water, leaving very little for the tail end of the system. This is mainly due to the day-light-hours-only irrigation practice on the farms.

With no water control on the delivery system to the farmers and the daytime-only irrigation practice, the down-stream users are often without water at peak irrigation periods. This sometimes results in forcing night irrigation for those at the tail-end as it is the only time water is abundant there. It also has resulted in the District Engineer being required by the governorate to extend the "on" period to complete the irrigation of the farms that were unable to irrigate in the allotted rotation period. There are no deep well pumps operated in the MOI system for supplementary water or to allow for flexibility of operation. It is reported that a few individual farmers utilize wells.

The majority of farmers are required to pump from the "meska" (the farm or header ditch) by means of sakias (water wheels), tanbours (Archimedean screw), dip buckets, electric, diesel or gasoline pumps, as the meska generally lies below (usually less than a meter) the level of the field it is to irrigate. This lack of gravity delivery at field turn-outs causes operational problems as it slows down the ability of the system to deliver water; each farmer requires a long period to irrigate his land, thereby making the common ditch (meska) unavailable to downstream users, or reducing the flow in it for long periods. Additional water is also required in the application as the farmer irrigates small basins successively due to the lack of sufficient head to move the water across his land in a short period of time. The general lack of land-leveling also contributes to this problem.

IV. The Project Plan:

The Project Plan will include:

(a) All aspects of improving the physical works of the irrigation and drainage system, including redesign or replacement where so indicated; the operation of the improved system down to the farm turn-outs; on-farm management of water and land shaping; and a maintenance plan for the improved system. The plan is expected to draw heavily on the work of the AID-supported Water Use and Management Project in developing the recommended course of action.

(b) A detailed description and time scheduling, including estimated cost, of physical facilities, technical and capital assistance necessary to raise farmer production and income in the area. This may include but will not necessarily be limited to requirements for additional farm inputs such as fertilizer, for additional credit, for additional extension assistance, for the establishment of cooperatives or for the development of marketing channels. It will necessarily include proposed organizational and administrative mechanisms.

Farmer input and service elements are expected to involve various elements under the direction of the Ministry of Agriculture and will seek to apply technology and working methods developed under other AID assisted projects such as Major Cereals, Small Farmer Production, Cooperative Marketing, Agricultural Mechanization, Agricultural Development Systems and Small Scale Agricultural Activities.

The objectives are to raise farmer production and income and to improve the efficiency and effectiveness of the water conveyance system enabling more efficient use of water at the farm level. The plan will be developed through consideration of all logical alternatives and supported by detailed analysis of technical, economic, financial, administrative, environmental and social aspects.

The Plan shall demonstrate technical, economic, financial, social, administrative and environmental soundness and shall include a computation of costs and benefits made insofar as practicable with the procedure set forth in the Memorandum of the President (U.S.) dated May 15, 1962, with respect to such computations. (NOTE: Required under the U.S. Foreign Assistance Act for land and water related projects to be financed by the United States). A feasibility study and Project Plan will be submitted to the Ministry of Irrigation and other Ministries as appropriate in suitable report style covers (soft) eighteen months after effective date of contract. Copies of a working draft edition will be submitted for review and comments prior to preparation of and printing the final copies.

V. Consultant's Tasks:

Performance of the services required for preparation of the Feasibility Study and Project Plan described above shall include, but not be limited to, the specific tasks outlined below. The description of the tasks are not intended to limit or restrict the

CONSULTANT to the items contained therein--the CONSULTANT shall perform these tasks and such other tasks as may become apparent during the progress of the work.

The CONSULTANT will maintain continuous contact with Governorate, Inspectorate and District personnel responsible for operation of the present irrigation and agricultural support systems so that Egyptian staff will be involved in the entire process of feasibility study and plan development.

A. Overall:

The CONSULTANT shall familiarize himself with all available information pertinent to the work. The MOI and the MOA shall provide the CONSULTANT or assist him in obtaining copies of all studies, reports, data, etc. from governmental agencies and other sources within Egypt pertinent to the work. Although the MOI will provide such assistance to the CONSULTANT, it shall be the CONSULTANT's responsibility to ascertain what is relevant and to initiate requests and inquiries.

B. Irrigation System Elements:

1. Topographic Surveys and Mapping:

The CONSULTANT shall conduct topographic surveys as necessary to map the North Zifta Irrigation System. The map will be used as a base for all irrigation studies and, reduced to appropriate scale, included in the report. (It may be possible for the CONSULTANT to utilize the services of the MOI's surveying section in completing

this task.) NOTE: The Egyptian General Survey Authority operates under the direction of the Ministry of Irrigation. Mapping of the Nile Delta has been reported done at a scale of 1/25,000; two kilometers each side of the Nile River at 1/10,000 with contours at one-half meter intervals; and cadastral maps of agricultural lands at a scale of 1/2500. It is recommended that prospective consultants satisfy themselves as to the availability of relevant maps of the North Zifta District prior to submittal of technical proposals.

2. Hydraulic and Hydrological Surveys:

The CONSULTANT shall measure flows at key control points in the existing system and construct discharge rating curves as necessary to analyze flows in the system. (It may be possible for the CONSULTANT to utilize the services of the MOI's hydraulic section in completing this task.)

3. Ground Water Survey:

A review of all existing data and reports will be conducted to determine ground water depth and relationship to the irrigated land. Recommendations for remedial measures will be made, including any necessary surveys, in conjunction with the need to provide supplemental water and more flexible operation of the system.

4. Water Management and Farm Practice Surveys:

The CONSULTANT shall make a survey of present on-farm irrigation and related agronomic practices. Socio-economic data

shall be gathered on farmer organizations, credit availability, fertilizer use, cropping practice, and crop yields, etc. as necessary to develop a sound operational basis for the system improvement project and provide a valid base for computation of benefits accruing from the system improvement project.

5. Irrigation System Plan:

Utilizing the elements of the existing irrigation system to the extent practical, a gravity system for the entire area will be studied as one of the alternatives. This will include main, secondary, branch canals and laterals, header ditches (meskas) as well as structures, pumping plants necessary to create a head for gravity irrigation, and farm delivery turnouts.

Other logical alternatives shall be studied, to include but not limited to change from a rotation system of operation to a demand system; lined or elevated meskas, pressure system, etc. for delivery to the farm.

The alternatives studied as well as the recommended plan will be presented in the Feasibility Report. Such alternative designs will depict characteristics such as location, size, elevations, capacities, etc. as necessary for understanding of the components of the system.

The recommended plan shall be complete with conceptual drawings, implementation plan and schedule, cost estimate, and operations plan for the improved system, including on-farm water management.

a. Main and Branch Canals:

The main canals will be analyzed and evaluated for rehabilitation or improvement to meet system requirements. This might include modifying of gate structures to enable operation for regulation, control and measurability of water flow. Motorization of gate controls should be evaluated as to need and practicality.

b. Laterals:

The lateral system will be analyzed and evaluated for rehabilitation and/or redesign. This will include the feasibility of converting all or part of the system to gravity, concrete lining, pumping plants, structures, gates, etc., to provide control of and measurability of water in the improved system.

c. Header Ditch* (Nekas)

The CONSULTANT will investigate the present system of delivering water to the farmers and the ability of the MOI to control, monitor and deliver adequate water in necessary quantities.

The CONSULTANT will evaluate the different alternatives that are practical for the purpose of improving operational control to the farm plots or units. This will include consideration of including some or all of the nekass under MOI operational and maintenance responsibility; water users

organizations to operate and maintain the meskas; elevating meskas to provide sufficient gravity head to deliver water efficiently to the farm plots. The feasibility of concrete lining of meskas or pressure pipe system should be considered. The CONSULTANT should evaluate alternatives for MOI system based on delivery of water to meskas serving not more than (100) feddans. These "short" meskas might be maintained and operated by the farmers. Such a farmer delivery system would be similar to the present meskas system but meskas would be reduced in size and length to the extent feasible.

d. Operation and Maintenance:

A comprehensive plan shall be prepared for operation and maintenance of the improved irrigation system with particular attention to problems in operation and maintenance of the existing system including the meskas.

e. Organization:

The existing organizational structure will be analyzed as to its capability to operate and maintain the improved irrigation system. Problems discovered in the existing organizational and functional structure will be addressed and appropriate reorganization will be recommended.

Consideration should include farmer input into the operation and maintenance program.

f. Budgeting for Operation and Maintenance

The budgeting and funding procedure for operation and maintenance of the North Zifta system will be analyzed. Problems discovered in existing fiscal management and budget administration by the MOI and the Ministry of Finance that would mitigate against the improved North Zifta system receiving ample funds for recurring operation and maintenance will be addressed. Procedures to accomplish the desired and compatible with the budgeting system of the Government shall be developed.

g. Training:

Organization and procedures will be recommended for the training of personnel required to operate and maintain the improved irrigation system, including on-farm management of water.

The existing drainage system will be studied and evaluated as to its adequacy and its compatibility with the improved irrigation system and farming operations. Both surface and subsurface drainage requirements and facilities will be analyzed and included in the recommended plan. Utilization of drainage water for downstream irrigation will be considered.

a. Operation and Maintenance:

A comprehensive plan shall be prepared for operation and maintenance of the improved drainage system with particular attention to problems in operation and maintenance of the existing system.

b. Organization:

The existing organizational structure will be analyzed as to its capability to operate and maintain the improved drainage system. Problems discovered in the existing organizational and functional structure will be addressed and appropriate reorganization will be recommended.

c. Budgeting for Operation and Maintenance Report:

The budgeting and funding procedure for operation and maintenance of the North Zifta drainage system will be analyzed. Problems discovered in existing fiscal management and budget administration by the MOI and the Ministry of Finance that would mitigate against the North Zifta drainage system receiving ample funds for recurring operation and maintenance will be addressed. Procedures to accomplish the desired end compatible with the budgeting system of the Government shall be developed.

d. Training:

Organization and procedures will be recommended for the training of personnel required to operate and maintain the drainage system.

7. Conjunctive Use of Water:

Review the need for, and feasibility of, Well Pumps to be installed in the North Zifta Irrigation District for the purpose of providing supplemental water, system operation flexibility, and drainage of high water table. Consideration must be given to the present tile drainage system installed in the area or to be installed in the area under an on-going drainage project.

8. Construction Procedures and Plans:

The CONSULTANT will develop construction plans and procedures necessary to execute the system redesign and improvement program. The program shall take into account the desirability of keeping the present system in operation during the execution of construction and improvement works.

9. Implementation and Construction Schedule:

The CONSULTANT will develop an implementation schedule showing essential items of work from detailed engineering to completion of improvement and construction works envisaged in the recommended plan. The Construction Schedule shall be broken down by discrete major work items.

10. System Redesign, Rehabilitation and Improvement Cost

Estimate:

- a. A detailed cost estimate for the redesign, rehabilitation and improvement of the irrigation systems will be prepared presenting total capital costs broken down into U.S. dollars

and Egyptian pounds components. This estimate will also include the cost of any land shaping recommended to be accomplished other than by individual farmer effort. The total cost estimate shall include engineering design and construction supervision as well as physical and price contingencies.

b. An estimate will be made to show the initial cost of training facilities for improved operation and maintenance, and the staffing of an organizational structure to support the operation and maintenance of recommended improved irrigation system.

c. An estimate will be made of annual recurring costs to the MOI for operations, maintenance, training, etc. to support the continued effective operation of the improved system.

11. Land Leveling:

The CONSULTANT shall assess the feasibility of re-leveling lands irrigated by the system to the new concept of "dead level". (See reports by Soil Conservation Service, Phoenix, Arizona written by Leonard Erie.) The purpose of this investigation is twofold:

- a. To provide fill material for raising waterways as necessary in the proposed gravity system; that is, putting laterals and header ditches into embankment, if so determined.
- b. To improve the flow characteristics on the individual farms and improve irrigation efficiency.

12. Plans, Analysis, Estimates and Schedules:

The preliminary designs, outline drawings, descriptions, cost estimates and analyses developed for the report shall be prepared in such a manner that detailed design for construction can proceed expeditiously (by separate contract). The preliminary designs produced shall include but not be limited to:

- a. Plan and profile, showing location, hydraulic gradients, dimensions and elevations of the proposed system, adequate to provide a basis for a reasonably firm estimate of cost.
- b. Description of of system, capacities, structures, lining, gates, etc., of major facilities.
- c. Location of electric power lines necessary to operate the improved system.
- d. Conceptual drawings of major structures and facilities.
- e. Conceptual layout of any new facility that may be necessary to physically support the new system. i.e. centralized office for operations and maintenance, maintenance yard, etc.
- f. Description and cost estimate of material and equipment to support the improved system.
- g. Total cost estimate for the irrigation redesign, rehabilitation and improvement element.

These preliminary designs and outline drawings, layouts, cost estimates, etc., shall clearly and absolutely convey the intent, general features and specify and describe the basic performances and sizes of the improved irrigation system. Appendices shall contain information on survey data, aerial photography (if used), investigations, tests, conceptual design details and other supporting material and data supplementary to the main text.

C. Agricultural Production Increase Element

1. Agricultural Potential:

The Consultant shall assess the current level of agricultural activities in the North Zifta area and the potential for increased output. This will include examinations of the current resource base, existing and potential cropping patterns, livestock production and current and potential technology application levels. The focus must be on raising production levels to maximum economic levels recognizing that drastic changes in cropping patterns and for technology are not likely in the near term.

2. Existing GOE Services and Facilities:

The CONSULTANT shall prepare a complete inventory of government-financed services being provided to farmers in the area. This must include the identification of facilities owned or used by government agencies, personnel employed and programs being conducted. Specific areas to be covered will include: credit,

extension, marketing, plant protection, veterinary and machinery hire. In each area a description of the system as it is operated shall be provided.

3. Existing Private Sector Services and Facilities:

The Consultant shall also inventory services being provided to farmers by private sector individuals or organizations. These will include the topics identified above as well as processing and manufacture of farm equipment.

4. Farmer Need for Services:

The Consultant will interview a representative sample of farm residents to determine the off-farm services needed for agricultural production activities. Based on these interviews, personal observation and expert opinion the Consultant will prepare a detailed analysis of the farmer's needs. This must include conclusions as to possible production increases if services were available.

5. Adequacy of Services Available:

Using the material from the previous tasks the Consultant will evaluate the adequacy of services available. The Consultant must identify any physical, organizational, structural or financial deficiencies in the current system and recommend a plan to overcome these deficiencies as part of a comprehensive effort aimed at production increases. The recommended plan shall include an implementation plan and schedule, cost estimates and an administrative plan. It must specifically address:

a. Agricultural Credit:

The amounts of short, medium and long term credit needed to raise production levels will be identified. Alternative methods of providing the credit must be analyzed.

b. Agricultural Inputs

The quantities of fertilizer, pesticides and other off-farm inputs needed to increase production must be determined. A system of providing these inputs in a timely manner in the indicated quantities must be prepared.

c. Agricultural Extension:

The effectiveness of current information channels must be assessed. A recommended strategy to address any deficiencies must be developed.

d. Agricultural Marketing:

The adequacy of current channels must be evaluated and a plan to overcome any shortcomings developed. This should include both crop and livestock marketing.

6. Plans, Analysis, Estimation and Scheduling:

As indicated above the work carried out must lead to a detailed operational plan for increasing agricultural production in the North Zifta area. This must be complete with descriptions of needed programs, conceptual drawings of needed physical facilities, identification of external and Egyptian resources needed and total

benefits
cost estimates. The Report will also contain appendices for individual items, details of procedures used to arrive at the conclusions and other supporting material.

D. Environmental Assessment:

Preparation of a Scoped Environmental Assessment of the proposed project in accordance with the AID environmental procedures published as 22 CFR Part 215 in the Federal Register on October 23, 1980. The purpose of the Environmental Assessment is to provide the GOE and USAID with a comprehensive understanding of the reasonably foreseeable environmental effects of the proposed activities and reasonable alternatives, if any, so that the expected project benefits can be weighed against any adverse short or long-term impacts upon the environment. Briefly, the Environmental Assessment shall discuss:

1. Construction Impacts, with particular attention paid to identification of construction monitoring requirements to assure proper finishing work and removal of debris is done by the contractor. Special attention should be given to the regrading of roads where they have been disturbed by the activities of heavy construction equipment.
2. Operation and Maintenance Activities, the study should include the analysis of alternative methods for the control of ditch bank and aquatic weeds in both supply canals and drains.

3. Control of Water Borne Diseases, the study should include an analysis of alternative methods for control and examine in detail the institutional requirements/capital costs/recurrent costs for control activities.

4. Management of Agricultural Chemicals, especially insecticides, herbicides, rodenticides and fertilizers, attention should be given to both public health impacts and improved utilization methods for these materials.

5. Management of Water Application, the study should place special emphasis on water conservation through (constructional), educational/extension and pricing techniques.

E. Technical Soundness:

The irrigation and agricultural improvement activities will be considered technically sound if all pertinent technical aspects have been considered in the analysis, if the project is designed in accordance with accepted engineering standards and practices, and/or agricultural development techniques and the estimated cost is as low as any other reasonably available alternative which would produce the intended results.

The technical aspects listed below and others necessary to demonstrate technical soundness shall be considered:

1. Principal engineering features of the project as to type, capacity and characteristics of major facilities or units.

2. Justification of the scope of activities of the project.
3. Design objectives, criteria, standards, and specifications of new facilities and equipment and new expanded programs in relation to the existing agricultural production system and the quality of service to be provided.
4. Preliminary investigations and data sufficient to identify the significant technical problems and establish solutions per general criteria and standards.
5. Justification of the criteria and standards, proposed as compared with other available alternatives.
6. Conceptual designs and outline plans for all facilities, sufficiently complete to provide a basis for reasonably firm estimates of work quantities and costs.
7. Special construction problems foreseen such as keeping existing canals in operation during construction, availability of materials and equipment, manpower requirements and availability--skilled and unskilled.
8. Project execution in sufficient detail for cost estimating purposes and scheduling; identification of constraints and measures to deal with them.
9. Operation and maintenance of the completed project--operating plan, recurring maintenance plan, organization, availability of trained personnel and required facilities, and equipment.

F. Financial Soundness:

The financial aspects listed below and others necessary to demonstrate financial soundness of proposed activities shall be considered.

1. Estimated capital cost of land, engineering, equipment, construction and credit funds in U.S. dollars and local currency. Estimated average cost per feddan of land benefitted.
2. Estimated recurrent costs including personnel, equipment, and supplies, training and administration. Estimated annual cost per feddan benefitted.
3. Estimated overall annual costs to include annual depreciation and interest on total project investment on estimated life of project. Total annual cost and average annual cost per feddan benefitted.
4. Estimated returns: total annual benefit to land-owners and average benefit per feddan total annual benefit from handling reduced amount of unused (waste) water enabled by the improved system; total annual benefit of water conserved.

G. Economic Soundness:

The economic aspects listed below and others necessary to demonstrate economic soundness shall be considered:

1. Present agricultural production - crops and acreages, yields per feddan and total income received, deduction for farms input costs, net agricultural returns.
2. Factors expected to increase production:
 - a. Changes in farm sizes (if any)
 - b. Water availability and improved irrigation to present farmers.
 - c. New crops and modified rotation and cropping patterns.
 - d. Availability of additional input quantities and services (credit, fertilizer, extension, etc.)
 - e. Interactive effect of improved water management on other agricultural inputs (fertilizer, seeds, agronomic practice).
3. Agricultural production after completion of project--crops and yields, value at anticipated prices.
4. Additional costs in achieving production increases.
5. Benefits to farmers--gain in total agricultural production, annual net benefits to farmers.
6. Annual benefits from handling reduced amount of unused (waste) water enabled by the improved irrigation system including:

- a. value of conserved water in other uses,
- b. impact on net value of agricultural production,
- c. reduced pumping costs if the plans call for gravity flow.

7. To the extent possible the expected effect on production/farm income each of the proposed interventions to enable the identification of the most cost-effective changes. The calculation of economic and financial IRR's for the separate components proposed.

8. Using the above a benefit/cost or IRR analysis complete with sensitivity tests must be provided.

H. Social Soundness Analysis:

The socio cultural aspects listed below and others necessary to determine the social soundness of proposed activities shall be examined:

1. The values, beliefs, social structure and organization of the North Zifta Community.
2. Possible project impacts on identified participants, with differences between groups specified.
3. Benefits and costs to expected participants with difference between groups analyzed.
4. Socio-cultural constraints to project implementation.
5. Effect of project activities on community dependence on outside services and resources.

6. Changes in resource access and employment that might occur due to the project.
7. Changes in community power and participation from project activities.
8. User control of the irrigation network.
9. Establishment of Water Users Organizations, possibilities and strategies.
10. Division of responsibilities for operations and maintenance of the irrigation system.

Recommendations on alternatives to alleviate any negative socio-cultural impacts and an overall implementation strategy to maximize positive effects must be included.

VI. Report Format:

The Final Report in bound form (soft covers) shall be prefaced by a summary which shall provide an overview of the proposed project and contain location maps indicating the project boundaries and current situation.

The summary shall present briefly, the CONSULTANT's major findings and conclusions relative to the financial, social, technical, environmental and economic soundness of the project and indicate related costs. The body of the Report shall set forth in appropriate detail the CONSULTANT's findings, analyses and conclusions. Statistical data, conceptual drawings, maps, detailed

plans, preliminary specifications, etc. shall be bound as appendices with the body of the report.

One set of reproducible drawings of conceptual plans, maps, etc., shall be provided to the MOI upon submittal of the Final Report.

VII. Report Submissions:

1. Interim Action Reports:

To ensure prompt and timely review of project elements, the Consultant shall submit Interim Action Reports covering completed studies or investigations of the main items of work for advance review and approval. These reports are intended to assist the CONSULTANT by enabling him to submit recommendations for early approval thereby permitting the subsequent interrelated tasks to proceed expeditiously.

Interim Action Reports, when submitted, shall be straight forward working documents, complete and fully detailed to permit timely review, evaluation and decisions. A preliminary schedule of interim action reports anticipated by the Consultant shall be furnished within three months after the effective date of the contract.

2. Draft Final Reports:

It is anticipated that the CONSULTANT will be prepared to issue a Draft of the Final Report within 16 months after the

effective date of the contract. The Draft Report shall be submitted in twenty (20) copies to the GOE and ten (10) copies to USAID/Cairo for review and comment.

3. Final Report:

The CONSULTANT shall issue the Final Report within thirty (30) days after receipt of GOE and USAID comments. Such comments shall be provided to the CONSULTANT within sixty (60) days after receipt of the Draft Report. This Final Report in bound form (soft covers) shall be submitted in fifty (50) copies to the GOE.

