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UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

PROJECT PAPER

PAKISTAN

IRRIGATION SYSTEMS MANAGEMENT

391-0467

MAIN TEXT AND ANNEXES

MAY 1983

UNCLASSIFIED

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

PROJECT AUTHORIZATION

PAKISTAN

Irrigation Systems
Management
Project No. 391-0467

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended (the Act), I hereby authorize the Irrigation Systems Management Project for the Islamic Republic of Pakistan (Cooperating Country) involving planned obligations of not to exceed U.S. dollars Sixty-Five Million ($65,000,000) in grant funds over a four (4) year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is seven years from the date of initial obligation.

2. The Project, which will be co-financed by the World Bank (IBRD) through its affiliate the International Development Association (IDA) under the Irrigation Systems Rehabilitation (ISR) Project, will provide technical assistance, training, reimbursement for construction, commodity support and operating expenses to assist the Cooperating Country, and the four Provincial Irrigation Departments (PIDs) participating in this Project to (a) rehabilitate and maintain approximately 14,000 km of surface canals and 3,500 km of surface drains and strengthen human and physical resources and management operations to plan and design civil works; (b) improve the institutional capability of PIDs to operate and maintain the entire system and improve the capability of the Ministry of Water and Power and the Water and Power Development Authority (WAPDA), at the federal level, to coordinate both water policies and storage supplies; (c) strengthen the capacity of PIDs to plan future projects in the water sector and continue with WAPDA the transformation of policy guidelines into action programs, and strengthen existing critical research programs in areas of water management both within and outside the Indus System; and (d) study the feasibility of command water management to integrate the management of irrigation water at all levels within canal commands.

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 and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the Cooperating Country or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the Cooperating Country or of the United States.

b. Condition Precedent to First Disbursement

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Cooperating Country shall furnish or have furnished to A.I.D., in form and substance satisfactory to A.I.D., a written statement authorizing A.I.D. to proceed with the procurement of technical consultants and project commodities and with training and other project activities.

c. Conditions Precedent to First Disbursement in a Specific Province

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project for project activities in a specific province, or to the issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the Cooperating Country shall furnish or have furnished to A.I.D., in form and substance satisfactory to A.I.D., a written statement from the responsible Provincial Official(s) of that Province indicating Provincial approval of the Project.

d. Conditions Precedent to the Commencement of Civil Works Rehabilitation Activities

Except as A.I.D. may otherwise agree in writing, prior to the commencement of civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Cooperating Country shall furnish the following to A.I.D. in form and substance satisfactory to A.I.D.:

i. documentary evidence that suitable arrangements have been made by the Cooperating Country for a Supervisory Consultant to assist in project implementation and that said Consultant is mobilized and ready to review rehabilitation work design and work plans, inspect rehabilitation work, and monitor construction progress;

ii. a written description of a detailed inspection system establishing procedures to be followed to insure that rehabilitation work conforms to specifications.

e. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works commenced after the first twelve months from the date of the signing of the Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Cooperating Country shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation indicating that the Cooperating Country has established within the Federal Coordinating Cell, or other appropriate administrative structure, a Central Procurement Office to coordinate and administer the commodity procurement process, including consolidating Provincial requests for spare parts during the life of the Project.

f. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities in a Specific Province Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works in a specific province commenced after the first twelve months from the date of the signing of the Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Cooperating Country shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation establishing that the Provincial Government for the Province for which reimbursement is sought has completed all irrigation maintenance workshop remodelling in a manner acceptable to A.I.D. (This condition will be applied on a Provincial basis, i.e., reimbursement for civil work rehabilitation will be made after the first project year for work completed in any province that has fulfilled this condition precedent.)

g. Covenant as to Water Charges

The Cooperating Country shall cause to be carried out by each Province periodic increases in water charges, or other appropriate financial arrangements, to cover an increasing percentage of the cost of operation and maintenance of irrigation facilities located in that Province, in order that the full cost of such operation and maintenance will be recovered by the following dates:

Sind July 1, 1988
Punjab July 1, 1990
North West Frontier Province (NWFP) July 1, 1991
Baluchistan July 1, 1992

h. Covenant as to SCARP Transition Study

The Cooperating Country shall cause to be completed by July 1, 1983, the Salinity Control and Reclamation Projects (SCARP) Transition Study.

i. Covenant as to Operation and Maintenance Funding

The Cooperating Country shall cause each Province participating in this Project annually to increase funds available for operation and maintenance for canal, surface drainage, and flood protection bunds. The levels of funding proposed by each PID for said operation and maintenance shall be reviewed annually by the Provincial Authority and shall be furnished to A.I.D. by March 1 of each year for review and comment.

j. Covenant as to Canal Freeboard

In carrying out the civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Cooperating Country shall maintain, or cause to be maintained, the integrity of the minimum designed freeboard in rehabilitated channels.

k. Covenant as to Federal Project Review Board

The Cooperating Country shall assure that a Federal Project Review Board, to include the Provincial Irrigation Department Secretaries, the Chief Engineering Advisor of the Ministry of Water and Power, and the

General Manager of the WAPDA Planning Division, meets regularly and serves as a review and decision-making body for overall implementation of the Project.

4. Waiver

Based on the justification set forth in Annex F of the Project Paper, I hereby approve a waiver of the requirements of Section 636(i) of the Act and approve a waiver of source, origin and nationality from Code 000 (U.S. only) to Code 935 (Free World) to permit the procurement of twenty (20) small (80-125cc) trailbikes and spare parts.

Signature
M. Peter McPherson
Administrator

May 5, 1983
Date

Clearances:	Date	Initial
AA/ASIA, Charles W. Greenleaf	3/25	CW
AA/PPC, John R. Bolton		
GC (Acting), John E. Muller		

GC/Asia:STisa:hp:2/23/83:ext 28092

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Pakistan

3. PROJECT NUMBER: 391-0467

4. BUREAU/OFFICE: Asia — 04

5. PROJECT TITLE (maximum 60 characters): Irrigation Systems Management

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 04 DD 30 YY 90

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 83 B. Quarter 2 C. Final FY 86

8. COSTS ($000 OR EQUIVALENT $1 = Rs 12.82)

A. FUNDING SOURCE	FIRST FY 83 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	19,963	14,037	34,000	35,000	30,000	65,000
(Grant)	(19,963)	(14,037)	(34,000)	(35,000)	(30,000)	(65,000)
(Loan)	(-)	(-)	(-)	(-)	(-)	(-)
Other U.S. 1.						-
Other U.S. 2.						-
Host Country	-	4,200	4,200	-	27,830	27,830
Other Donor(s) IBRD/IDA	-	11,220	11,220	-	40,000	40,000
TOTAL $	19,963	29,457	49,420	35,000	97,830	132,830

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ESF	184	064	-	-	-	65,000	-	65,000	-
(2)									
(3)									
(4)									
TOTALS				-	-	65,000	-	65,000	-

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 019, 022, 032, 09

11. SECONDARY PURPOSE CODE: 134

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

A. Code	BF	R/AG	EQTY	LAB	TECH	TNG	
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

To increase the capabilities of institutions involved in irrigation system planning, design, research, operation and maintenance, and to bring about policy changes needed for proper irrigation water management.

14. SCHEDULED EVALUATIONS
Interim MM 03 YY 84 — MM 03 YY 86 — Final MM 03 YY 90

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☒ 000 ☐ 941 ☒ Local ☐ Other (Specify)

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

17. APPROVED BY
Signature: Donor M. Lion
Title: Director, USAID/Pakistan
Date Signed: MM 09 DD 19 YY 83

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM 11 DD 17 YY 83

AID 1330-4 (8-79)

IRRIGATION SYSTEMS MANAGEMENT

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LIST OF ABBREVIATIONS AND ACRONYMS

AID	Agency for International Development
ACOP	Alluvial Channel Observation Project
AC&E	Agricultural Commodities and Equipment (Program)
ADP	Annual Development Plan
CWM	Command Water Management
COP	Chief of Party
CPO	Central Procurement Office
ESF	Economic Support Fund
ERR	Economic Rate of Return
FY	Fiscal Year
FAA	Foreign Assistance Act
FAR	Fixed Amount Reimbursement
FCC	Federal Coordinating Cell
* FPRB	Federal Project Review Board
GOP	Government of Pakistan
IMF	International Monetary Fund
IBRD	International Bank for Reconstruction and Development
ISM	Irrigation Systems Management (Project)
ISR	Irrigation Systems Rehabilitation (Project)
IDA	International Development Association
IQC	Indefinite Quantity Contract
IEE	Initial Environmental Examination
LIM	Lower Indus Water Management and Reclamation Research Project, Tando Adam
maf	million acre feet
mt	million tons
MIS	Management Information System

* The GOP is considering renaming this entity.

NWFP	North West Frontier Province
NESPAK	National Engineering Services (Pakistan) Limited
O&M	Operation and Maintenance
PACD	Project Assistance Completion Date
PID	Provincial Irrigation Department
PAAD	Program Assistance Approval Document
PC	Planning Commission (PC-I, PC-II)
PCC	Provincial Coordinating Cell
PSA	Procurement Services Agent
PSC	Personal Services Contract
PDF	Project Design Fund
RAP	Revised Action Program for Irrigated Agriculture
RFP	Request for Proposal
RFTP	Request for Technical Proposal
SCARP	Salinity Control and Reclamation Project
SAR	Staff Appraisal Report
TA	Technical Assistance
USG	United States Government
USAID	United States Agency for International Development
UNDP	United Nations Development Program
WAPDA	Water and Power Development Authority

I. SUMMARY AND RECOMMENDATIONS

A. Recommendations

1. Funding

USAID/Pakistan recommends that an ESF grant of $65 million be authorized, of which $34.0 million is proposed for obligation in FY 1983, for the Irrigation Systems Management Project, which has a Project Assistance Completion Date (PACD) of April 30, 1990. This action constitutes the first phase of a proposed $90 million project. USAID/Pakistan plans to recommend approval of an authorization amendment in FY 1984 to provide an additional $25 million for a Command Water Management (CWM) pilot activity to be financed under this project.

2. Geographic Code

The project authorization should specify that, except as A.I.D. may otherwise agree in writing:

a. Goods and services financed by A.I.D. under this Project shall have their source and origin in countries included in A.I.D. Geographic Code 000 or Pakistan; and,

b. Ocean shipping financed by A.I.D. under this Project shall be only on flag vessels of the United States or Pakistan. A recent SER/COM policy clarification concerning eligibility of co-operating country flag bottoms in projects specifying 000 plus co-operating country source indicates host country bottoms may be authorized if a programmatic reason exists for doing so. A key concern in the negotiation of the Pakistan economic assistance program was the threat to Pakistan's economic stability posed by a deteriorating balance of payments. The use of Pakistani flag bottoms supports the intent of the overall assistance program by augmenting Pakistan's balance of payments receipts. Moreover, a precedent has been established by the use of Pakistani bottoms for projects authorized in FY 1982; excluding them from this project would unnecessarily strain the understanding and cooperation that has been established between our two countries.

3. Waiver

It is recommended that a source/origin waiver from A.I.D. Geographic Code 000 to Code 935 be approved to permit the purchase of twenty (20) small (80-125 cc) trail-bikes and spare parts. A copy of the waiver request is included in Annex F.

B. Summary Project Description

The Irrigation Systems Management (ISM) Project, which will be co-financed by the World Bank (IBRD) through its International Development Association (IDA) affiliate under the Irrigation Systems Rehabilitation (ISR) Project, is designed to assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface irrigation and drainage systems and to improve Pakistan's institutional capacity to operate and maintain the systems. The project will provide funds to rehabilitate approximately thirty (30) percent of Pakistan's surface canals and drains and to improve federal

and provincial capability to plan, design, undertake research, and operate and maintain the country's irrigation systems so that reliable and equitable water supplies are available to the irrigated agriculture sector.

The ISM project is intimately linked to the IBRD's $40 million ISR project. Indeed, implementation of the ISR project is dependent on A.I.D. support. While the IBRD project focuses almost exclusively on rehabilitation works, the A.I.D. project addresses, in addition, water and institutional policies and practices through reform, directed planning and research programs, and action programs to implement policy reforms. The A.I.D. project also takes the first steps toward the long-term goal of integrating water, land, and farmer resources, known as the Command Water Management (CWM) concept.

Both A.I.D. and IBRD financing will be administered in a parallel manner for rehabilitation of civil works in a ratio of about one-third to two-thirds. IBRD will also fully fund the services of a local Supervisory Consultant firm for all rehabilitation activities and partially finance the services of a local evaluation/research organization. A.I.D. will also partially finance the services of the local evaluation/research organization and will fully fund all the expatriate technical assistance, training, earthmoving and workshop equipment and spare parts as well as hydraulic measurement and research equipment. Most of the equipment to be financed by A.I.D. will be provided under the A.I.D.-supported Agricultural Commodities and Equipment Program (391-0468). In addition, both Project Agreements will contain the same covenants which are aimed at ensuring that adequate financing of operation and maintenance (O&M) costs are available to prevent the deterioration of rehabilitated canals and drains.

The IBRD's project has already been negotiated and signed. However, the Bank, in recognition of the close interrelationship between the two projects, has made a "Condition of Effectiveness" of its loan that the A.I.D. Project Agreement be signed and the initial conditions precedent be met. Since the Bank's loan has already been signed and its schedule is several months ahead of A.I.D.'s, it is important to move ahead promptly with the A.I.D. contribution.

The A.I.D. project consists of four distinct but complementary and interrelated components as follows:

1. <u>Rehabilitation Works</u>

(b) strengthen its human and physical resources and management operations to plan and design civil works activities and effectively operate and maintain the entire system.

2. Institutional Improvement: Management and Technical Skill Development

Institutional improvement will take place at both the provincial (PID) and federal levels. In order to increase the productivity of PIDs to operate and maintain the entire system, the following activities will occur: (a) $31 million of new earthmoving and workshop equipment and spare parts will be provided to increase existing machinery stocks; (b) seven PID maintenance workshops will be upgraded; (c) improved control systems will be developed and institutionalized to enable the PIDs to efficiently manage and operate machinery for preventive maintenance of civil works; (d) design capacity will be improved to reduce continuing maintenance demands; (e) substantial management training will be provided for PID personnel; and, (f) a Management Information System will be developed and institutionalized to generate and disseminate information needed for management decision-making. In order to increase the productivity of federal level bodies, namely, the Ministry of Water and Power and the Water and Power Development Authority (WAPDA), to coordinate both water policies and storage supplies, the following activities will occur: (a) the establishment of a Federal Coordinating Cell (FCC) to ensure effective implementation, coordination, and supervision of the project; (b) the establishment of a Central Procurement Office (CPO) to routinely order spare parts and to serve as an expeditious channel for emergency orders; and, (c) the expansion and application of a water management computer modelling system in WAPDA to monitor total water supplies and scheduled distribution.

3. Planning, Policy Implementation, and Research

The objectives of this component are to : (a) strengthen the capacity of the PIDs to engage in the planning process for future projects in the water sector and to continue, with WAPDA, the transformation of policy guidelines into action programs; and, (b) strengthen existing critical research programs in areas of water management both within and outside the Indus System.

4. Command Water Management

This component is intended to integrate the management of irrigation water at all levels within canal commands. The objectives of this pilot effort are to : (a) substantially increase agricultural production in selected pilot areas through improved water management; (b) develop

water management techniques and programs which can be replicated throughout the country; (c) reduce inequities in actual water deliveries at all levels; and, (d) build within the provincial agencies (i.e., Irrigation and Agriculture) and WAPDA a continuing capability for planning, implementing, and operating integrated programs for irrigated agriculture. Funds will be provided under the project to assist the GOP to undertake a CWM feasibility study. On the basis of the outcome of the feasibility study, a Project Paper amendment will be prepared by the Mission to provide $25 million toward the total cost of implementing a CWM pilot program in all four provinces between FY 1984 and FY 1990.

A summary of the A.I.D., IBRD/IDA, and GOP contributions to this co-financed activity is provided below:

	ISM Project a/ (A.I.D. Grant)	ISR Project (IBRD/IDA Loan)	GOP b/	Total
	(In $ 000)			
Technical Assistance	29,004	1,600	-	30,604
Training	11,722	-	1,800	13,522
Commodities	4,329	-	500	4,829
Civil Works	13,700	28,700	17,300	59,700
Other Costs	6,245 c/	9,700 d/	8,230 e/	24,175
	65,000	40,000	27,830	132,830

a/ An additional $38.0 million has been earmarked for this project under the Agricultural Commodities and Equipment Program (391-0468) consisting of $26.0 million in FY 1982, $6.0 million in FY 1983 and $6.0 million in FY 1984 to import earthmoving and workshop equipment and spare parts and hydraulic measurement and research equipment.

b/ At the exchange rate of US $1.00 = Rs 12.82

c/ Includes contingency and operating expenses

d/ Includes contingency and inflation

e/ Includes contingency, workshop remodeling and operating expenses

C. Summary Findings

This project is ready for implementation and is considered socially, financially, and economically sound, and technically and administratively feasible.

D. Project Checklists and Mission Director's Certifications

1. The project meets all applicable statutory criteria. Appropriate checklists are included in Annex B.

2. Two certifications signed by the USAID/Pakistan Mission Director are included in Annex C:

a. a FAA 611(e) certification, which certifies that the GOP has the capability to implement and maintain the project; and,

b. a FAA 612(b) certification to permit the disbursement of dollars in lieu of U.S.-owned rupees to finance local costs.

E. APAC Concerns and Design Guidelines

The concerns and issues raised at the APAC review of the Project Identification Document (PID) for this project and where they are addressed in the Project Paper are as follows:

1. Describe and analyze the co-financing mechanism in terms of financial planning, monitoring, and evaluation

A description of the IBRD's project is included in Section II.E., Other Donor Assistance, and Section III D.1., Rehabilitation Works. Administrative, financial, and evaluation arrangements are described in Section IV., Implementation Plan, specifically under the sections entitled, "Administrative and Monitoring Arrangements," "Fixed Amount Reimbursement (FAR) Procedures and Inspection," and "Evaluation Plan."

2. Describe and anlyze the GOP's capability to adequately operate, maintain, and repair project-financed equipment

A major objective of this project is to increase the operation and maintenance (O&M) capability of the Provincial Irrigation Departments (PIDs), including equipment O&M. Accordingly, the PIDs will renovate and upgrade seven PID Workshops in all four provinces, and project funds will be provided to purchase spare parts for machinery currently on hand, to develop an earthmoving and workshop equipment and spare parts inventory control and maintenance system, and to train a substantial number of personnel including operators and mechanics to both operate and maintain the equipment. (See Section III. D.2)

3. Salinity and waterlogging interventions should not be a part of this project

Under the civil works component of this project, funds will be provided to rehabilitate surface drains in order to provide for the removal of surface runoff resulting from rainfall. Maintenance of surface drains is a major responsibility of the PIDs. Although rehabilitation of these drains will in some cases reduce salinity and waterlogging, this will not be the primary objective of the activity. Under the second phase of this project, however, namely the CWM pilot program, the provision of subsurface drainage to relieve waterlogging and salinity problems within a subproject area may be judged to be of sufficiently high priority to warrant funding. The need for such civil works will be assessed by intensive study and analysis and will be justified in the planned amendment to this Project Paper.

4. Describe and analyze the causes of the system's deterioration and indicate an approach to ensure adequate maintenance of the system in the future

Inadequate financial resources, manpower deficiencies, and institutional weaknesses have all contributed to the deterioration of the systems and are documented in Section II.B. The project will address these problems in two ways: (a) by providing technical assistance, training, and commodities to strengthen the capability of federal and provincial water sector agencies to plan, design, operate and maintain, and undertake research in irrigation systems water management; and (b) by including in both the IBRD's and the A.I.D. Project Agreements covenants which require increased levels of O&M financing by the GOP and the Provinces. (See Sections II.C., III.D.2., III. D.3., and VI.).

5. Examine the need for management training and the use of computer modelling to improve the long-term management of the irrigation system

The ISM project will include a significant amount of management training for both federal and provincial personnel, technical assistance to assist in the development of a management information system (MIS), and funds to procure mini and micro computers for the PIDs as well as funds to support research in computer modelling by WAPDA's Planning Division. (See Sections III.D.2 and III.D.3.).

6. Analyze the GOP's capability and determination to impose water charges at a rate sufficiently high to generate revenue needed for O&M

As discussed in Sections II.C. and VI., the subject of water rates is one of the covenants which was negotiated

between the IBRD and the GOP and PIDs and is included in the IBRD Agreement. This covenant will also be included in the A.I.D. Project Agreement. Water rates have been increasing, and it is the Mission's judgment (See Section I.F.1.) that this trend will be maintained.

7. A.I.D.'s Areas of Emphasis

A.I.D.'s four areas of emphasis are at the very core of this project, namely, institution-building, technology transfer, policy changes, and increased private sector involvement.

A primary objective of the project is to upgrade institutional capacity at both the federal and provincial levels. Training and technical assistance are heavily focused on this objective. In addition, the majority of project activities will contribute directly to technology transfer. Technical assistance and training in engineering will help the PIDs incorporate new design concepts which minimize maintenance problems. Assistance in planning and management will improve existing approaches in these areas. A substantial research component will help adapt new technologies to specific Pakistani problems.

While the implementing agencies at both the federal and provincial levels will be governmental, the private sector will be involved in and benefit significantly from the project. About 40 percent of civil works is expected to be performed by manual labor, which will be contracted out by the PIDs to existing small private contractors. Private contractors will be encouraged to lease earthmoving equipment from the PIDs. Local private consultants and training facilities will be used whenever possible. Local procurement of supplies and equipment will also assist the Pakistani private sector. There will also be ample opportunity for the involvement of the U.S. private sector in the provision of commodities and technical assistance under this project. And, importantly Pakistani farmers, whose livelihood depends on the productivity of their irrigated farmlands, will derive significant benefits from the improvements in water management anticipated under the project.

Finally, as discussed in Section II, the GOP and the provinces have adopted and are already pursuing sound policy directions This project will encourage and reinforce these policy initiatives as well as seek reforms in other policy areas in the irrigation water management sector.

F. Project Issues

1. Are the GOP and the Provincial Irrigation Departments (PIDs) receptive to changes in policies and procedures that will enable them to improve the

management and operation of the irrigation system, including the provision of sufficient financing for O&M?

The proposed levels of technical assistance and training in the ISM project as well as all the covenants and all but one of the conditions precedent which will be incorporated into the Project Agreement have been fully negotiated with and agreed to by both federal and provincial authorities. Officials at all levels of the irrigation system are eager to obtain and apply the latest technology in water resources management to their work. In fact, many of the technical assistance needs were first identified by the recipient organizations themselves. In addition, the covenants have already been negotiated between the IBRD and the GOP and PIDs and reflect policy directions which have either already been identified by the GOP or are being actively pursued by the GOP. Further evidence of the GOP's commitment to the proposed policy and operational changes is the fact that the Federal Coordinating Cell and several of the Provincial Coordinating Cells, which are to be constituted to serve as the key institutions responsible for implementation of the ISM and ISR projects, have already been established and played a major role in the design of this project. Finally, both the IBRD and IMF are placing considerable emphasis on the GOP's performance on these policy issues as a condition of future assistance in the water sector, which will serve as an additional incentive to the GOP.

2. How can the Mission manage and effectively implement this project given its complexity, the number of GOP counterpart agencies involved, the number of technical assistance teams and training programs proposed, the interrelationship of the project components, and the need for close collaboration with the IBRD in terms of administration, financial planning, monitoring, and evaluation?

As discussed in Section IV. under "Administrative and Monitoring Arrangements" and "Evaluation Plan", provision has been made under this project to take into account the project's complexity and the need for close collaboration and coordination among A.I.D., the IBRD, the Federal Ministry of Water and Power, WAPDA, the four PIDs, and the four long-term technical assistance teams. As mentioned previously, a Federal Coordinating Cell, headed by a Federal Project Coordinator, has already been established in the Ministry of Water and Power. The Mission will work closely with the Federal Project Coordinator on a day-to-day basis. Several of the Provincial Coordinating Cells, which are also to be established in all four provinces, are already functioning.

The Supervisory Consultant for all rehabilitation activities has been selected, and the various officials in WAPDA responsible for the planning and research activities under the project have been identified. In addition, a covenant under the A.I.D. Project will require the establishment of a Federal Project Review Board, consisting of the Chief Engineering Advisor of the Ministry of Water and Power, the PID Secretaries, and the General Manager of WAPDA's Planning Division which will meet regularly to provide overall policy and program direction for the ISM and ISR projects.

Each of the four technical assistance teams will have a Chief of Party (COP) who will be responsible for supervising the performance of his team as well as liaising with the COPs of other technical assistance teams. Because of the key role the COPs will be expected to play, the qualifications of the personnel proposed for this position by potential contractors will be a major factor in the evaluation of proposals during the contracting process. In addition, funds will be provided under the project to hire, under a direct A.I.D. Personal Services Contract, a senior and experienced individual to serve as the Project Management Advisor. This individual will ensure that the diverse components of this project are successfully integrated and will provide a direct linkage between the A.I.D. Mission and field operations. He will, inter alia, organize and chair regular coordination meetings of all technical assistance team members, provide reporting instructions and other directions to the COPs of all four teams, and coordinate the implementation of all in-country and overseas training programs.

The Project Management Advisor will report directly to the A.I.D. Project Officer who will be the Assistant Agricultural Development Officer (Irrigation Engineer) in the Office of Agriculture and Rural Development (O/ARD). The Mission Project Officer will be assisted by several Pakistani professionals in O/ARD, as necessary. The addition to the Mission staff of a U.S. direct-hire Training Officer and a Contracts/Supply Officer in January, the planned expansion of the O/E&E Pakistani professional staff to undertake the Mission's responsibilities for the rehabilitation works component as well as the availability of other Mission staff resources are considered adequate to meet the Mission's administrative and monitoring responsibilities under the project.

Coordination and collaboration between A.I.D. and the IBRD, with both its Pakistan resident staff and Bank officials in Washington, have been excellent during the design and development of this project and are expected to continue throughout implementation. In addition to regular informal meetings which have been occurring and will continue to occur

between A.I.D. and IBRD staff in Islamabad, formal bi-annual donor reviews are scheduled to take place during the life of the project.

In the Mission's judgment, adequate provision has been made to ensure the timely and effective implementation of this complex but highly significant and far-reaching water sector project.

3. The Supervisory Consultant firm for the civil works rehabilitation project component will be under a direct contract with the GOP which will be fully financed by the IBRD under the ISR project. How will the Mission ensure that the firm is responsible and objective in carrying out the inspection and supervision work for the A.I.D.-financed civil works activities?

The firm which was chosen by competitive procedures to serve as the Supervisory Consultant under the ISR project is the National Engineering Services (Pakistan) Ltd. (NESPAK) located in Lahore. As discussed in Section IV.B. and E., this quasi-governmental organization has a long history of professional involvement in development work and is adequately staffed to perform the work required under the ISR and ISM projects. The Mission has already had favorable experience with NESPAK in developing specifications for irrigation equipment and in other aspects of the design of this project.

Prior to the implementation of the ISM project, A.I.D., IBRD, GOP, Provincial, and NESPAK representatives will meet to firm up plans for a mutually acceptable program of inspection, supervision, and reimbursement, including a clear definition of the criteria to be applied under the A.I.D. project for both inspection and reimbursement. The Fixed Amount Reimbursement (FAR) method which will be employed has already been discussed with and agreed to by all parties concerned. In addition, engineers in the Mission's Office of Energy and Engineering will monitor the work of the Supervisory Consultant by undertaking spot-checks at key decision points in the inspection/reimbursement process. While the procedures to be employed by the IBRD and A.I.D. will require that NESPAK present the material obtained from the PIDs in slightly different formats, the procedures to be followed will not require any changes in the methodology currently employed by the PIDs nor will they place any undue burden or involve any significant additional effort on the part of NESPAK. Given the highly professional and well established reputation of NESPAK, the recognition by all parties that this is a co-financed activity, and the Mission's plan to undertake spotchecks at critical points during the project, the Mission has determined that the use o

NESPAK for all rehabilitation activities will ensure uniformity in inspection procedures, will streamline administrative and financial arrangements for this co-financed activity, and constitutes an effective means of reimbursing the GOP for rehabilitation activities.

4. Is the Command Water Management (CWM) component a critical element of a program designed to make optimum use of Pakistan's water resources?

The civil works rehabilitation and institutional strengthening components of the ISM project will lay the foundation for the improved delivery of water through the canal system in Pakistan. The challenge which will remain for administrators of the water system, however, will be to manage water deliveries over the 34 million acres of irrigated land in Pakistan with the objective of increasing on-farm productivity of water use. The CWM pilot program which will be financed under this project will enable program administrators, with the active participation of water users, to address the complex set of questions related to water delivery and water use by focusing on the intensive management of small units of 20,000 to 500,000 acres of land in each province.

Efficient and effective operation, maintenance, and management of the irrigation system is a necessary first step in the implementation of a strategy aimed at improving the productivity of the land and water resources in Pakistan. CWM is the logical and essential next step to ensure that all relevant agencies cooperate to match water supplies with crop requirements in order to increase crop production, which is the overall goal of this project. The successful implementation of a pilot CWM program in Pakistan will revolutionize the agriculture sector and establish a capability for planning, implementing, and operating integrated programs for irrigated agriculture whereby water is delivered in response to crop water requirements and in concert with other necessary agricultural support services and non-water inputs.

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II. BACKGROUND

A. USG-GOP Negotiations

1. Background

The United States Government and the Government of Pakistan are embarked on a renewed and strengthened effort to increase their economic and development cooperation. This effort was marked by high level USG-GOP consultations in 1981 which culminated in the negotiation of a $3.2 billion package of military and economic assistance which the U.S. will seek to provide to Pakistan between FY 1982 and FY 1987.

The economic assistance component was designed not only to maximize its development impact but also to produce as favorable balance of payments effects as possible. The balance of payments objective reflects two critical purposes of the agreed upon economic assistance: (a) to ameliorate the burden created by Pakistan's increased defense expenditures; and, (b) to reduce the constraints on development which balance of payments strains generate. In this manner, the economic, developmental, and security interests of both nations are interrelated and supported.

The U.S. Economic Assistance Negotiating Team, headed by the A.I.D. Administrator, visited Pakistan in August 1981 to discuss the details of the economic portion of the military/economic assistance package with the Government of Pakistan. These negotiations were successfully completed, and an agreement was reached on the FY 1982 ESF program and on the areas of concentration for the FY 1982 through FY 1987 period.

2. Strategy

The assistance package is one of the strategic elements of the renewed and expanded USG-GOP relationship. It is one of the instruments required to achieve the mutual goals of the USG and GOP with respect to security and economic development. The assistance package is seen as an indispensable contribution to the shaping and implementation of a new U.S.-Pakistan relationship and to the critical role in the region which the U.S. Government seeks to assist Pakistan to play. The military-security-political position of Pakistan, including the burden of a massive refugee influx, accentuates the development problems to which the proposed U.S. economic assistance package responds.

The economic assistance program is designed to help Pakistan, one of the world's largest and poorest nations, fulfill the basic human needs of its people. At the same time, it is designed to address the country's foreign exchange needs through quick disbursing activities while laying the foundations for more rapid economic growth. The program is shaped

to assure the widest possible distribution of benefits. The program agreed to by the Government of Pakistan and U.S. negotiating teams will:

a. reactivate a long-term development assistance relationship, which the USG views as important because of Pakistan's size, poverty, strategic location, and other multi-facted U.S. interests;

b. provide balance of payments support so as to help address short and medium term foreign exchange shortfalls, thereby reducing development constraints and strengthening the economy;

c. address key economic problems, which will help enable Pakistan to achieve self-sustaining growth and manage its debt burden;

d. complement and support IMF and IBRD assisted programs and accentuate their overall impact; and,

e. expand resource availability for local cost financing.

It was in this context that the Government of Pakistan and A.I.D. reached agreement on the Irrigation Systems Management (ISM) Project. In order to meet the balance of payments support objectives of the USG-GOP program, all of the construction equipment required for canal rehabilitation was included in the A.I.D.-financed Agricultural Commodities and Equipment (AC&E) Program,which is already underway. The irrigation system rehabilitation activities under the ISM project will be co-financed with the IBRD through its International Development Association (IDA)1/ affiliate, in line with the objective noted in (d) above. The A.I.D. strategy outlined above will be implemented through this project by strengthening the ability of Government of Pakistan agencies to efficiently and effectively manage water resources for irrigation, upon which Pakistan's economy so greatly depends.

B. Country Setting

1. The Agricultural Sector

Agriculture is the largest sector in Pakistan, accounting for about 32 percent of GDP, employing some 56 of the labor force, and contributing approximately

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1/ The terms World Bank, IBRD, and IDA will be used interchangeably throughout this paper.

50 percent of export earnings. Irrigation is the single most important factor in agriculture, bringing lands under cultivation which would otherwise, because of insufficient rain, be left uncultivated or, if cultivated, produce less. The importance of irrigation to the Pakistan economy can be seen in Table 1.

TABLE 1

PRODUCTION AND ACREAGE OF MAJOR CROPS BY IRRIGATED AND NON-IRRIGATED LAND, PFY 1979/80 - 1980/81

	AREA (000 Hectares)		PRODUCTION (000 Metric Tons)	
Crops	Irrigated	Non-Irrigated	Irrigated	Non-Irrigated
Wheat				
(1979/80)	5,253	1,659	9,177	1,627
(1980/81)	5,463	1,517	10,099	1,374
Rice				
(1979/80)	2,034	-0-	3,216	-0-
(1980/81)	1,935	-0-	3,120	-0-
Cotton				
(1979/80)	1,977	104	706	22
(1980/81)	2,004	105	724	23
Sugar Cane				
(1979/80)	676	43	26,361	1,137
(1980/81)	776	49	30,979	1,380
Maize				
(1979/80)	400	301	603	272
(1980/81)	432	313	672	275

Source: GOP Ministry of Food, Agriculture and Cooperatives; and Potential for Irrigated Agriculture Development in Pakistan, South Asia Projects, July 1981.

Irrigated lands account for 75 percent of total cropped acreage and 90 percent of the production of the major crops. On the average, yields on irrigated lands are higher than those in rainfed areas. However, crop yields, even in the irrigated areas, are low, measuring less than half of estimated potential yields. Cropping intensity, which under irrigated conditions should range from 130 to 150 percent, averages about 100 percent for the Indus Plain. While factors such as inadequate funding for research, ineffective extension programs, and less than optimum availability of off-farm inputs contribute to this phenomenon, inefficient and ineffective water management is considered to be the principal constraint.

2. The Irrigation System

a. Physical Characteristics

Pakistan has the world's largest contiguous irrigation system with a history spanning 3,000 years. The Indus River and its major tributaries supply an irrigation network comprised of three major reservoirs with 15.3 million acre feet total live storage capacity, 19 barrages/headworks, 12 link canals, and 43 canal commands. The total length of the canal system is about 40,000 miles, feeding a network of watercourses. Nine thousand miles of surface drains, constructed to alleviate waterlogging and to control stormwater runoff, have been built over the years. The Indus system also includes over 13,000 publicly installed tubewells and about 200,000 private tubewells, which annually pump about 34 million acre feet. The contiguous system commands 34.5 million acres. The largest contiguous system in the U.S. is only one-half million acres.

b. Current Problems

The ISM project fits within a broad set of GOP activities harnessing water resources for agriculture. An extensive irrigation system was developed in Pakistan in the last half of the 19th and first half of the 20th centuries. Since 1955, in a series of five year plans, the GOP has undertaken, with the assistance of numerous donors: (i) projects to further regulate the uncontrolled river flows in the Indus Basin, including the construction of the Mangla and Tarbela dams; link canals for intra-basin transfer of waters of major tributaries; and, major barrages (diversion dams); (ii) improvements of canal systems which supply water to irrigated land; (iii) development of groundwater through expanded public and private tubewell programs; and, (iv) a program to address salinity and waterlogging problems through a series of Salinity Control and Reclamation Projects (SCARPs). Despite massive investments by many donors over many years, however, Pakistan's system is not yet designed to maximize agricultural output. The system is characterized by the following problems:

i. Deteriorated Canals and Drains

Canals and drains are in badly deteriorated condition due primarily to the absence of adequate and timely maintenance. Silt deposits have raised the beds of the channels, encroaching on the designed freeboard. Embankments, subjected to continuous stress from water flow, wind and rain erosion, and human and animal abuse, have

deteriorated. These problems are compounded by canals carrying quantities of water much greater than their designed capacity. The end result, canal breaches with locational floods and interruption of downstream service to large farming areas, is a serious threat to the irrigation system, the lifeblood of Pakistan.

ii. Financial Constraints

The ability to carry out maintenance is inhibited,for the most part, by financial constraints. As the system has grown and aged, the burden of operating and maintaining it has produced a severe financial burden on provincial governments. In periods of high inflation, budgetary allocations have remained almost constant, resulting in a decline in real terms. In addition, the cost of maintaining publicly-owned tubewells has made additional demands on these scarce resources. While staffing levels have been maintained, funds for operation and maintenance have not been adequate to keep up with requirements dictated by time and use.

Revenue generated by the system has not kept pace with either rising costs or agricultural income. In addition, the revenue collected by the provinces becomes part of a provincial general fund which is allocated yearly for all provincial recurring budgets. This practice places the Provincial Irrigation Departments (PIDs) in direct competition for funds with education, health, and other provincial bodies. It is estimated,moreover, that even if the current level of water charges were earmarked for direct use by the PIDs, the resulting revenue would fall well below the amounts needed to cover the required cost of an adequate operation and maintenance program.

iii. Waterlogging and Salinity

Irrigation systems often bring with them the dangers of waterlogging and salinity, caused by rising water tables and the deposit of salts following evaporation. Vast areas of the Indus system are threatened by this phenomenon. The problem is particularly serious due to minimal slope conditions in the lower region of the Indus basin where as little as one foot of drop in three miles is found.

In 1960, the GOP embarked on a program to address salinity and waterlogging problems through a series of Salinity Control and Reclamation Projects (SCARPs). By 1980, in six SCARP areas, 12,000 public tubewells had been installed in

fresh groundwater zones and 1,300 in saline zones. An estimated 200,000 smaller private tubewells have come into use in the same areas. These tubewells provide relief to rising water tables, and, in fresh zones, tubewells complement surface water supplies for irrigation. A 1978 survey conducted by the Water and Power Development Authority (WAPDA) showed improvement in soil salinity conditions compared to a similar study undertaken in the early 1960's. The improvement was largely attributed to the leaching effects of increased water supplies. Drainage channels are an integral part of a campaign to combat waterlogging and salinity as well as a means to carry off stormwater. Drains, however, have traditionally had last claim on resources for maintenance, and many are clogged with silt and vegetation.

iv. Deficient Water Policies and Practices

The set of policies governing water and the roles of federal and provincial institutions in formulating and implementing water policy is a product of over eighty years of history. The present canal system has its genesis under the British Colonial Government and was constructed with two primary objectives: to obtain revenue from the sale of waste lands and to alleviate chronic famines by resettling farmers from poor areas. These objectives were best achieved by spreading available water over a large area and providing a relatively "sparse" supply to the areas served. This original allocation policy of "water spreading" has continued through the years. An illustrative per acre comparison between the Indus system and water delivery in the western United States is that the per acre delivery of water in Pakistan is about one-fourth of the amount delivered in U.S. irrigation schemes.

The current situation can be summarized as follows:2/

(a) Despite the addition of storage capacity (most recently Tarbela), the emphasis remains on the engineering aspects of water delivery rather than water delivery to meet agricultural needs;

(b) The institutional responsibility and concern for water use ends at the final canal outlet (mogha), leaving an institutional vacuum in the irrigated area. The Provincial Agricultural Departments are not fully capable of assuming this responsibility;

2/ Revised Action Program for Irrigated Agriculture, Vol. 1, 1979.

(c) Water rights are a product of historical accidents, determined by piecemeal allocations as each canal came on stream. These rights bear little relationship to water requirements; and,

(d) Conjunctive (simultaneous) use of surface water and tubewell pumpage, including publicly-owned tubewells under the SCARP program, is not well planned often resulting in wastage of water.

The combined effect of these policies and practices is that farmers have no control over their water supply. Amounts available at the final canal outlets vary with the season and the overall level of water in the canals. Generally, farmers at head reaches receive ample, even excessive supplies, while those at the tail end receive considerably less. Wherever his position along the canal, the farmer must schedule his production regime to a somewhat uncertain water supply, rather than scheduling water to meet production needs.

One study3/ attributes the very rapid growth of private tubewells to "... the response of those (farmers) who are able to manage... their own resources to cope with the unreliability of the public irrigation supply system. Those who were able to 'control' their water supplies have generally done well in their use of other inputs and so have improved their yields and cropping intensities significantly." Another study attributes substantial returns to farmers to the control or flexibility over water supplies which can be derived from both private tubewells and "active" trading of canal water rotational turns.4/

v. Institutional Gaps

The formulation and implementation of water policy and operational responsibilities are shared by several federal and provincial bodies. The Ministry of Water and Power, the principal federal body in the water sector, is charged with rationalizing overall water and power policy and investment programs. A semi-autonomous body, the Water and Power Development Authority (WAPDA), which falls under the Ministry of Water and Power, is the planning and executing agency for major civil works. It is also the operating agency for the Tarbela and Mangla Dams, the Chasma Barrage, and the Chasma-Jhelum link canal. Specialized technical units within WAPDA are dedicated to: overall planning and systemsanalysis; hydrologic studies; surveys and research

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3/ Ibid.,Page XI-5.

4/ Renfro, R.Z.H. "Economics of Local Control of Irrigation Water in Pakistan: A Pilot Study", Ph.D. Dissertation, Colorado State University, Fort Collins, 1982.

on water and agriculture: flood prediction; and, design and construction of major works.

Provincial governments have a role in formulating national water policy through consultations with the Ministry of Water and Power. Water charges are levied, collected, and become part of general revenues under provincial agencies. The Provincial Irrigation Departments (PIDs) are charged with operation and maintenance of the irrigation system within each province. Provincial Agricultural Departments provide extension services to water users as well as manage a special program for watercourse rehabilitation and maintenance.

As discussed in Section III, all of these institutions could benefit from technical assistance, training, and commodities to enhance their planning, management, operating and maintenance, and research capabilities.

C. Policy Options and Dialogue Opportunities

The policy framework for the water sector is undergoing significant changes. As a result of a major study in 1979 by WAPDA which was financed by the United Nations Development Program (UNDP), with the IBRD as executing agent, the Government of Pakistan has defined a master plan and overall framework for interventions in the agricultural sector. The study entitled the "Revised Action Programme for Irrigated Agriculture" (RAP), has been accepted in principle by the Government of Pakistan, and implementation of several identified policies is proceeding. The proposed program, supported by both the World Bank and A.I.D. is a major step in implementing recommended policy changes related directly to the water sector.

The water policies outlined in the RAP flow from the basic policy stance that: all agricultural-related investments and policies should be directed to the improvement of agricultural production and should not be focused on the independent development of inputs for agricultural production; and that the costs of development should be borne by the beneficiaries with the Government facilitating the financing of the investments. This policy calls for, inter alia, the implementation of specific actions as follows:

1. Whenever feasible, all costs of profitable technologies (tubewells and fertilizers) should be transferred to the private sector;

2. The operation and maintenance costs of public sector provided facilities (irrigation and drainage infrastructure) should be fully recovered from the direct beneficiaries of these services; and,

3. All future development of useable ground water should be done by the private sector, facilitated by public assistance programs.

The RAP generally serves as the basis for the development of new interventions by donors. This major study developed and recommended a program to:

"... provide a sound basis for long term planning and implementation of the Government's investment programme in the fields of irrigation, drainage, saline soil reclamation, and flood protection ... (and) prepare a basis for the planning, preparation and implementation of irrigation, surface storage and related hydro-electric generation, drainage, reclamation and flood protection schemes during the next fifteen years."5/

The study highlights the need for immediate rehabilitation of canals and drains, management improvement, and a shift from "water disposal" to "water management." While new capital additions to the system are generally considered necessary, such as increased storage and new drains to reduce or eliminate the constant threat of waterlogging and salinity, the thrust of the new policy guidelines is directed towards improved management of the system with an increased role for the private sector. As pointed out above, water users will have to pay a higher price for the water. This is only feasible and just, however, if more control over water supplies is given to the farmers.

The proposed project is designed in the short run to strengthen the physical and financial integrity of the irrigation system. Rehabilitation works in the first phase are coupled with financial reforms to insure that adequate funds will be available for future operation and maintenance. These changes have already been negotiated between the IBRD, GOP, and Provincial Governments6/ and are reflected as covenants in the IBRD Project Agreements. (See Annex P). These covenants, which will also be included in the A.I.D./GOP Project Agreement, are among those which are discussed below:

5/ Revised Action Programme for Irrigated Agriculture, Vol.1, 1979.

6/ A.I.D. representatives participated in these negotiations in Washington in March 1982.

1. Water Charges

This covenant requires the Provinces to periodically increase water charges or make other appropriate financial arrangements to cover an increasing percentage of the cost of O&M so that by specified dates for each Province, the total cost of O&M will be recovered. The dates are related to existing commitments in other IBRD/GOP Project Agreements. Setting of water charges is a provincial responsibility as is establishing and collecting water charges. It is generally accepted that in most areas, water rates are set far below the economic value of the water and do not produce sufficient revenue to maintain the canal system. Recent increases in water rates will be continued until the total expenses for O&M are met.

2. SCARP Transition Study

This covenant requires the Government of Pakistan to complete by July 1, 1983, the SCARP Transition Study which is already underway with IBRD financing. The Salinity Control and Reclamation Projects (SCARPs) include publicly owned and operated tubewells to provide subsurface drainage. Some 13,000 large tubewells, each designed to pump from 2 to 5 cusecs of water, have been installed since the beginning of the program in 1960. Many of these tubewells are in areas where quality is adequate for direct application to fields, and private tubewells could replace them. At present, double water rates are levied to water users for this additional water, but poor management has contributed to high operational costs. Since these costs are funded from general O&M funds for the canal system, this situation has contributed significantly to the shortage of funds for routine maintenance of canals. The study will outline a strategy for divestiture of tubewells where water quality is sufficiently high. Eventual divestiture of at least those tubewells in good quality groundwater areas would release substantial funds for use in O&M for canals.

3. O&M Financing

This covenant requires the Government of Pakistan and the Provinces to make every reasonable effort to secure the required level of funding in real terms to meet annual O&M requirements. A separate understanding among the IBRD, the GOP, and Provincial officials specifies the amounts by Province which are considered to be reasonable estimates of recurrent cost requirements by PFY 1984/85. The GOP has also indicated that funds made available for O&M will exceed the expected rate of annual cost increases. Increasing water

charges and reducing expenditures for publicly owned and operated tubewells will result in higher revenues for provincial governments. To insure that these funds are used to prevent continued deterioration of canals and drains, target O&M budgets have been agreed upon for the period PFY 1983/1984. At that time, a review by the GOP, the IBRD, and A.I.D. will determine if the rate of increase is sufficient to meet the targets for covering all O&M requirements by the following dates:

Sind July 1, 1988
Punjab July 1, 1990
NWFP July 1, 1991
Baluchistan July 1, 1992

4. Maintenance of Canal Freeboard

This covenant requires the PIDs to maintain minimum designed freeboard (the distance between the water level and the top of the channel bank) on rehabilitated canals. The allocation of the Indus Basin water among the provinces is based on an ad hoc distribution. Provincial water rights are often a barrier to rational management of the Indus Basin water and have been a subject of serious discord among the provinces. The distribution of the water of the Indus River System is at present under study by a commission headed by the Chief Justice of the Supreme Court. Until this Commission provides its recommendations and a rational plan of allocation is defined, it is important that the rehabilitation activities not be utilized as a means to acquire additional rights to water. It is also important that rehabilitated canals carry only the designed load to avoid breaches due to stress.

5. Federal Project Review Board

A Review Board made up of officials in the water sector with line jurisdiction will meet regularly throughout the life of the project to provide program and policy guidance and to ensure that all project implementation issues are addressed effectively and in a timely manner. The Board will consist of the Chief Engineering Advisor of the Ministry of Water and Power, the PID Secretaries, and the General Manager of the WAPDA Planning Division. With the exception of the WAPDA member, this Board has already been established and participated in the planning and design of the ISM project. This covenant will provide for the Board's continuation in an expanded capacity during project implementation.

In addition to the specific policy changes noted above in covenants 1-3, the ISM project will result in several other significant changes in Pakistan's irrigation management

program. A major objective of the proposed project is to increase the productivity of the staff and equipment of the public sector bodies charged with operating and maintaining the irrigation system. Inadequate financial resources for canal O&M has been mirrored by inadequate attention to maintaining the excellence of the professional staff and failure to adjust the machinery inventory to keep abreast of current techniques for canal maintenance. Through the use of selected technical consultants for in-service training programs, support for professional training, and introduction of small computers for management, the productivity of O&M resources will be increased.

Another major objective of the proposed project is to change the basic operational premise from one of merely dividing and subdividing the waters of the Indus system in accordance with current allocations to one of delivering water with the objective of maximizing production of irrigated agriculture. This requires substantial institutional and managerial modifications throughout the irrigation system and a larger role for farmers. Achievement of this objective is embodied in the implementation of the Command Water Management (CWM) component of this project.

D. Lessons Learned

As shown in Table 2, A.I.D. has been financing water programs in Pakistan since the early 1950's. Total dollar disbursements as of 1981 stood at about $1 billion. About 95 percent of the assistance has been in support of the Indus Basin Development Program. This program was developed to implement the Indus Basin Treaty, which was intended to resolve the dispute between India and Pakistan, following partition, over the diversion within India of the headwaters of rivers feeding the Indus plain. The program included high cost capital improvements such as the Tarbela Dam and the link canals which transport water between rivers within the Punjab. With the exception of approximately $11 million of U.S. contribution to the Indus Basin Replacement and Development Fund, which was managed by the World Bank, these programs were completed by the mid-1970's.

In 1973, a new research program was initiated by WAPDA with the assistance of Colorado State University to examine water use problems. That research led to the A.I.D.-financed On-Farm Water Management (OFWM) Project, a watercourse rehabilitation program that has proved to be successful. Both the research program and the project were limited in application to the farm-level water delivery system that begins at the final outlet from the public canal system. There was very little interchange with the Provincial Irrigation Departments which are responsible for the public canal system, and water supplies were taken as a fixed parameter.

TABLE 2

SUMMARY OF U.S. ASSISTANCE TO PAKISTAN FOR WATER RESOURCES DEVELOPMENT ACTIVITIES(1953-1981)

Activity/Project	Obligation Date	Disbursements (In $ thousands)		
		Grant	Loan	Total
1. Bolan Dam	1953	75	-	75
2. Groundwater Exploration	1953	188	-	188
3. Soil and Water Conservation	1954	561	-	561
4. Groundwater Survey	1954	4,608	-	4,608
5. Taunsa Barrage	1954	5,894	-	5,894
6. Water Resources Development	1955	134	-	134
7. Punjab Ground-water Reclamation	1959	-	14,963	14,963
8. Indus Basin Replacement and Development	1960	295,600	649,100	944,700
9. Salinity Control and Reclamation (SCARP)	1963	-	21,122	21,122
10. Land and Water Use	1967	213	-	213
11. Hydro Monitoring and Research	1967	433	-	433
12. On-Farm Water Management	1977	2,145	4,635	6,780
TOTAL		309,851	689,820	999,671

While considered successful within the parameters of the project design, it became obvious during implementation that the problems encountered at the farm level could not be treated in isolation from the canal system which delivered water. Untimely deliveries and water shortages, for example, could not be fully addressed at the farm level.

This long involvement by A.I.D. in water management programs in Pakistan and the continuing research carried out by Colorado State University have highlighted several important lessons which have been incorporated into the design of this project. Most significant are the following:

1. Need for Holistic Assessment

In the context of the Indus Basin Irrigation System, resolution of water problems can only be found through a holistic approach. While important benefits can be achieved through individual projects, especially in terms of water savings through watercourse rehabilitation and improved on-farm practices, in the final analysis, control over the timing and quantity of water supplies is critical for optimum use. Thus, in addressing questions of improvement in irrigation, the entire irrigation system must be the subject of examination.

2. Need for Appropriate Policy and Institutional Environment

The policy and institutional framework within which the irrigation system and water users must operate is clearly a major determinant of performance. As mentioned previously, inappropriate policies, outdated institutional operating procedures, and inadequate budgetary allocations are responsible for the deteriorated state of the system and the poor utilization of the water. Defining an appropriate set of policies and institutional guidelines must accompany any interventions in the water sector, and implementation of these policies and guidelines must follow as soon as practically and politically feasible.

3. Importance of Farmer Participation

Pakistani farmers have demonstrated a willingness to respond to projects where benefits, from their perspective, are real. The A.I.D.-financed OFWM Project clearly provided such benefits as the demand for project services was high and farmers contributed about fifty percent of the costs. Tubewells installed by producers is another manifestation of private response. In spite of inadequate and unreliable

power supplies and import restrictions on small diesel engines, an estimated 200,000 private tubewells have been installed. This project will seek ways to structure the public sector institutional framework to capitalize on the independent decision-making force of the farmers and maximize their participation in the management of water resources.

4. Need for Improved Management

Capital improvements over the past 20 years and increased sophistication of farming technology have placed heavy stress on the management structure of the irrigation system. Operating in some cases with procedures developed during the colonial period, managers are not able to respond to the demands of farmers. Research programs and the OFWM Project have demonstrated that water supplies can be increased through water savings. Delivery of water at the right place at the right time, through improved management, can substitute for expensive capital improvements to increase the total volume of water. Needed management improvements range from the global--changing the basic premise of the system from one of water disposal to water delivery--to the specific--increasing the productivity of both the labor and machinery required for the operation and maintenance of the system.

5. The Fixed Amount Reimbursement (FAR) Mechanism: The Importance of Inspection and Reimbursement Criteria

A.I.D. has had extensive experience with the FAR system under the OFWM Project. The advantages of this system are numerous. During implementation of the OFWM project, however, it became apparent that considerable time and effort has to be given to defining and reaching agreement with the host government on specific criteria for not only estimating the amount of reimbursement but also the criteria for inspection and approval for payment.

E. Other Donor Assistance

Many donors, including Australia, France, Germany, Italy, the U.K., and the IBRD provided assistance to the massive Indus Basin Works during the 1960's and early 1970's. The U.S. also contributed to this effort, including development and repair of the Tarbela Dam. The IBRD has been by far the major donor over the years.

Over a dozen donors are currently providing complementary assistance to Pakistan in ground and surface water development and improved on-farm water management. (See Table 3.) Pledges for these ongoing activities total $1.154 million, of which around $700 million has already been disbursed. All of

TABLE 3

SUMMARY OF OTHER DONOR ASSISTANCE ACTIVITIES IN IRRIGATION WATER DEVELOPMENT

Activity	Executing Agency	Donor	(In US $ 000) Allocation	Undisbursed Balance (9/30/81)
On-going				
SCARP Mardan	WAPDA	Canada	30,000	29,700
SCARP VI	WAPDA	KFW	8,414	8,414
Rigs, Dredges and Other Equipment	PID Sind	Netherlands	227	3
SCARP VI	WAPDA	U.K.	16,977	16,766
On-Farm Water Management	NF&A	IDA	41,000	41,000
Drainage and Irrigation Farming	WAPDA	IDA	14,000	7,204
Salinity Control and Reclamation	WAPDA	IDA	70,000	69,060
Salinity Control and Reclamation	WAPDA	IDA	60,000	59,000
On-Farm Water Management	NF&A	ADB	25,000	25,000
Tarbela Dam Repair	WAPDA	Saudia Arabia	58,692	47,507
Chashma Right Bank Irrigation	WAPDA	EEC	4,677	3,042
Chashma Right Bank Irrigation	WAPDA	EEC	25,360	25,240
Chashma Right Bank Irrigation	WAPDA	ADB a/	31,500	30,684
South Rohri Fresh Groundwater	WAPDA	ADB	47,000	47,000
South Rohri Fresh Groundwater	WAPDA	Saudi Arabia	14,339	14,339
Baluchistan Minor Irrigation and Agriculture Development	PID Baluchistan	IDA, KFW, Netherlands	32,700	NA
Tarbela Dam Development Fund	WAPDA	Australia, Canada, France, Germany, Italy, U.K., U.S.A., IBRD, IDA, EEC	674,727 b/	6,084
Total			1,154,613	NA
New				
Irrigation Systems Rehabilitation	PID	IDA	40,000	
SCARP Transition and Command Water Management	WAPDA	UNDP	1,400	
Total			41,400	

a/ Loan suspended on GOP request and has not yet been re-activated.

b/ Total pledges including "Indus Balance" transferred from the Indus Basin Development Fund to the Tarbela Development Fund.

Exchange Rates Used: U.S. $1 = 2.37704 DM
= 5.65620 FF
= 2.64664 DFL
= 0.50665 £
= 3.49300 SR

these projects focus primarily and in some cases exclusively on civil works activities. None of the projects address the policy, institutional, planning, management, O&M, and technical requirements of the agencies involved in implementing these projects. The proposed ISM project, with its heavy emphasis on institutional development, technology transfer, policy reform, and manpower development, will therefore fill a very important gap which currently exists in donor assistance to the water sector and will also thereby serve to enhance the impact of these other donor-assisted activities.

The A.I.D.-financed ISM project is most closely related to the IBRD's $40 million Irrigation Systems Rehabilitation (ISR) Project, which is described in Annex L, and the UNDP's $ 1.4 million SCARP Transition and Command Water Management Projects, which focus on planning and research activities for water resources management. The UNDP project provides operating expenses and limited funds for expatriate advisors to undertake feasibility studies for these programs. A.I.D. is also providing limited technical assistance to the CWM feasibility study effort, with funds under the Project Design Fund (391-0470), and as discussed in Section III, is planning to contribute a significant amount of funding under the ISM Project for implementation of a pilot CWM Program, based on the outcome of the feasibility study.

The ISM project is intimately linked to the IBRD's ISR project. Indeed, implementation of the ISR project is dependent on A.I.D. support. While the IBRD project focuses on basic rehabilitation works, the A.I.D. project goes beyond this and addresses other water and institutional policies and practices through reform, directed planning and research programs, and action programs to implement policy reforms. Together, they will provide funds to rehabilitate canals and drains, to improve systems of management and operations, and to strengthen the planning and research capability of federal and provincial institutions responsible for water sector activities. Both A.I.D. and IBRD financing will be used for rehabilitation of civil works. IBRD will also fully fund the services of the local Supervisory Consultant firm for all rehabilitation activities and partially finance the services of a local evaluation/research organization. A.I.D. will also partially finance the services of the local evaluation/research organization and will fully finance all the expatriate technical assistance, training, and equipment for the program, the latter to be provided under the A.I.D.-financed AC&E project. The two co-financed activities will provide resources for only about one third of the canal and drains in need of rehabilitation. However, the institutional

improvements, the additions to heavy machinery pools, and the increased flow of funds for O&M, which will result from the ISM project, should reduce the requirements for outside assistance for rehabilitation. Nevertheless, the Bank has stated its willingness to provide additional funds once the ISR/ISM projects have been successfully implemented.

The IBRD's project has already been negotiated and signed. However, the Bank, in recognition of the interrelationship between the ISR and ISM projects, has made a "Condition of Effectiveness" of its loan that the A.I.D. Project Agreement be signed and the initial conditions precedent be met. Since the Bank's loan has already been signed and its schedule is several months ahead of A.I.D.'s, it is important to move ahead promptly with the A.I.D. contribution.

F. Relationship to A.I.D. Strategy and Other A.I.D. Projects

The overall A.I.D. strategy in Pakistan relies on a blend of resources to reactivate a long-term relationship in development cooperation. Projects are intended to meet basic human needs, contribute to long-term development, build a foundation for more rapid economic growth, and relieve balance of payments difficulties. There is a major focus on building institutional capacity in both the public and the private sectors to enable Pakistan to better plan, manage, implement, and bear the recurring costs of development activities.

The overall goal of activities in the agriculture sector is to increase productivity and farmer income. Over the coming years, A.I.D. will be supporting the GOP in several programs to achieve this goal. It will be met through this project by improvement in the management of irrigation water resources throughout Pakistan. In addition, the disbursement of funds resulting from reimbursement to the GOP for irrigation canal improvements and rehabilitation will contribute to the balance of payments objective of the economic assistance program. This project is also consistent with the 1982 Asia Bureau Strategy Plan which places high priority on "irrigation particularly water management, training, and 'software' (social and economic considerations)," as one of the major long-term core programs of its strategy in agriculture and rural development.

The ISM Project is most closely related to the AC&E and the OFWM projects in the USAID/Pakistan portfolio. As mentioned

previously, funds under the AC&E project will be used to finance all of the the earthmoving equipment and spare parts required by the PIDs for rehabilitation activities, as well as workshop, hydraulic measurement, and research equipment. The OFWM project, which is being augmented by resources from the IBRD and the Asian Development Bank, focuses on how water is applied on the farm once it is delivered by the main irrigation works. Both the ISM and OFWM projects offer an opportunity to establish a more productive interaction between the overall irrigation system, the proper application of water for improved yields, increased intensity of cropping, and application of other inputs.

More efficient use of water resources will also contribute to the objectives of other A.I.D.-financed agricultural activities such as those under the on-going Agricultural Research Project and the proposed Agricultural Education, Research, and Extension Project. Inasmuch as water shortage is a major constraint to expanding oilseeds production in Pakistan, the project will also support the proposed Agricultural Production, Distribution and Storage Project which will have a major focus on oilseeds.

G. Project Rationale

1. General

Pakistan is more richly endowed with land resources than water resources. Improved water availability and management are indispensable to productive agriculture and, therefore, to satisfactory national economic growth and development. Only a very small percentage of water that enters the Indus River and its tributaries escapes to the sea, yet vast areas of fertile irrigable land lie either unirrigated or receive far less irrigation water than is required to maximize crop production because the water which is available is not efficiently exploited.

This situation, coupled with the need to increase agricultural production, points to the importance of making optimum use of available water resources for irrigation. This must be accomplished by integrated management of all parts of the system, including watershed, surface and groundwater storage, delivery, and on-farm use.

2. Management of the Indus Irrigation System

Despite efforts made in the past, there is considerable room for improvement in the management of irrigation water in Pakistan's canal network. The same procedures adopted in the early days of the

system are still followed. Efforts prior to Pakistan's independence in 1947 were directed mainly toward the expansion and improvement of the physical irrigation works. Since 1947, primary attention has been given to completion of the Indus Basin Project, under which required civil works were provided to compensate for the loss of river flows from India and to reduce waterlogging problems caused by the rising water table. During this period, improved seed accompanying the Green Revolution led to higher yields and diverted attention from the need to improve management of water. It is important to note that the inherent potential of these higher fertilizer responsive seeds has not been realized due to lack of adequate control of the water supply.

The water delivered by the canal system is not utilized productively. Yields per acre, one measure of the productivity of water in the system, are low. For many crops, average yields are less than those achieved by other countries under rainfed conditions. The policy framework has not provided consistent support and incentives for economic uses of water delivered. For example, even though the GOP has initiated a policy of eliminating the fertilizer subsidy and has increased product prices, water rates are very low. Frequently, the amount of water available to farmers is below optimum and timing of water delivery does not match crop needs.

Today it is recognized that improving the management of water for irrigation can no longer be ignored. While additional construction opportunities exist and may be required, it is agreed that a major effort is now needed to manage water so that it can be delivered to the farmer's field in a way to achieve optimum yields.

3. Rehabilitation Activities

Due primarily to a lack of O&M funds, irrigation canals and surface drains have badly deteriorated. Canal banks have eroded and silt has been deposited in their beds, creating unsafe conditions. Frequent breaches result in both flood damage and adverse effects on crops that are deprived of water while repairs are made. The capacity to carry flows to the tail reaches of many canals no longer exists. Surface drains have become clogged with silt and debris, causing losses in crop production due to inadequate drainage of water from fields.

The need for the PIDs to develop the capability to maintain their facilities and to eliminate the hazard of canal breaches justifies A.I.D.'s participation in rehabilitation

work. The economic returns on investments which increase the reliability and equity of water distribution are very high, as expectations regarding adequate and timely water delivery strongly influence farming practices. This activity will also provide an opportunity for A.I.D. to develop a relationship with all GOP agencies concerned with irrigation that will be helpful in improving the overall management of the irrigation system.

4. Water Management Outside the Indus System

Areas outside of the Indus System must not be neglected if Pakistan's water resources are to be thoroughly and equitably utilized. Much of the western provinces lies outside the Indus System. The capability to make optimum use of water resources for agricultural production in all areas must be addressed. Thus, assistance under the project is proposed for relatively small, isolated irrigation schemes, as well as research in such areas as sailaba farming, the use of flood waters for irrigation.

The western provinces are generally characterized by water scarcity for agriculture. Large tracts of Pakistan in all provinces lie outside canal irrigated areas, necessitating other irrigation techniques and technologies. Research and development of these "other" irrigation practices have largely been ignored by local and international development institutions and agencies. One priority includes research into watershed protection to minimize the threat of periodic floods to both sailaba agricultural lands and any downstream canal systems.

In summary, the ISM project responds to the GOP's request for assistance, contributes significantly to the GOP's and A.I.D.'s development priorities, supports the two governments' balance of payments objectives, implements a variety of A.I.D.'s areas of emphasis, deals directly with the major constraints in irrigation system management, and coherently relates to A.I.D.'s total portfolio as well as to other donor activities in this sector.

III. DETAILED PROJECT DESCRIPTION

A. Introduction

Pakistan's irrigation system suffers from neglect of both infrastructure maintenance and the institutional framework which shapes public and private sector behavior and performance. The causes of this situation are multiple, but inadequate budgetary allocations, outmoded policies and procedures, and insufficient training for professional staff are the primary constraints.

Pakistan is well endowed with engineering talent and has coped very well with the expansion of the Indus system. Basic training and practical experience are already embodied in the system. The technology applied, however, is not fully current, and management skills are acquired on the job with little in-service training for engineers who are promoted to management positions. The division of institutional responsibilities between agriculture and irrigation and the lack of exposure to a "management by objectives" approach have produced a generally accepted perception among the professional staff that financial and technological constraints are the foremost concern, with little recognition of the need for explicit treatment of human factors. These human factors include not only the appropriate formal and informal management and organizational tools to move the water, but also recognition of the paramount role of farmers in achieving the agricultural potential of the water delivered.

The proposed project focuses on the role of the four Provincial Irrigation Departments (PIDs). The PIDs are the front line participants in the continuing task of managing the Indus System waters. Past interventions in the water sector have tended to bypass these agencies, focusing instead on WAPDA in the construction of major civil works which, in some cases, were then turned over to provincial authorities for management and operation. The PIDs have been constrained in their operations by shrinking budgets in real terms and few opportunities for professional recognition or upgrading of technical skills. They have accepted the additional burden placed on them and, for the most part, have managed their business very well.

The activities described below will support improvements in the institutional setting, enhance the human skills required to adequately manage the system, and provide capital to carry out critically needed rehabilitation works. The Command Water Management (CWM) component will begin the process of changing the basic operating premise of the Indus System by adopting management guidelines which emphasize delivery of water for optimum production. The first stage,

supported by this project, will provide answers to many of the basic unknowns of a demand-oriented system. Operational research is also supported to broaden the state of the art in water management, in some cases outside of the Indus System. Water is the limiting factor in agricultural production and much of the arable land cannot be serviced by traditional irrigation schemes.

B. Project Goal and Purpose

The project goal is to increase agricultural production and farmer income by improving the management of irrigation water resources. Progress toward goal achievement will be assessed by measuring the extent to which increases have occurred in project areas in overall crop production, yields and farm income. Progress will be verified by GOP agricultural production data. The major assumption for goal achievement is that GOP policies will continue to encourage canal and drain rehabilitation and maintenance, agricultural production, and increased farmer income.

The project purpose is to increase the capabilities of institutions involved in irrigation planning, design, research, operation and maintenance, and to bring about policy changes needed for proper irrigation water management. End of project status indicators include the following:

1. PID capabilities improved by trained staff and additional equipment;

2. in-service training programs institutionalized by PIDs where needed;

3. priority canal systems rehabilitated such that future operation and maintenance problems will be minimized;

4. improved planning, design, and water management capabilities in government organizations;

5. improved research capability at the following institutions:

a. Punjab Irrigation Research Institute;

b. Hydrology and Systems Analysis Organization, WAPDA;

c. Central Monitoring Organization, WAPDA;

d. Mona Reclamation Experimental Project, Punjab;

e. Lower Indus Water Management and Reclamation Research Project, Sind; and,

f. Sind Hydraulic Research Station.

6. water charges are increased and rationalized such that water charges are more in line with water use;

7. adequate funding is available for O&M through increased water rates, reduced expenditures for publicly owned tubewells, and/or other financial arrangements; and,

8. canal freeboard is maintained on rehabilitated canals.

Major assumptions for achieving the purpose of this project are that : (1) adequate personnel and budgetary support will be provided by the GOP; (2) GOP and provincial agencies will adopt and utilize new technologies and systems for improved irrigation water management; (3) WAPDA and PID personnel involved in research activities at all organizational levels will be receptive and responsive to the policy and operational reforms required to undertake research and eventually to improve the overall irrigation system; and, (4) farmers will respond favorably to the opportunities offered them by the improved management of water.

Experience during the design of this project indicates that these assumptions are valid and realistic. An example of this experience is the progress already made for the rehabilitation component. The Federal Coordinating Cell and several of the Provincial Coordinating Cells have already been established. Coordination meetings have been held on a regular basis and action taken as required to arrange for the procurement of equipment, to prepare plans of work, to prepare specifications for civil works and equipment, and to make other arrangements for the successful implementation of the project. Financial arrangements for this component are also already in place. In addition, the PIDs have expressed a desire to rapidly improve their design capability and to incorporate the latest technology into rehabilitation design. As indicated in Section II., a favorable farmer response is also anticipated.

C. Project Outputs

The project is expected to produce the following outputs which together should achieve the project purpose:

1. reliable, safe, and stable water delivery by about 14,000 km of rehabilitated canals;

2. prompt disposal of surface water by about 3,500 km of rehabilitated drains;

3. increased farm employment by about 62,000 jobs;

4. increased irrigation system construction employment throughout the project life by about 29,000 jobs;

5. improved rehabilitation design criteria based upon the collection of hydraulic data to minimize maintenance requirements;

6. improved operation and maintenance procedures;

7. seven Provincial Irrigation Workshops upgraded in the four provinces;

8. 162 WAPDA, university, and PID personnel will have completed long-term training in the U.S., including 90 non-degree, 13 Ph.D. and 59 M.S. degree candidates; 228 persons will have completed short-term training courses in the U.S., and 1,505 will have completed short-term in-country training courses, or a total of 1,895 personnel will have been trained;

9. a new procurement and inventory management system for earthmoving and workshop equipment and spare parts developed and institutionalized in the PIDs;

10. at least six priority research studies in water management completed; and,

11. a CWM feasibility study completed for the implementation of a CWM pilot program consisting of one subproject in each of the four provinces.

Additional information on the relationships between the goal, purpose, inputs and outputs of this project is provided in the Logical Framework in Annex E.

D. Project Components

1. Rehabilitation Works

a. Nature of Activities

Under this project component, funds will be provided to carry out canal and drain rehabilitation. The rehabilitation works activity will be co-financed by the IBRD. The IBRD will also finance local technical assistance and evaluation in support of this activity. (See Annex L.) Funds will also be provided under the A.I.D.-financed Agricultural Commodities and Equipment (ACAE) Program to procure the equipment and commodities required for the civil works activities. The IBRD views the civil works component of the project as an initial "time slice" that will serve as a model for future replication to rehabilitate the entire system. In support of this approach, A.I.D. will provide technical assistance and training to the institutions involved in the civil works program in order to strengthen their capacity to plan, design, and execute future "time slices" as well as to efficiently operate and maintain the system.

The following extracts from the IBRD Staff Appraisal Report (SAR) dated April 19, 1982, for the Irrigation Systems Rehabilitation (ISR) Project, is the agreed description of this project activity:

"System Rehabilitation. The need for system rehabilitation is urgent and required on most reaches of canals and surface drains. The project would provide earthwork, stone pitching, and repair of hydraulic structures for about 14,000 km of canals, as well as cleaning and resectioning about 3,500 km of surface drains."

"In the case of the Indus system, canal rehabilitation would be limited to present operating or design capacities, whichever is greater. The major quantity of such earthwork would relate to (a) raising the height of the canal bank to obtain required operating freeboard; and (b) widening the canal bank to improve safety of operation. Also, hydraulic structures would be repaired, however in the Indus system these repairs would be in line with existing capacities. . . . . "

". . . . Small compacting equipment provided by the project would be made available on a rental basis by PIDs to private contractors employing labor intensive techniques. Generally, labor intensive methods would be employed on waterlogged and congested areas, schemes with short leads, and minors and smaller distributaries and this work would

amount to about 60% of the earthwork. When substantial quantities of earthwork with long leads, or underwater excavation are involved, the work would be carried out by heavy earthmoving equipment. It is estimated that about 30% of the earthwork relating to canal rehabilitation, and nearly all of the surface drainage rehabilitation, or in total about 40% of all civil works, would be done by equipment."

"Accumulated sediment, particularly in distributaries and minors has reduced the conveyance capacities of the channels. This has resulted in inequitable water deliveries, where upper reach watercourses receive more water and lower reach watercourses receive less water than planned deliveries. Even though equitable water deliveries is a prime objective in operating the Indus Irrigation System, the PIDs have had difficulty in remedying this situation because: (a) labor intensive methods can be employed only during the 15 day closure of perennial canals for the annual January inspection; and (b) specialized equipment has not been available that could remove the sediment while the canals are operating. In some areas of Sind, farmers are donating their labor to regularly clean their minors. This is a logical and inexpensive arrangement to mobilize considerable manpower and would be encouraged in this project. Where required to achieve better equity in deliveries, PIDs, in designing canal rehabilitation work, would also consider changes in mogha design, as well as 'bushing and staking' to improve channel cross section characteristics."

"Rehabilitation of the drainage systems primarily involves earthwork. Most of the drains are badly clogged and require clearing and cleaning. Virtually all of this work must be done by draglines. Small and medium capacity draglines would be provided by the project to supplement the existing equipment fleet for doing this work."

". . . . In planning and carrying out the rehabilitation program, PIDs would exercise care to assure the rehabilitation of complete systems or subsystems during the project period. . . ."

". . . . USAID designated schemes would be reviewed and approved by USAID."

Rehabilitation works targets are shown in Table 4. All A.I.D.-financed civil works activities will be undertaken in accordance with the Fixed Amount Reimbursement (FAR) system. Proposed procedures for sub-project identification, inspection, and reimbursement are described in Section IV. E. This section also contains a discussion of the relationship between IBRD and A.I.D. reimbursement procedures.

TABLE 4

CIVIL WORKS TARGETS UNDER THE ISM/ISR PROJECTS BY PROVINCE

(In Kilometers)

Province	Canal Rehabilitation	Drain Rehabilitation	Total
Punjab	11,144	1,157	12,301
Sind	2,476	2,173	4,649
NWFP	699	76	775
Baluchistan	85	-	85
Total	14,404	3,406	17,810

b. Technical Assistance

Technical assistance under the ISM Project will be provided through four teams of expatriate and local consultants as follows: Engineering, Equipment Management, Planning/Management, and Research. All of these teams will be indirectly involved in the civil works component of this project, in such areas as improving canal rehabilitation design capability; assisting researchers at the PID research facilities in the Punjab and Sind; improving the capability of staff at provincial irrigation workshops to maintain and operate equipment; and, improving the management and organizational skills within the PIDs. The Engineering and the Equipment Management Teams are described in detail under component 2, Institutional Improvement, where their most direct inputs will be made. The Planning/Management and the Research Teams are similarly described under component 3, Planning, Policy Implementation, and Research.

c. Commodities

Commodities which will be procured for the rehabilitation works activity include a variety of earth-moving equipment, spare parts, workshop equipment (which is required to maintain the earthmoving machinery), and equipment to collect flow and sediment data on all canals rehabilitated under this project, which will be utilized for the purposes of evaluation and canal rehabilitation design. Detailed lists of the equipment to be procured by A.I.D. for this activity are provided in Annex K.

2. Institutional Improvement: Management and Technical Skill Development

a. Introduction

The officials of the federal and provincial organizations responsible for the planning, operation, maintenance, and research of the world's largest irrigation system are dedicated professionals. They are well trained and technically competent. Their effectiveness has been constrained, however, by an institutional environment established early in the twentieth century, reflecting conditions and objectives appropriate for that era, and by a lack of attention to continuing staff development. Management of the Indus System is in large measure unparalleled in the West, creating a situation where institutional improvements have to be developed on site, capitalizing on the embodied experience of the staff while evaluating and testing new management and training techniques from outside.

Institutional improvement will take place at two levels, the provincial and federal. The Provincial Irrigation Departments (PIDs) are the primary focus of the Project since the ultimate responsibility for water delivery rests with them. At the federal level, where policy and administrative guidelines are developed, including comprehensive planning for the Indus System, institutional improvement takes on a different character. Here the responsibilities are concerned with supporting the work of the PIDs and managing the flow of water before it reaches the domain of the provinces.

b. Increasing the Operation and Maintenance (O&M) Capability of the PIDs

During the next few years, the major rehabilitatio program undertaken by the PIDs will serve as a living laboratory for institutional improvement. During this period, the ISM project will support management capacity building for all personnel, including decision-makers who plan multi-year programs, engineers who supervise construction, schedule machinery, and allocate water through the moghas or watercourse outlets, and heavy equipment specialists.

Because of the need for irrigation water throughout the year, the canals are empty for only a few weeks each winter. The continued maintenance of the system therefore is critically dependent on the ability of maintenance crews to remove silt and carry out rehabilitation while the water continues to flow. The addition of machinery, some of it new to the Indus System, will expand the capacity of the PIDs to keep ahead of the continuing maintenance tasks. At the same time, the efficient use of this machinery requires changes in operating procedures, especially machinery scheduling, improved capacity for machinery maintenance, and training of engineers, mechanics, and machine operators. This project component consists of six activities which are designed to improve the O&M capability of the PIDs.

i. Procurement of New Equipment

Approximately $31 million of new equipment and spare parts will be procured to increase the PIDs' machinery stocks. The existing PID equipment fleets were procured primarily to meet the needs of large civil works projects, such as construction of large link canals and barrages. These fleets are lacking sufficient transport units and are practically devoid of equipment required for small and medium size jobs, for removal of sediment from operating canals, and for improving the efficiency and quality of labor intensive operations. In addition, replacements are urgently needed for equipment that has reached the end of its economic life.

Equipment will be provided that will balance the equipment fleets, such that they are capable of efficiently undertaking the scale of work required for continuing rehabilitation. In addition to equipment to be used directly by the PIDs, small compaction equipment will be procured to meet the needs of private contractors who perform earthwork by labor intensive methods, but who do not have the financial resources or maintenance facilities to furnish this equipment themselves. These hand-operated compactors will be rented by the PIDs to the contractors.

The PIDs also have a program for renting heavy equipment to qualified private civil works contractors. This program will be encouraged to strengthen the private contracting industry. In addition to the new equipment discussed above, spare parts will be procured for equipment currently on hand, the utilization of which is inefficient due to insufficient spare parts inventories. A list of the equipment to be procured is included in Annex K-1.

ii. Workshop Improvements

Seven maintenance workshops will be upgraded with equipment and training. The PIDs' workshops and stores are generally old and equipped with antiquated machinery. Workshop technicians have demonstrated unusual ability in keeping earthmoving equipment operating, in spite of these limitations. However, they lack the capability to adequately maintain modern equipment. The following activities are planned under this project component:

(a) Seven workshop buildings[7/] will be rehabilitated to provide adequate space for spare parts inventories and maintenance activities, adequate lighting, and dust-free areas where precision equipment will be housed;

(b) Workshops will be equipped with modern tools and equipment required to maintain equipment fleets, including equipment for machine shops, engine overhauling, brake repair, and hydraulic equipment repair. Mobile workshops will also be provided to enable the PIDs to undertake field maintenance and repair throughout the vast areas administered by the PIDs;

(c) Equipment maintenance units, such as lubrication and fuel trucks and trailers, will be provided to insure efficient utilization of equipment;

(d) Technical assistance will be provided to improve the PIDs' capabilities in management of spare parts, preventive maintenance, and workshop operations; and,

(e) Training will be provided for workshop technicians.

During implementation, steps will be taken to insure that trained workshop technicians are available to properly maintain the equipment. An examination of job classification rules will be conducted to identify ways to ensure that sufficient incentives exist to attract and retain skilled personnel. Depending on the situation in each province, the following means of ensuring technician availability will also be investigated:

(a) requiring all PID technicians who are trained to execute a bond that will require them to remain on the job for five years;

(b) exploring the possibility of increasing benefits to provide more incentive to continue employment with the PID;

7/ At Peshawar, Quetta, Sibi, Jamshoro, Mughalpura, Bhalwal, and Multan. The costs of workshop improvements will be borne by the PIDs.

(c) training technicians who are already at a higher pay scale, i.e., subengineers; and,

(d) arranging for the Equipment Management technical assistance team to contract with local technicians, if necessary, on an interim basis while exploring the above alternatives.

iii. Equipment Management

Improved control systems will be instituted for machinery management to facilitate the efficient assignment of machinery out of central pools and the regular scheduling of preventive maintenance. Technical assistance will be provided to help the PIDs develop a Pakistani training team and to improve their capability to make optimum utilization of earthmoving equipment. Work to be done by each PID is spread over a very large area with many miles of canals and drains of various sizes. Decisions regarding the use of equipment on these large systems are complex and require detailed planning and management and consideration of such parameters as:

(a) determining which work can best be done by equipment as opposed to labor intensive methods;

(b) inspecting work sites to determine the location of borrow areas (sources of earth), haul distances, and other factors that will affect equipment operations;

(c) selecting the proper major equipment and supporting items required for each work area;

(d) working out logistic details such as required supervision, equipment operators, maintenance, refueling, communication support, and inspection;

(e) preparing work sites prior to the arrival of the bulk of earthmoving equipment including clearing of borrow areas, preparation of haul roads, removal or trimming of trees, construction of access ramps, selection of areas for daily maintenance, and selection of positions for lighting equipment;

(f) providing for proper soil moisture content and compaction; and,

(g) preparing plans for the next work location prior to the completion of work in progress.

Formal in-country training courses will be conducted by consultants, who will also provide on-the-job training as they work closely with PID officials.

iv. Improved Design Capability

When canals are initially designed, grades and cross-sections are selected so that canals will remain stable, i.e., neither siltation nor scouring will occur. Once a canal is in operation, any inaccuracies in design become evident. Scouring may occur because velocities assumed to be suitable for the soils are actually erosive, or silting may occur due to errors in estimating characteristics of silt carried by the water or due to improper distribution of silt at headworks. Although PID maintenance problems are substantially due to such factors as erosion from wind, rain, and animals, important PID maintenance problems are also the result of design problems. Consequently, in order to address maintenance problems, consideration must be given to design parameters.

Under this project, assistance will be provided to improve the PIDs' ability to deal effectively with design-related maintenance problems. An extensive hydraulic data collection and analysis activity will be implemented, as well as a training program in recent innovations in alluvial channel design. Under the direction of the Federal Coordinating Cell (FCC), an existing organization within the Water and Power Development Authority (WAPDA) called the Alluvial Channel Observation Project (ACOP) will collect detailed flow and sediment data on all channels rehabilitated under this project. This work will be funded under the IBRD loan. With the data from six to eighteen months' assessment available, the PIDs, with assistance from A.I.D.-financed expatriate consultants will be able to design rehabilitation works that will minimize future maintenance problems.

Some PIDs are interested in increasing the capability of their design offices so that they can conduct intensive hydraulic data collection themselves. During implementation, arrangements will be made for these PIDs to provide staff to work with ACOP in order to acquire the necessary skills to perform this work independently in the future. Equipment will also be procured for the PIDs as needs are identified to develop their design capability.

v. Management Training Program

As part of the overall effort to improve the PIDs' O&M capabilities, funds will be provided to conduct management training programs for PID personnel. Several modes of training will be utilized. First, in-country

management training facilities will be assisted to develop specialized management training programs tailored to the needs of the water sector agencies. Second, expatriate technical consultants will, as a part of their duties, conduct seminars within their respective fields of specialization. Third, formal training in management sciences will be supported for selected individuals. By combining a mix of formal and in-service training programs dedicated to management, drawing as much as possible on indigenous institutions, management as a required skill will be given appropriate attention. The development of an in-service management training program that will continue after the project will also allow the widest possible dissemination among the various management levels.

vi. Development of a Management Information System (MIS)

Information generated under the existing system emphasizes fiscal controls rather than resource management. Detailed accounts are kept on the expenditure of funds and are subject to periodic audit while little information is generated and available to decision-makers to allocate resources according to management objectives. A multi-tiered MIS will be developed to service the needs of managers at different levels. Beginning at the job site, this system will generate information on construction progress, use of machinery, and requirements for job completion. This information will be examined and appropriate reports generated for decision-makers at different levels of responsibility. As one moves up the decision-making chain, these system reports will be used by appropriate authorities to identify trouble spots, pinpoint those areas where progress is impeded, and determine the cause for delay. Demand for machinery time can then be adjusted across several job sites at higher levels of responsibility.

c. Improving Water Management at the Federal Level

Direct management responsibilities at the Federal level are limited. The Ministry of Water and Power develops and coordinates water policy formulation and oversees the distribution of water among the provinces. WAPDA is called on to construct major additions to the irrigation system but, with the exception of storage facilities and the link canals, turns over operations to the PIDs. WAPDA, however, plays an important management supporting role in the Indus System through monitoring water flows. Although estimates of annual runoff from the snowpack in the northern areas (and India) are not made with any confidence, monitoring

devices in the main system begin once water leaves the dams. This information is fed back into the decision-making process and helps to determine the amount of releases during the year.

The role of the federal agencies in management of the Indus System is thus limited to two important areas: planning and policy formulation; and, management of storage facilities and monitoring water flows. Planning and policy formulation are discussed in project component 3. The following section describes those activities which will be carried out at the federal level under the project in the management area.

i. Coordination and Management of Rehabilitation Work

A Federal Coordinating Cell (FCC) has been established in the Office of the Chief Engineering Advisor of the Federal Flood Commission, Ministry of Water and Power, to ensure the effective implementation, coordination, and supervision of the IBRD/A.I.D. projects. At the head of this cell is a Project Coordinator, who will be assisted by support staff. A Provincial Coordinator will also be designated in each PID. Depending on the size of the PID and existing administrative arrangements, additional staff will be assigned to assist the Provincial Coordinators. Finally, the "Supervisory Consultant", which is a local firm financed under the IBRD project, will work with the coordinators at both the Federal and Provincial levels in carrying out its major role in the civil works activities. In addition, a Federal Project Review Board (FPRB), consisting of the Chief Engineering Advisor of the Ministry of Water and Power, the four PID Secretaries, and WAPDA's General Manager for Planning, will be established to regularly review progress and problems and to provide overall policy and program direction. Unlike the Federal and Provincial Project Coordinators discussed above, who have no line jurisdiction over regular operations, the FPRB will contain sufficient authority to insure that decisions taken will be implemented.

ii. Centralized Procurement Office (CPO)

In each province, the Director of Industries (DI) is responsible for the procurement of equipment and spares for the PIDs. Procedurally, a PID consolidates its annual requirements in the form of indents and forwards them to the DIs, after obtaining financial concurrence from the Provincial Department of Finance. The DIs then float tenders and award contracts. Normally, DIs do not handle emergency/priority requirements except in special cases recommended by the PID Secretary himself.

This procedure has built-in delays. To provide an efficient and responsive channel for processing PID requirements, a CPO will be established within the FCC of the Ministry of Water and Power to:

(a) define the procurement cycle in consultation with A.I.D. and the manufacturers, and process routine requirements on a bi-annual basis;

(b) receive and consolidate normal requisitions from the PIDs and prepare purchase orders;

(c) process urgent requisitions when received;

(d) monitor progress on supplies and maintain close liaison with PIDs and the manufacturers; and,

(e) maintain accounts for the contracted stores.

The advantages of a CPO are manifold. It will enable the PIDs to effectively manage spare parts inventories. Spares will be available as needed, reducing down time of high cost heavy equipment and thereby reducing costs. In addition, there is currently no mechanism for spares to be shared among provincial bodies, resulting in overstocking. The CPO will provide a mechanism whereby PIDs can procure, from each other, spare parts needed on an immediate basis.

Initially, spare parts for approximately the first year of operation will be procured at the same time as the earth-moving equipment. However, to better match spare parts needs with inventories, thereafter, spare parts will be ordered through the CPO.

iii. Water Monitoring

There is a critical need for real time data on the movement of water through the Indus System. Efficient management of the system is now hampered by the institutional inability to know, at any given time, the quantity and quality of water by location. Groundwater pumpage, which is estimated to equal the flow of water from the canals, is not accounted for in current estimates.

WAPDA[8/] has developed a surface water model to describe flows, but this model does not include groundwater pumpage and is not maintained by real time data. This model will be modified to serve as a systematic management tool to account for the water in the system in order to allow management decisions to be made during the course of the year instead of *ex post facto* analysis of past trends.

8/ Through its Hydrology and Systems Analysis Organization (HSAO)

d. Technical Assistance

Two of the four technical assistance teams for the ISM project, namely the Engineering Team and the Equipment Management Team, will be directly involved in technical skill development under this project component. The Planning/Management team will also be involved in the management development activities under this component. The composition of these teams is provided in Section IV.C.1.

i. Engineering Team

The Engineering Team will assist the PIDs to implement the canal and drain rehabilitation component and provide in-service training to provincial staff. The team will also work with the Punjab Irrigation Research Institute and the Sind Hydraulic Research Station to address specific design questions related to rehabilitation work. Expatriate design engineers will assist in improving the PIDs' canal rehabilitation design capability and advise A.I.D. and the GOP regarding the amount of design work required for various canal systems. This requirement exists because many channels are not in "regime", i.e., there is a continual collection of silt or erosion occurring. For these problem channels, data collection and analysis will be required, as well as a knowledge of recent innovations in alluvial channel design.

As discussed previously, ACOP will collect flow and sediment data on all channels to be funded under this project. With this data, the PIDs will be able to consider designs which will reduce the likelihood of continued maintenance problems, i.e., design changes which will help reduce O&M requirements once rehabilitation has been carried out. The data will provide guidance for such decisions as to whether accumulated silt needs to be removed from a particular reach of canal or whether silt should be distributed between canals differently than at present.

The well-established Punjab Irrigation Research Institute in Lahore and the Sind Hydraulic Research Station can contribute to resolving specific problems faced by the PIDs that are related to this project. These include siltation due to flat gradients, machinery use, construction methods for canal rehabilitation, silt removal, and evaluation and design procedures.

The Punjab Irrigation Research Institute has conducted research since Pakistan's independence for many international clients, and a few years ago was a thriving and active institution. As the PIDs' O&M funds were cut, and tubewell

maintenance requirements burgeoned, funds for research diminished and neither the staff nor its equipment currently approach the state of the art in irrigation research. The Sind station, which, in the past, never had the capability of the Punjab institute, also would benefit from a strengthened research capability.

In conjunction with providing new equipment to enable these two research facilities to adapt their laboratories and measuring devices to the most modern methods being used in the United States and Europe, this project will finance two researchers on the Engineering Team to assist these two research stations with specific research activities, provide technical skill transfer, arrange observational tours, and assist in placement of PIDs' research staff in advanced degree programs.

ii. Equipment Management Team

In conjunction with the equipment provided to the PIDs for the rehabilitation works component of the project, consultants will be provided to assist in developing procedures and conducting on-site training to improve utilization. This equipment includes a variety of earth-moving equipment and workshop equipment that is required for its maintenance. Some equipment such as suction dredges and hydraulic excavators will be new to the PIDs' fleets, as will some shop equipment.

The Equipment Management Team will assist in arranging training courses at local institutions for mechanics, machinists, operators, and other technicians. They will conduct training courses in all relevant areas, such as proper grouping and scheduling of equipment and use of specific pieces of equipment. Assistance will also be provided in upgrading the present inventory control system in workshop stores.

e. Training

The professionals who plan and manage Pakistan's irrigation system are, without question, well trained and capable. However, as with all professionals, there is a continuous need to update their technical knowledge and improve other skills to make them more productive. Currently, WAPDA and the PIDs do not have a training function built into their organizations. Training and retraining are not now systematically part of staff members' career paths. This project will have as one of its objectives the institutionalization of training within these organizations while funding a minimal level of priority staff training. The types and nature of the training to be financed under this project are described in detail in Section IV.D.

f. Commodities

Commodities for this project component will be limited to vehicles for technical advisors, research equipment for the Sind and Punjab PID research facilities (see Annex K-3), and computers (see below).

g. Implementation of Computer Technology

Although WAPDA has been utilizing main frame computers for some time, they have never been introduced to the PIDs. The ISM project will introduce the use of both mini and micro computers, in a phased manner, to the PIDs in order to improve technical and management performance. On the management side, computers will be used to facilitate better communication, faster and more accurate information analysis, more consistent reporting, and more informed decision-making. On the technical side, computers will be used to keep accurate records of system characteristics and designs, to produce higher quality and consistent designs, to provide better historical records, and to speed the process of design and analysis.

Recent advances in the development of mini and micro computers and programs have made the portable, stand-alone desktop computers inexpensive, reliable, and "user-friendly" so that competence and experience on direct applications can be readily acquired. Little if any prior experience or understanding of computers is necessary to carry out some very powerful applications relevant to this project. Programming skills are not needed by users since a growing body of software is available and directly applicable to the needs which are anticipated under this project. Custom programming can be done for specific project needs where necessary and duplicated for routine use in model programs, e.g., with specific canal design applications and equipment inventory programs.

There are a number of distinct benefits to be gained by the use of mini and micro computers on the ISM project which result from advances in computer technology.

i. The power, speed and accuracy of computers now make it possible to carry out routine functions and tasks rapidly and at relatively low costs so that staff time can be made available for other responsibilities required for high quality project performance;

ii. Increased computational strengths and memory systems facilitate the maintenance of more accurate records on both design and administrative functions and provide a wide range of alternatives through better information for responsible persons throughout the project organization;

iii. The portable and easily managed nature of micro computers make them useful at both the field and operational levels without extensive technical demands so that they can be used for information and analysis where the needs for accurate information are highest and where potential applications have the greatest impact for sound management and high quality design; and,

iv. The ability to develop compatible and integrated systems at different project levels and locations provides a means for linking field operations with each other and with central management for the sharing of technical and management information throughout the dispersed project sites.

Prior to procurement, a technical assessment will be made of the types and numbers of computers required. It is anticipated that 25 mini and micro computers will be provided, in a phased manner, during the project for the following purposes:

i. spare parts inventory;

ii. equipment utilization and maintenance;

iii. design, development, financial management and reporting;

iv. planning, analysis, and canal design;

v. management information system; and,

vi. monitoring and evaluation.

WAPDA is currently in the process of procuring, with its own resources, a new computer. To assist WAPDA in the computer modeling activities under this project, funds will be provided to procure essential ancillary equipment at an estimated cost of $160,000.

3. Planning, Policy Implementation and Research

a. Planning and Policy Implementation

The GOP places high priority on planning for the water sector. The RAP, prepared by WAPDA under a UNDP grant executed by the IBRD, represents a major planning exercise. Completed in 1979, this multi-volume study examined existing conditions of irrigated agriculture, gauged the potential for improvement, and mapped out a comprehensive program to realize that potential. It is a work of high quality that provides the foundation for far-reaching changes in the utilization of waters of the Indus River System. The resulting policy guidelines, discussed previously, establish the

framework for further government action and emphasize the need for future programs to be directed toward increasing the productive use of the water delivered and a shift in the role of the government to provide a meaningful role for water users in the management of irrigation water.

Given this major shift reflected in the RAP and endorsed by the GOP, the task before the GOP is policy implementation. Transformation of policy guidelines into action programs requires another step in the process, that is, continuing planning to develop specific programs for implementation.

WAPDA has the responsibility for developing major water projects. Participation by the PIDs in this process has been sporadic. At the PID level, planning has traditionally focused on operational targets such as estimates of work to be done, the cost of carrying out the work, and the resources required. These are performed at the sub-engineer level and then aggregated at various levels until the plan is complete. This aggregation of sub-plans does not take into account competition for scarce resources, like machinery, nor is much attention paid to economic or social costs or benefits. The focus in these plans is on engineering demands, leaving questions of alternative means of achieving the same objective or important socio-economic questions unanswered. While there is always a danger of imposing too rigid and too comprehensive planning requirements on operational staff, the present system appears to fall far short of running this risk. The more important issue is that the PIDs, as primary operational bodies, are not actively involved in medium to long range planning. A corollary to this is the gap between developing project-specific plans and the administrative/managerial system for implementation.

This project activity is designed to strengthen the capability of the PIDs to engage in the planning process for future projects in the water sector and to continue, with WAPDA, the refinement of the RAP to transform policy guidelines into action programs. Initially, this skill-building program with the PIDs will be closely linked to the management of on-going duties. Drawing largely on existing experienced staff, the planning process will focus on how to utilize available resources to achieve maximum productivity. Another major planning exercise under this activity will be the involvement of the PIDs with WAPDA in the design of the Command Water Management (CWM) Program, a project identified in the RAP and selected by the GOP for development and implementation.

Utilizing the experience gained during the formulation of the RAP, WAPDA's Planning Division is proceeding with the refinement of the CWM concept as outlined in the RAP into

an implementable action program. Both UNDP and A.I.D. are providing assistance to WAPDA in the initial stages of this exercise. Under the ISM project, additional assistance will be provided to examine the feasibility of a CWM Program and to define and document implementation requirements.

The development of the CWM concept represents one of the necessary steps in defining several interventions in the water sector. At the same time, there is a continuing need to refine the basic analysis to examine global questions related to agriculture and water management, including questions such as: What is the optimum allocation of water (the limiting resource) to achieve national goals? What investments are necessary to continue a process of improvement? At what costs? Are there alternative means of achieving the same objectives at less cost? What are feasible interventions in rainfed areas to enhance the utilization of water for agricultural production? What is the relationship between agriculture in watershed areas and the management of the Indus System?

The institutional modifications necessary to improve the planning process are marginal. The basic structure already exists in WAPDA. The institutional demands on the PIDs are not large. What is required is the implanting of an awareness of the importance of effective planning and a demonstration of its utility. Equally important is the establishment of a direct linkage between planning and project management.

Other than limited commodities (small computers), the requirements for this activity entail training and technical assistance. The technical assistance team will work with existing staff in demonstrating proven planning and management techniques. These consultants will also conduct in-service training programs and seminars. Formal training will also be offered in such fields as economics, sociology and management.

b. Research

A great deal remains to be learned about the irrigation system and the potential for optimization of water use. The size and complexity of the system prohibit the simple transfer of current technology without a period of adaptive research. The basic institutional structure and core of skilled manpower are in place; what is required is technical assistance to transfer skills and impart knowledge to existing staff and to carry out in-service training; commodities; and funds for critical research programs.

The scope of research activities to be supported under this project is broad and reflects the diversity of problems encountered. In some cases, research efforts are focused on water management problems outside of the Indus System. It is becoming increasingly clear that water management problems associated with dryland agriculture are, in many cases, directly related to the integrity of the Indus System. Better utilization of arable land promises not only increased agricultural production and income for inhabitants of these areas but also serves as a means of protecting the watershed and controlling periodic floods. In the western provinces of the Northwest Frontier and Baluchistan, a sustainable agriculture depends on utilizing scarce water resources through such means as water spreading, where seasonal torrents are captured to provide moisture for subsequent plantings.

i. Engineering and Hydraulic Research

The Indus System presents several engineering and hydrological challenges that cannot be met by importing technological solutions from other countries. Priority problems must be tested in Pakistan under existing conditions. The Punjab Irrigation Research Institute and Sind Hydraulic Research Station will, *inter alia*, address the research agenda described below:

(a) develop means of excluding or extracting silt as required to properly distribute silt at headworks;

(b) develop design procedures for alluvial channels and incorporate the latest findings in design standards;

(c) develop suitable hydraulic lift mechanisms that can increase the gradient of small canals and thus solve siltation problems, or adapt existing pumping equipment for this purpose;

(d) develop least cost methods for silt removal from canals of various sizes while water is flowing by such means as suction dredges, excavation equipment, and hydraulic sluices, and determine the best method for utilizing the removed silt for strengthening banks;

(e) study the use of grass and tree cover to improve canal bank stability, especially as protection against wind and rainwater erosion;

(f) study water redistribution problems that arise on distributary canals after rehabilitation; and,

(g) improve information transfer to engineering departments of universities and design,operation, and research personnel in the PIDs.

ii. Water Management

Research priorities in water management include developing methods for identification and monitoring of available water resources, including groundwater, and on-site tests to improve the quantity and quality of water available for agricultural production. WAPDA has continued to carry out research in these areas, often with limited internal funds. Support will be provided under the ISM Project for the following research activities:

(a) examination and refinement of on-farm water management technologies at Mona Reclamation Experimental Project site (where the original research for the OFWM was conducted) and under the Lower Indus Water Management and Reclamation Research Project, located in Sind Province. At the Sind site, findings from earlier Mona research will be evaluated to test their suitability under different conditions as well as to identify research problems specific to the farming environment of Sind;

(b) tubewell research, including computer modeling of tubewell performance and studies of the quality of water pumped;

(c) modification and development of computer models to predict availability and expected utilization rates. Merging groundwater and surface supplies in one predictive model will be undertaken;

(d) development of standard design procedures for small diversion structures to replace temporary bunds constructed by farmers at the headworks of privately managed canals in the NWFP and Baluchistan;

(e) investigation of the potential for on-farm and other local reservoirs and development of standards for design and construction;

(f) investigation of the potential to create groundwater storage schemes in river flood plains; and,

(g) an analysis of the socio-economic environment governing the final use of the water. A high degree of cooperation is required among the 20 to 80 farmers that comprise a watercourse command area for the system to function effectively. How this cooperation takes place within the formal rules of government bodies is a critical determinant of the productivity of water use.

c. Technical Assistance

Two technical assistance teams will be directly involved in implementing this component: a Planning/ Management Team and a Research Team.

i. Planning/Management Team

This team will work with federal and provincial authorities to increase the planning and management capacity of all personnel, from the decision-makers who plan multi-year programs to the engineers who supervise construction, schedule machinery, and allocate water through the canal outlets.

Planning and management seminars will be conducted by this team for high level PID staff to examine the constraints of the existing system and jointly seek solutions to recurrent problems caused by historic underfunding. Without presupposing any solutions, the project will sponsor exchanges on management and planning concepts which have emerged from other irrigation and drainage systems and examine the efficacy in Pakistan of management techniques which have proved useful elsewhere. These efforts will be undertaken by specialists in conjunction with management training institutions such as WAPDA's Tarbela Academy, which has expressed a keen interest in being involved in this project.

This team will also work with PID and federal staff to develop an MIS that will include the capacity for administrative and logistics control. The team will also provide guidance for the revitalization of in-country training institutions and training curricula for mid-level managers. These courses will combine technical reviews and resource allocation options. Supplies, equipment, and new technologies such as small computers and video-tape machines will be made available over the life of the project to selected institutions which develop a heightened capacity to transfer skills and techniques.

ii. Research Team

The research team will work with WAPDA and provincial bodies to carry out the research agenda described above. This team will also interact with the Engineering Team supporting the rehabilitation activities. Early in the implementation of the project, prior to the arrival of this long-term technical assistance team, a group of short-term advisors (a Research Definition Team) will review and critically analyze the proposed research program including

defining required research equipment needs to ensure that priority targets are being addressed and that relevant research from the U.S. and other countries is taken into account in the Pakistani program.

d. Training

The Planning/Management and Research Teams will conduct in-country training programs. The Research Team will also, where appropriate, monitor and advise on research theses prepared as part of formal training requirements for long-term participants.

e. Commodities

Computer equipment for the planning activities under this component was previously described under component 2. Additional commodities to be financed include a variety of specialized research equipment for: (i) the Mona Reclamation Experimental Project; (ii) the Lower Indus Water Management and Reclamation Research Project; (iii) the WAPDA Central Monitoring Organization; and, (iv) WAPDA Planning Division. Detailed lists of the types of research equipment which are likely to be procured are provided in Annex K-3.

4. Command Water Management

a. Introduction

The rehabilitation works, institutional improvement, and planning and research components of this project will lay the foundation for the improved delivery of water through the canal system. The challenge which will remain for administrators of the water system, however, will be to address, with the active participation of water users, the complex set of questions related to water delivery and water use in order to manage water deliveries over the 34 million acres of irrigated land in Pakistan with the objective of increasing on-farm productivity of water use. Efficient and effective operation, maintenance, and management of the irrigation system is a necessary first step in the implementation of a strategy aimed at improving the productivity of the land and water resources in Pakistan. Command Water Management (CWM) is the logical and essential next step to ensure that all relevant agencies cooperate to match water supplies with crop requirements in order to increase crop production.

CWM has become the shibboleth of irrigated agriculture in Pakistan. Conceptually, it has no detractors, serving

the role of a universally accepted goal. In practice, however, particularly within an irrigation system which has never been organizationally connected to agricultural production, the implementation of such a concept requires major breakthroughs in technology and institutional change. The concept was proposed by WAPDA as an outgrowth of the 1979 major study of the irrigated agriculture sector (the RAP). Since that time, the CWM concept has been endorsed by the GOP as a policy goal. Within Pakistan, CWM is defined as the integration of specialized agencies, water and agriculture, at the canal command level, with the expressed objective of increasing agricultural production by combining institutional, administrative, and technical expertise and control over surface and groundwater supplies, agricultural inputs, and extension to deliver the best possible advice and required resources to the farmer in a timely and coordinated manner.

This project component is intended to assist the GOP to transform its stated policy goal into an action program. The specific objectives of the project component are to:

i. substantially increase agriculture production in selected pilot areas through improved water management, i.e., by delivering water in response to crop water requirements to the maximum extent possible, and to integrate into this program the necessary agricultural support services and non-water inputs;

ii. develop water management techniques and programs replicable over a wide range of agro-climatic zones and land and water environments for subsequent application in other parts of the country;

iii. reduce inequities in actual water deliveries in the tail reach as compared to the head reach of canals at all levels (branches, distributaries, minors, and watercourses) through both revised scheduling and improved conveyance efficiencies; and,

iv. build within the provincial agencies and WAPDA a continuing capability for planning, implementing, and operating integrated programs for irrigated agriculture.

The CWM component of this project will be implemented after: (i) the completion of a feasibility study that is now underway; (ii) the assessment of the findings of the study; and, (iii) the preparation and approval of an amendment to this Project Paper which will define in detail the activities of this component.

b. Feasibility Study

A major feasibility study was initiated by WAPDA on July 1, 1982, with a $1 million grant from the UNDP, with the IBRD as the executing agency. A.I.D. is also providing technical assistance for this study under the Project Design Fund (391-0470), and additional assistance will be funded under the ISM Project. Under the study, plans for specific subprojects, comprising 50,000 to 200,000 acres in each of the four provinces will be prepared. The subproject plans will describe the scope of work to be undertaken, details of project implementation, institutional arrangements, and the estimated costs and benefits expected. Provincial Planning and Development, Irrigation and Power, and Agriculture Departments will select the subproject areas in consultation with WAPDA.

Each subproject plan will include an economic and engineering assessment of all the elements listed below:

i. rehabilitation of the canal system above the watercourse;

ii. watercourse improvement;

iii. irrigation practices within a command area and on farms(land levelling, secondary watercourses and field ditches);

iv. surface and subsurface drainage and reclamation involving private tubewells in fresh groundwater zones;

v. scheduling of water deliveries to facilitate crop needs;

vi. non-water inputs (including fertilizer, seeds, pesticides, tractor and bullock power, labor, management, and extension); and,

vii. other complementary works required to increase crop production such as rural roads, rural electrification, and the like.

The feasibility study is expected to be completed by October/November 1984.

c. Pilot Program

Following the successful completion of the feasibility study, detailed plans will be prepared to implement a pilot program, based on the findings of the study, in each of the four provincial subproject areas studied during the feasibility stage. The total cost of the proposed pilot program in four subproject areas, comprising 50,000 to 200,000 acres each, is estimated at $120 million. The majority of

costs would be for civil works and on-farm investments in the four subproject areas. Taking an average figure of 125,000 acres for each subproject area or a total of 500,000 acres for the pilot program, the estimated total cost of $120 million would provide on the average only $240 per acre, which is modest considering the inputs that are contemplated.

Through an amendment to this Project Paper, which will be sent to AID/Washington for approval in the second quarter of FY 1984, A.I.D. will contribute $25 million to implement the pilot CWM program between FY 1984 - FY 1990. A.I.D. funds will be used for civil works, on-farm investments, training, technical assistance, and commodities. The balance of the funds required for the program will be provided by the GOP, the IBRD, and possibly other donors. It is anticipated that there will be close collaboration between A.I.D. and the IBRD in designing the CWM pilot program as was the case for the other components of the ISM project.

There are several policy-related issues that are vital to the success of the CWM pilot program and will have to be addressed in the design of this component:

i. Institutional arrangements. Implementation of the CWM concept will require the integration of appropriate programs of the Provincial Irrigation and Agriculture Departments, including the On-Farm Water Management (OFWM) Directorates and extension services. Other relevant government agencies (e.g., Directorate of Agricultural Engineering, Departments of Local Government and Rural Development), credit agencies, and universities would also be participants in the program and provision would have to be made for their involvement.

ii. Fresh groundwater development. All new fresh groundwater resources should be developed privately, with emphasis on fractional tubewells. If possible, the OFWM Directorates would be responsible, in association with credit agencies, for promoting private tubewells to complement watercourse-related improvements. In SCARP areas, they would also explore, in association with the PIDs, the opportunities for turning over public tubewells to private ownership or for replacing them with smaller private tubewells (SCARP Transition Program).

iii. Cost recovery. Arrangements must be made for ensuring adequate cost recovery, particularly in relation to on-farm and watercourse improvements (including tubewells). Credit agencies will need to be increasingly involved with OFWM Directorates, making credit available for both cooperative ventures and individual farmer improvements. In

addition, water charges will need to be increased. The Revenue Department could also be involved in credit repayment collection on behalf of the credit agencies. Research may focus on water rate issues, including the possibility of restructuring rates.

IV. IMPLEMENTATION PLAN

A. Implementation Schedule

All ISM project activities, except those under the Rehabilitation Works and the Command Water Management(CWM) components, are scheduled to take place over a period of five years from the date of signing of the Project Agreement. Rehabilitation works activities will take place over a period of three years in accordance with the implementation schedule of the ISR project. Implementation of the CWM pilot program is expected to begin in the summer of 1984 and continue until the A.I.D. Project Assistance Completion Date (PACD), which is April 30, 1990.

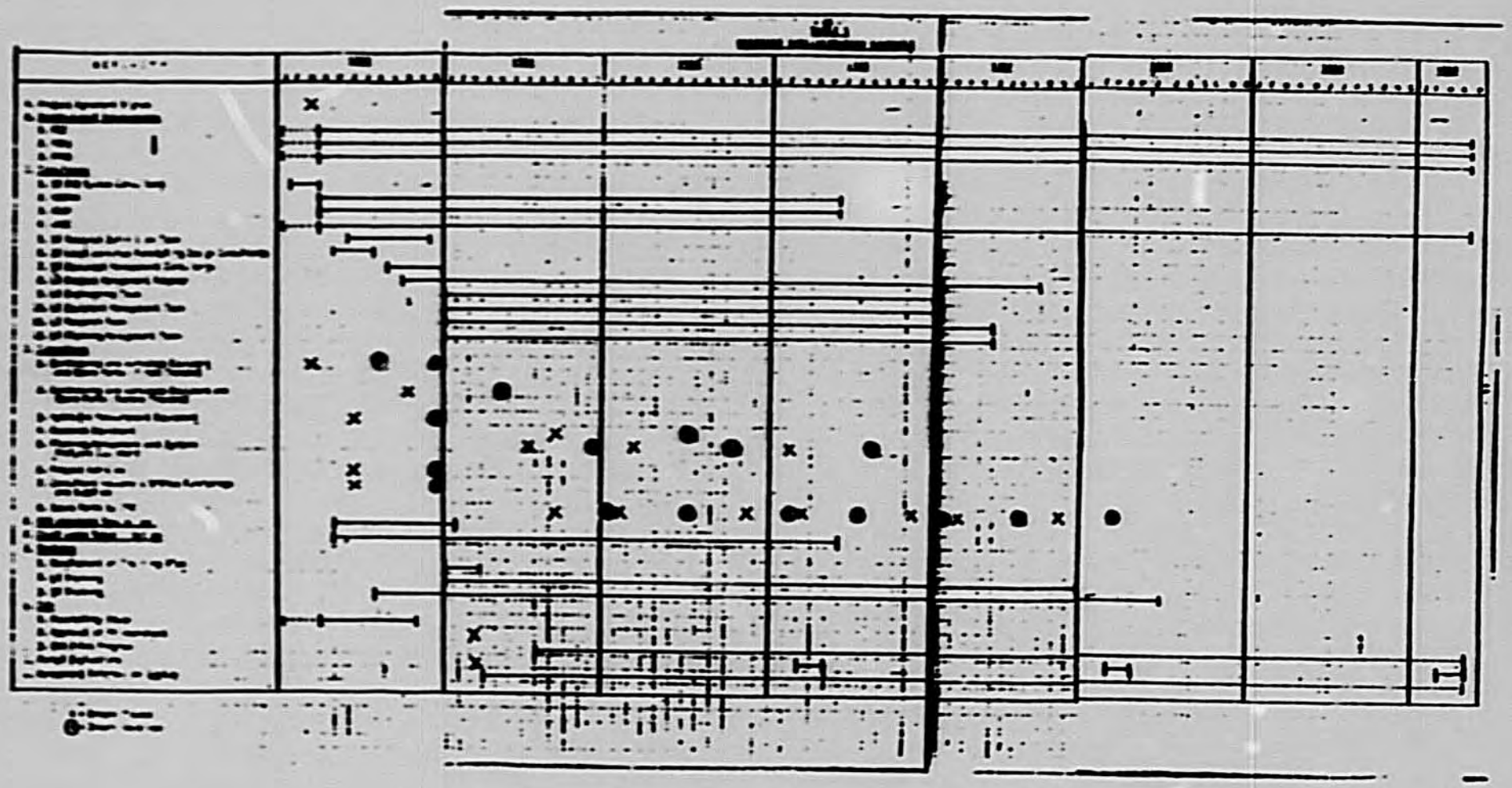
Implementation of the ISR project is scheduled to take place over a period of three years. The ISR Project Agreement was signed in June 1982. However, since the date of effectiveness of the ISR project will be about March 1983, the ISR's revised completion date will be March 1986.

A proposed implementation schedule is included in Table 5.

1. Institutional Arrangements and Procurement of Technical Assistance

Prior to the signing of the ISM Project Agreement, funds from the Project Design Fund will be used to hire a short-term consultant to assist the Mission prepare a detailed plan for implementation of the Fixed Amount Reimbursement (FAR) system for civil works. Within the first three months after the signing of the A.I.D. Project Agreement, the Federal Coordinating Cell (FCC), the Provincial Coordinating Cells (PCCs), and the Federal Project Review Board (FPRB)9/ should be fully staffed and operational. In addition, the IBRD-funded contract between the GOP (FCC) and NESPAK will have been signed, and Project Implementation Orders for Technical Services (PIO/Ts) will have been prepared by the Mission for: (a) the short-term Research Definition Team; (b) the long-term Project Management Advisor; (c) the long-term Equipment Management Team; (d) the long-term Engineering Team; (e) the long-term Research Team; and, (f) the long-term Planning/Management Team. It is expected that all the long-term advisors will be in-country within nine months after the signing of the Project Agreement. During this nine-month period, short-term expatriate and local consultants will be hired under Indefinite Quantity Contracts (IQCs) or other arrangements to provide equipment management, engineering, and planning/management services until the arrival of the long-term consultants. The Research Definition Team is scheduled to arrive within the first three months after the Agreement is signed.

9/ As mentioned previously, the FPRB has held meetings, and the FCC and some of the PCCs are already partially staffed and functioning.



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In addition, within the first month of the project, the Alluvial Channel Observation Project (ACOP), under the direction of the FCC and with IBRD funding, will have begun collecting baseline hydraulic data with existing staff and equipment on flows and sediment for canals to be rehabilitated in the first year of the project. Similarly, the Watercourse Monitoring and Evaluation Cell (WMEC), under the direction of the FCC with IBRD funding, will have begun collecting baseline production impact data. Local consultants will also be hired within the first three months under the ISM project to assist the PIDs finalize designs for the remodeling of workshops. Preliminary designs have already been prepared during the design stage of the ISM project.

Finally, it is expected that the Central Procurement Office (CPO) in the FCC will be fully staffed and operational by the end of the first year of the project.

2. Procurement of Equipment

As discussed under the Commodity Procurement Plan (Section IV. C.2.), the procurement of earthmoving and workshop equipment and spare parts is already underway by two Procurement Services Agents(PSAs) with funds under the FY 1982 tranche of the AC&E Program (391-0468). This equipment should arrive in-country between August and December of 1983. It is anticipated that all workshop remodeling activities will be completed by January 1984 such that the PIDs will have adequate facilities to house and maintain this equipment. The additional earthmoving and workshop equipment and spare parts which will be procured by these PSAs with funds under the FY 1983 tranche of the AC&E Program should arrive in-country between March and August of 1984.

Upon the signing of the ISM Project Agreement, the Mission will issue Project Implementation Orders for Commodities (PIO/Cs) to procure all project vehicles and household and office furnishings for all long-term expatriate technical consultants. Arrangements will also be made, as soon as the FY 83 AC&E PAAD Amendment has been authorized and funds obligated, to obtain the services of a PSA to procure the hydraulic measurement equipment for ACOP and the PIDs with funds from the FY 1983 tranche of the AC&E Program. Procurement of the planning and management equipment and systems analysis equipment under the ISM project by the long-term Planning/Management Team will begin after the team arrives and will be undertaken in tranches over a period of several years. A needs assessment will be undertaken prior to the procurement of any systems analysis equipment. Similarly, procurement of the required research equipment, which will be procured with funds under the FY 1984 tranche of the AC&E Program, is not expected to begin until the summer of 1984, by which time the Research Definition Team

will have undertaken a needs assessment and the long-term research technical assistance team will have arrived in-country and assisted the GOP and PIDs to finalize equipment lists and specifications. It is anticipated that the CPO will begin procuring spare parts for the PIDs' equipment fleets with funds under the ISM project beginning in the fall of 1984 and continuing throughout the life of the project.

3. Rehabilitation Works Activities

Once the A.I.D. Project Agreement is signed and the initial conditions precedent met, IBRD funds will be released and the contract with the Supervisory Consultant will be executed.10/ IBRD-financed rehabilitation activities will begin immediately after these events have occurred and the PCCs and FCC are in place. A.I.D.-financed rehabilitation activities will begin after a mutually acceptable system of reimbursement and inspection has been worked out in detail and agreed to by all relevant parties, which is expected to occur by the third month after the A.I.D. agreement is signed. Rehabilitation activities are expected to be implemented over a period of three years.

Rehabilitation activities during the first year of the project will focus on those canals requiring limited design work. Initially, the work will be undertaken with the equipment currently on hand with the PIDs By the end of the first year of the project, it is anticipated that the majority of new earthmoving equipment and workshop equipment and spare parts (the latter for existing inoperable equipment as well as the new equipment) will be in place in the provinces such that the pace with which rehabilitation activities occur will be accelerated. In addition, ACOP will begin collecting data on flows and sediment early on in the project with existing staff and equipment. With the arrival of hydraulic measurement equipment during the first year of the project and the training of additional staff (including some from the PIDs), ACOP will be in a position to provide the necessary hydraulic data required for the design of the more complex rehabilitation works which will be undertaken beginning in year 2 of the project. The Design Engineers on the long-term Engineering Team, who are expected to arrive within nine months after the Project begins, will assist the PIDs to incorporate the ACOP data as well as current technologies in alluvial channel design into the design of schemes to be rehabilitated in years 2 and 3. Prior to the arrival of the long-term Equipment Management Team, short-term local and/or expatriate consultants will be hired to train workshop technicians and equipment operators in the use of the new machinery.

10/ Anticipatory approval of the PC-1s for the rehabilitation program has recently been obtained. The GOP has indicated its intention to sign a contract with NESPAK as soon as possible and to reimburse NESPAK retroactively upon the signing of the ISM project which will also release ISR project funding.

4. Command Water Management (CWM) Project Component

The CWM feasibility study, which is being undertaken by the GOP with technical assistance from A.I.D. (under the Project Design Fund (391-0470)) and UNDP (with the IBRD as executing agency) began on July 1, 1982 and is expected to be completed by October/November 1983. ISM project funds will be used to provide additional short-term technical assistance for this effort. Based on the findings of the feasibility study, A.I.D. will prepare and submit to AID/Washington for approval in March 1984, an amendment to this Project Paper to provide an additional $25 million to finance a CWM pilot program in all four provinces. Implementation of the CWM pilot program, which will also be a co-financed activity, will take place over a period of six years.

5. Training and Evaluation Activities

Most of the training activities under this project will take place over a five year period beginning in FY 1983. Long-term degree candidates are expected to begin their programs of study in FY 1984 and FY 1985. A detailed training plan (especially for the in-country training portion of the program) will be developed with the assistance of the long-term technical assistance teams and the Project Management Advisor early in the second year of the project. A proposed implementation schedule for the training component is shown in Table 8 under Section IV.D., Training Plan.

Formal evaluations are scheduled to take place in March of 1984, 1986, 1988, and 1990. These evaluations as well as other evaluation activities are discussed in Section IV. F., Evaluation Plan. In addition, it is anticipated that the Management Information System (MIS), which will be installed initially in the FCC, will be operational within six months after the arrival of the long-term Planning/Management Team, i.e., within 15 months after the project begins.

B. Administrative and Monitoring Arrangements

1. A.I.D. Responsibilities

The USAID/Pakistan Office of Agriculture and Rural Development (O/ARD) will have overall responsibility for managing the project. O/ARD is currently staffed with five USDH and seven Pakistani professionals. The USDH staff includes an agricultural officer, a deputy agricultural officer, an assistant agricultural development officer, a rural development officer, and an agricultural economist. Three other USDH positions have recently been approved. The Pakistani professional staff includes four program specialists, an economic specialist, an economic assistant, and a rural development specialist. The Mission Project Officer for this project will be the assistant agricultural development officer (irrigation engineer), who will be assisted by Pakistani professionals in O/ARD and the professional staff of the Provincial Liaison Offices.

O/ARD will be assisted in all contracting and procurement actions by the Mission's Office of Project Development and Monitoring (O/PDM), all FAR system activities under the Rehabilitation Works component by the Office of Energy and Engineering (O/E&E), all financial management and disbursement matters by the Office of Financial Management (O/FM), all evaluation and training matters by the Office of Program (O/PRO), and all logistical and administrative support activities by the Office of Management (O/M). These Mission staff resources will be supplemented by assistance from AID/Washington backstopping staff and the services of the A.I.D. Regional Legal (located in Islamabad), Environmental, Contracts, and Commodity Management Advisors. In addition to this in-house capability, the project has been designed such that the way the technical assistance teams will perform and relate to each other will make it easier for the Mission to carry out its functions. Taken together, all of these staff resources are considered adequate to handle USAID/Pakistan's monitoring and administrative responsibilities under this project.

2. GOP Responsibilities

The major implementing organizations under this project will be the Federal Ministry of Water and Power, the four Provincial Irrigation Departments (PIDs), and WAPDA. To facilitate the implementation of the I&R and ISM projects, the Ministry of Water and Power has established a Federal Coordinating Cell (FCC) in the Office of the Chief Engineering Advisor. The FCC will be headed by a senior engineer, designated as the Federal Project Coordinator, who will be supported by accounting and clerical staff. Budgetary

arrangements for all these positions have already been made by the Ministry. The FCC will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities on a day-to-day basis;

b. review annual work plans of the PIDs to ensure consistency with the project targets and project implementation schedules, and prepare consolidated work plans;

c. review quarterly and annual progress reports of the PIDs and prepare consolidated reports for submission to A.I.D. and the IBRD;

d. review financial reports of the PIDs, maintain project financial records, and prepare appropriate consolidated financial reports for submission to A.I.D. and the IBRD;

e. make arrangements with the Federal Ministry of Finance, through the Ministry of Water and Power, to provide adequate funds required by the PIDs for the execution of civil works;

f. serve as the authorized representative of the GOP in the procurement of project-financed commodities;

g. review reimbursement applications submitted by the PIDs and certified by the Supervisory Consultant;

h. monitor and supervise the work of the Supervisory Consultant;

i. monitor and supervise the work of the independent local research and evaluation units (ACOP and WMEC);

j. coordinate and monitor the work of all project-financed expatriate and local consultants;

k. coordinate and oversee the implementation of all training activities under the project including in particular, the development and administration of the overseas training program;

l. administer the operations of the Central Procurement Office for the procurement of spare parts;

m. coordinate and participate in all project evaluations;

n. ensure that all required PC-1's and other GOP documentation related to this program are prepared and approved in a timely manner;

o. serve as the main channel of communications between the PIDs on the one hand and the IBRD and A.I.D. on the other hand; and,

p. serve as the Secretariat of the Federal Project Review Board (see below).

At the provincial level, a Provincial Coordinating Cell (PCC), which will report directly to the PID Secretary and will be headed by a Provincial Project Coordinator, will be established in all four provinces. The PCC in each province will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities in the province on a day-to-day basis;

b. select the schemes to be rehabilitated;

c. review the detailed designs of schemes to be rehabilitated;

d. prepare lists of required equipment, spare parts, and machine tools with specifications;

e. provide required information to the Supervisory Consultant for the preparation of reimbursement applications;

f. prepare quarterly and annual progress reports for submission to the FCC;

g. prepare annual provincial work plans for submission to the FCC;

h. maintain separate project financial accounts and prepare financial reports as required for submission to the FCC;

i. ensure that adequate funds are available for workshop remodeling and oversee the construction activities to ensure their timely completion;

j. coordinate and implement all training programs in the province and ensure that qualified participants are selected for all training activities;

k. participate in all project evaluations;

l. ensure that equipment procured under the project is properly utilized and maintained;

m. ensure that adequate counterparts are in place to work with project-financed consultants;

n. participate as resource personnel as required at meetings of the Federal Project Review Board; and,

o. serve as the main focal point for communications and liaison functions between the province and the FCC.

The other key implementing organization under the project will be WAPDA. The General Manager for Planning will be the coordinator of all ISR/ISM project activities involving WAPDA. He will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities undertaken by WAPDA on a day-to-day basis;

b. prepare consolidated quarterly and annual progress reports of all project activities undertaken by WAPDA organizations;

c. prepare lists of required equipment and spare parts with specifications;

d. maintain separate project financial accounts and prepare financial reports as required for submission to the FCC;

e. coordinate and implement all training programs involving WAPDA staff and ensure that qualified participants are selected for all training programs;

f. ensure that research results are widely disseminated to appropriate decision-making bodies;

g. participate in all project evaluations;

h. ensure that equipment procured under the project is properly utilized and maintained;

i. ensure that adequate counterparts are in place to work with project-financed consultants;

j. review project work plans of the following WAPDA organizations to ensure consistency with project targets and project implementation schedules;

i. Planning Division;

ii. Planning and Investigation Organization;

iii. Mona Reclamation Experimental Project;

iv. Lower Indus Water Management and Reclamation Project;

v. Command Water Management Project;

vi. Hydrology and Systems Analysis Organization;

vii. Monitoring and Evaluation Organization; and,

viii. Central Monitoring Organization; and,

k. serve as the main focal point for communications and liaison functions between WAPDA and A.I.D. and the IBRD.

To provide effective overall leadership, establish policy and program guidelines, review and solve major project implementation problems, and serve as a continuing forum for the PIDs, the Federal Government, and WAPDA to monitor progress of the projects, the GOP has established a Federal Project Review Board (FPRB), which will meet at least quarterly throughout the life of the projects. The Board consists of the Chief Engineering Adviser of the Ministry of Water and Power, as Chairman, the four PID Secretaries, and the General Manager for Planning in WAPDA. Representatives of A.I.D., the IBRD, and the Supervisory Consultant (NESPAK) will attend Board meetings as ex officio members. In addition, the Federal Project Coordinator and the Provincial Project Coordinators will attend Board meetings from time to time as resource personnel.

3. Supervisory Consultant

Because the FCC is a newly established office which will play a major role in the implementation of both the ISR and ISM projects, provision has been made under the ISR project to hire a local Supervisory Consultant (NESPAK) to assist the FCC to effectively coordinate and monitor all program activities. In addition, the Supervisory Consultant, given its major role in the implementation of the rehabilitation works program, will serve as a unifying force in rationalizing the administrative and financial procedures for inspection and reimbursement under both the A.I.D. and IBRD-financed projects. The Supervisory Consultant team will report directly to the Federal Project

Coordinator in the FCC and will be under his direct supervision. The Consultant team will perform the following services:

a. review plans and designs for all civil works;

b. review PIDs' annual project work plans to determine, among other things, compliance with GOP/IBRD and GOP/A.I.D. Project Agreements on eligibility of schemes to be rehabilitated, schedules, targets, and proposed levels of funding for rehabilitating schemes; and schedules, targets and levels of funding for O&M program work;

c. inspect all rehabilitation works during construction and all schemes upon completion to determine compliance with standards required for reimbursement by A.I.D. and the IBRD;

d. evaluate, for inclusion in a project completion report, the quality of completed civil works and the efficiency of the PIDs' equipment utilization and maintenance, including comparison of labor intensive and heavy equipment methods;

e. assist the FCC to monitor project progress and to prepare consolidated quarterly and annual progress reports and project completion reports; and,

f. assist the PIDs to integrate project-financed equipment, spare parts, and machine tools into existing fleets and operations to ensure efficient utilizati...

The Supervisory Consultant team will consist of approximately 30 full-time members and two part-time members. One coordinator will be located in Islamabad in close proximity to the FCC and others will be located in the four provinces, as mutually agreed to by the FCC, Provinces, and NESPAK. Additional information on NESPAK is contained in Section IV.E.2.

4. Independent Research and Evaluation Units

Two units within WAPDA, the Alluvial Channel Observation Project (ACOP) and the Watercourse Monitoring and Evaluation Cell (WMEC), will be responsible for collecting and analyzing data for design and evaluation purposes under the ISR/ISM projects. While organizationally, ACOP falls under WAPDA's Water Resources Management Organization within the Planning Division and WMEC falls under WAPDA's Monitoring and Evaluation Organization within the Planning Division, under the ISR/ISM projects, both will serve as "consultants"

to the PIDs and the FCC in data collection, analysis, and evaluation. Both will report directly to the Federal Project Coordinator in the FCC. ACOP's services under the program will be fully funded under the IBRD project. The IBRD project will also provide funding to WMEC for project activities in FY 1983 and FY 1984. The A.I.D. project will provide financial support to this cell for project activities beginning in FY 1985 and continue funding until the end of the project. The nature of the work to be performed by these two entities is described in Section IV.F., Evaluation Plan.

5. Project Management Advisor

In order to ensure that the diverse components of the ISR/ISM projects are successfully integrated and to provide a direct linkage between the A.I.D. Mission and field operations, ISM project funds will be used to hire, under a direct A.I.D. Personal Services Contract, an experienced and senior individual to serve as the A.I.D. Project Management Advisor. This Advisor will report directly to the A.I.D. Project Officer and his scope of work is further described in Section IV.C.1.

C. Procurement Plan

1. Technical Assistance

Table 6 summarizes the broad range of technical assistance which will be required to implement this project. The majority of technical assistance will be provided by four separate teams of long-term expatriate consultants. These teams will be complemented and supplemented by short-term expatriate consultants and both long and short-term local consultants. While the four teams will work primarily on discrete components of this project as discussed in Section III., each of the teams will also be responsible for working closely with other teams on specific activities under the individual project components. Since the project components are closely related and require that certain activities take place in some cases sequentially and in other cases simultaneously, close coordination among the teams and integration of work schedules will be critical.

To facilitate this, each of the four long-term expatriate technical assistance teams will have a Chief of Party (COP) who will be responsible for supervising the performance of his team as well as liaising with the COPs of the other technical assistance teams. Because of the key role the COPs will be expected to play, the qualifications of the personnel proposed for this position by potential contractors will be a major factor in the evaluation of proposals during the competitive contracting process. In addition, funds will be provided under the ISM project to hire, under a direct A.I.D. Personal Services Contract, a senior and experienced individual to serve as the Project Management Advisor. This individual will ensure that the diverse components of this project are successfully integrated and will provide a direct linkage between the A.I.D. Mission and field operations. He will, inter alia, organize and chair regular coordination meetings of all technical assistance team members, provide reporting instructions and other directions to the COPs of all four teams, and coordinate the implementation of all in-country and overseas training programs. The Project Management Advisor will report directly to the A.I.D. Project Officer who will be the Assistant Agricultural Development Officer (Irrigation Engineer) in the Office of Agriculture and Rural Development (O/ARD).

As mentioned previously, the Supervisory Consultant firm (NESPAK) for the rehabilitation activities under both the ISR and ISM projects has already been selected by competitive solicitation and will be fully funded by the IBRD under the ISR project. Execution of the host country contract between NESPAK and the GOP is expected shortly as explained on page 68.

TABLE [illegible]

[illegible] - [illegible] OF [illegible] ADVISORS IN THE AID/[illegible]

Type of Technical Assistance	Location of TA Requirements	Fiscal Year [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	All Years
I. [illegible]							
A. Long-Term Expatriate Requirements							
1. [illegible] Engineer (Alternate Chemical)	Lahore	-	12	12	12	-	36
2. Research Engineer (Hydraulic Machinery)	Lahore	-	9	12	12	-	33
3. Design Engineer	Lahore	-	9	12	9	-	30
4. Design Engineer	Hyderabad	-	9	12	9	-	30
5. Design Engineer	Peshawar	-	9	12	3	-	24
6. Design Engineer	Quetta	-	9	12	3	-	24
B. Short and Long-Term Local Requirements	-	6	21	24	24	-	75
C. Short-Term Expatriate Requirements	-	3	12	12	12	-	39
Sub-Total		12	39	108	81	-	240
II. Research Team							
A. Long-Term Expatriate Requirements							
1. [illegible]	Lahore	-	9	12	12	9	36
2. Groundwater Hydrologist	Lahore	-	9	12	12	9	36
3. Agronomist	Lahore	-	9	12	12	9	36
4. Economist	Lahore	-	9	12	12	9	36
5. Anthropologist	Lahore	-	9	12	9	-	30
6. Systems Analyst	Lahore	-	9	9	-	-	18
7. Agricultural Engineer	Lahore	-	9	9	-	-	18
B. Short and Long-Term Local Requirements	-	36	36	36	36	36	180
C. Short-Term Expatriate Requirements	-	36	36	36	36	-	144
Sub-Total		36	36	144	72	36	324
III. Planning/Management Team							
A. Long-Term Expatriate Requirements							
1. [illegible] and Training	Islamabad	-	12	12	12	9	36
2. Planner (Projects and Budgets)	Lahore	-	9	12	12	9	36
3. Planner (Projects and Budgets)	Hyderabad	-	9	12	12	9	36
4. Planner	Islamabad	-	9	12	3	-	24
5. Trainer	Islamabad	-	9	12	9	-	30
6. Management Information Systems Specialist	Islamabad	-	9	12	3	-	24
B. Short and Long-Term Local Requirements	-	6	24	24	24	6	84
C. Short-Term Expatriate Requirements	-	3	12	12	12	3	42
Sub-Total		12	84	108	72	36	312
IV. Development Management Team							
A. Long-Term Expatriate Requirements							
1. [illegible] Management	Lahore	-	12	12	12	-	36
2. Construction Management	Lahore	-	9	12	9	-	30
3. Equipment Maintenance and Repair	Peshawar	-	9	12	9	-	30
4. Machine Shop	Quetta	-	9	12	9	-	30
5. Foreman	Hyderabad	-	9	12	9	-	30
B. Short and Long-Term Local Requirements	-	18	12	12	12	-	54
C. Short-Term Expatriate Requirements	-	3	3	3	3	-	12
Sub-Total		18	63	72	63	-	216
V. Project Assessment Advisor		-	12	12	12	12	48
TOTAL		78	234	417	324	84	1,236

[illegible] Total of Parts

Best Available Document

In addition, the services of short-term consultants have already been procured under Indefinite Quantity Contracts (IQCs) with funding from the Project Design Fund (391-0470) to assist the GOP and UNDP undertake the feasibility study for the CWM project component.

Since the Federal Coordinating Cell (FCC) has no prior expatriate contracting experience and insufficient staff to prepare and administer contracts, A.I.D. will undertake all the contracting for this project with the approval of the Federal Coordinating Cell of the Office of the Chief Engineering Advisor, GOP. The following mechanisms will be employed to procure the technical assistance required for the ISM Project:

a. a direct A.I.D. Personal Services Contract(PSC) for the Project Management Advisor for 3 years with the option to extend an additional year;

b. three separate direct A.I.D. competitively awarded contracts with U.S. private firms for the Engineering, Equipment Management, and Planning/Management technical assistance teams, each for a period of 3 or 4 years. Each of these contracts will include both long and short-term expatriate consultants and some may also require that the contractor sub-contract with local firms for long and short-term consulting assistance. The Planning/Management technical assistance contractor will also be required to procure project-financed commodities as part of the scope of work, as discussed in Section IV. C. 7; and,

c. a direct A.I.D. competitively awarded contract with a U.S. university for the research technical assistance team for a period of 4 years. This contract will include both long and short-term expatriate consultants and may also require that the contractor sub-contract with local firms for additional expertise. Since there are only a few U.S. universities which can offer the combination of field research support and academic training required by this project, the Mission will, with the assistance of AID/Washington, prepare a short list of qualified universities or consortia under Title XII or other arrangements, solicit proposals from these universities, and select the most qualified institution for the job.

In addition to the long-term contracts discussed above, the Mission will utilize existing IQCs and/or PSCs especially during the early stages of the project prior to the arrival of the long-term technical assistance teams and for specific tasks such as evaluation. ISM project funds will also be used to "buy in" to existing central projects or contracts such as the Water Management Synthesis II Project and the Organization and Administration of Integrated Rural Development Project. This "buy in" approach will be utilized to procure the services of the short-term Research

Definition Team early on in the project. During the design of the ISM project, the Mission identified and utilized the services of several local consulting firms who performed excellent work. Accordingly, funds have been set aside under the project to procure the services of short-term specialists under direct A.I.D. contracts with local consulting firms from time to time during the life of the project.

2. Commodities

Table 7 summarizes the proposed commodity procurement plan for this project. Seven different categories of commodities will be procured: (a) earthmoving equipment and workshop equipment and spare parts; (b) hydraulic measurement equipment; (c) research equipment; (d) planning and management equipment; (e) systems analysis equipment; (f) vehicles; and, (g) spare parts on a bi-annual and emergency basis for the PIDs' equipment fleet. Categories (a) through (c), which total approximately $38.0 million, will be procured under the Agricultural Commodities and Equipment(AC&E) Program(391-0468) while categories (d) through (g), which total approximately $3,140,000, will be procured under the Irrigation Systems Management (ISM) Project (391-0467).

a. Procurement under the AC&E Program

i. Earthmoving Equipment and Workshop Equipment and Spare Parts

The procurement of approximately $26 million of earthmoving equipment and workshop equipment and spare parts for the PIDs in support of canal rehabilitation and maintenance is currently underway with funds from the FY 1982 AC&E Program. Annex K-1 provides a list of the items being procured by two Procurement Service Agents(PSAs) under host country contracts which were competi vely awarded. Under the FY 83 AC&E PAAD Amendment, an additional $5 million will be earmarked for the procurement of additional quantities of the same equipment. The Mission plans to seek approval of a waiver of competition to enable the GOP to amend the contracts of the existing PSAs to procure these additional items. As a result of these procurement transactions, each of the four PIDs will have spare parts for machinery currently on hand but inoperable, spare parts for new equipment for one year, and a complete set of workshop equipment with which to repair and maintain the earthmoving equipment in both their old and new equipment fleets.

ii. Hydraulic Measurement Equipment

Approximately $1 million worth of hydraulic measurement equipment will be procured under the FY 83 tranche of the AC&E program by a PSA selected by informal

TABLE 7

PROPOSED COMMODITY PROCUREMENT PLAN

Type of Commodity	Estimated Cost (In $)	Funding Source	Commodity Source	Method of Procurement
1. Earthmoving Equipment and Workshop Equipment	26,000,000	FY82 AC&E	U.S.	Existing PSA under host country contract
and Spare Parts	5,000,000	FY83 AC&E	U.S.	Existing PSA under host country contract
TOTAL	31,000,000			
2. Hydraulic Measurement Equipment	1,000,000	FY83 AC&E	U.S.	PSA under host country contract
3. Research Equipment	6,000,000	FY84 AC&E	U.S.	PSA under host country contract
4. Planning and Management Equipment	400,000	ISM	U.S.	Planning/Management Technical Assistance Team under direct A.I.D. contract
5. Systems Analysis Equipment	160,000	ISM	U.S.	Planning/Management Technical Assistance Team under direct A.I.D. contract
6. Vehicles	580,000	ISM	Japan	USAID/Pakistan
7. Spare Parts for PIDs' Equipment Fleet	2,000,000	ISM	U.S.	GOP through its Central Procurement Office

Definitions: AC&E = Agricultural Commodities and Equipment Program(391-0468)
ISM = Irrigation Systems Management Project(391-0467)
PSA = Procurement Services Agent

solicitation procedures. Annex K-2 provides an illustrative list of the items to be procured. The equipment will be provided to ACOP and also to those provinces which have expressed a keen desire to increase their hydraulic data collection capabilities.

iii. Research Equipment

Approximately $6 million worth of research equipment will be procured under the FY 84 tranche of the AC&E program by a PSA selected by competitive solicitation. Annex K-3 provides an illustrative list of the items to be procured for use by the research organizations of the PIDs and WAPDA to upgrade their research facilities and to enable them to undertake the research activities planned under the ISM project. Prior to the selection of the PSA, firm lists of equipment and specifications will be prepared. The short-term Research Definition Team will begin the process of assessing research equipment needs and arranging for study tours for researchers to enable them to make informed judgements about the types of equipment required. The lists will be finalized with the assistance of the long-term Research Team which will be working primarily with WAPDA and the long-term Engineering Team which will be working primarily with the PIDs.

b. Procurement under the ISM Project

i. Planning and Management and Systems Analysis Equipment

Approximately $560,000 has been earmarked under the ISM project for the procurement of $400,000 of planning and management equipment and $160,000 of systems analysis equipment. During the design phase of this project, many officials of training institutes and operating agencies expressed interest in acquiring more modern methods of skill transfer and instruction, with specific emphasis on the use of small (mini and micro) computers. PIDs in two provinces also indicated a desire to utilize video tapes for upgrading and modernizing the engineering skills of their O&M staff. There are other training aids available in the United States which could make a significant contribution to the process of technical and management skills transfer in Pakistan.

The long-term Planning/Management team will assist the GOP to undertake a needs assessment and develop firm lists of equipment and specifications and will procure the equipment. A variety of audio-visual and electronic training equipment and mini/micro computer equipment will be procured by the contractor. The computer equipment will be procured after review and approval of the list of equipment by SER/DM, AID/Washington.

The introduction of computers as well as the other equipment will be phased in such that users become capable of operating each piece of equipment prior to the procurement of the next more sophisticated and complex level of equipment.

The systems analysis equipment will support WAPDA's new computer system. WAPDA's central computer serves all of Pakistan's water and power distribution needs and is therefore heavily utilized. In the past, obtaining computer time for research operations was a difficult task. With the procurement of a new system by WAPDA with its own funds and new peripheral devices and software programming with ISM project funds, these previous problems should be eliminated.

During a January 1982 TDY by a SER/DM representative, it was recommended that approval of the use of A.I.D. funds to support the WAPDA computer system be preceded by a systems analysis study to ensure coordinatic among users of the system. Such a study will be a major activity in the scope of work for the Planning/Management team.

ii. Vehicles

Approximately $580,000 has been earmarked under the ISM project for the procurement of four different categories of vehicles for use by the long-term technical assistance teams and by GOP personnel for the various planned research programs. All of the vehicles will be procured from Japan by USAID/Pakistan. They consist of: (a) eighteen (18) right-hand drive, 4-wheel drive, diesel station wagons; (b) three (3) right-hand drive, 4-wheel drive, diesel pick-up trucks; (c) fifteen (15) right hand drive, 4-wheel drive, diesel jeeps; and, (d) twenty (20) 80 - 125 cc trailbikes. The exact specifications of these fifty-six (56) vehicles and the purposes for which they are being procured are contained in the vehicle source/origin waiver request in Annex F.

iii. Spare Parts for PIDs' Equipment Fleet

Approximately $2 million has been set aside under the ISM Project for the procurement of spare parts for the PIDs on a bi-annual and emergency basis by the Central Procurement Office of the PCC over the life of the project.

D. Training Plan

Table 8 summarizes the training activities which will take place under the Institutional Improvement and Planning, Policy Implementation and Research Components. The training program will consist of three basic types of training: vocational, technical, and planning/management.

1. Vocational Training

Under the project, PIDs' equipment fleets will be expanded and workshops will be significantly upgraded which will enable the PIDs to more effectively perform civil works with heavy equipment. This will require:

a. recruitment and training of additional equipment operators and workshop technicians such as welders, machinists, and mechanics;

b. training of newly recruited or reassigned line and workshop supervisors in technical areas related to specific machines and equipment, human relations, and resource utilization; and,

c. familiarization training in the use of new earthmoving and workshop equipment for equipment operators, workshop technicians, and foremen/supervisors, as well as Executive Engineers and Subdivisional Officers in charge of workshops and excavation/operating divisions.

A total of about 400 equipment operators, workshop technicians, and workshop supervisors in the PIDs will participate in this type of training program, all of which will be held in-country.

2. Technical Training for Professionals

This type of training will include both participant (long and short-term) and in-country training, and will involve all types of professionals in the PIDs and WAPDA associated with the project. Long-term degree training is oriented for both technical specialties of irrigation engineering and water management research. Thirteen Ph.D. degree programs and 59 Masters degree programs are planned.11/

Technical training is required to update the skills of professionals in several subject areas. Some training will be specifically required to implement this project, such as industrial engineering courses for Executive Engineers and Subdivisional Officers responsible for optimum use of earthmoving equipment. These personnel will take courses in

11/ Most dissertation research will be undertaken in Pakistan on research topics related to the water sector.

TABLE 8

PROPOSED TRAINING PLAN

Project Component	Type of Training	Length of Training	Place of Training	No. of Partici-pants	Total Person Months	Proposed Schedule (FY - FY)
A. Institutional Improvement						
	1. Participant - Technical					
	a. Ph.D. Degree	42 mo.	U.S.A.	3	126	84 - 87
	b. M.S. Degree	24 mo.	U.S.A.	19	456	84 - 87
	c. Non-Degree University	12 mo.	U.S.A.	30	360	83 - 89
	d. Short-Term/Technical Courses	1 mo.	U.S.A.	60	60	83 - 89
	e. Short-Term/Study Tours	1 mo.	U.S.A.	44	44	83 - 89
	2. In-Country - Technical and Vocational					
	a. Technical Courses	0.5 mo.	Pakistan	500	240	83 - 87
	b. Vocational Training	1-5 mo.	Pakistan	400	1680	83 - 87
	SUB-TOTAL			1056	2966	
B. Planning, Policy Implementation and Research						
	1. Participant - Technical					
	a. Ph.D. Degree	42 mo.	U.S.A.	10	420	84 - 87
	b. M.S. Degree	24 mo.	U.S.A.	40	960	84 - 87
	c. Non-Degree University	12 mo.	U.S.A.	60	720	83 - 89
	d. Short-Term/Technical Courses	1 mo.	U.S.A.	97	97	83 - 89
	e. Short-Term/Study Tours	1 mo.	U.S.A.	27	27	83 - 89
	2. In-Country - Technical and Planning/Management					
	a. Technical Courses	1 mo.	Pakistan	200	200	83 - 87
	b. Seminars	0.5 mo.	Pakistan	360	175	83 - 87
	c. Management Training	0.75mo.	Pakistan	45	34	83 - 87
	SUB-TOTAL			839	2633	
	TOTAL			1895	5599	

planning and control, inventory management, work simplification and standardization, and quality control. Study tours/orientation visits abroad will be arranged for staff of the PID equipment organizations to familiarize them with agencies that are engaged in work similar to their own. PID engineers will also become familiar with the latest information on alluvial channel design in order to enhance the PIDs' capability to utilize the latest design procedures in providing for optimum management of irrigation water. Also, some WAPDA officials will take technical courses to assist them in undertaking research funded under this project.

Other technical training activities will be more general in purpose but will provide the upgraded skills needed to keep pace with the challenges faced by these agencies. Included will be study tours, short-term courses, non-degree university study, and university degree programs in such areas as engineering, geology, economics, sociology, agronomy, soil science, and research instrumentation. In addition to WAPDA and the PIDs, the capabilities of selected Pakistani universities to train needed water resources management manpower will be upgraded by providing appropriate training to their faculties.

Short-term technical courses will be provided in the U.S. or at such training sites as the Asian Institute of Technology (AIT) in Bangkok, Thailand, for about 157 participants from the PIDs and federal personnel, including WAPDA. Short-term, in-country, technical courses will also be conducted in response to expressed technical, management, or research needs. These courses may be held in the form of seminars or workshops. An estimated 500 PID and WAPDA staff will attend these courses over the life of the project. An additional 200 participants from PID and WAPDA research institutions are expected to attend similar courses which focus on specific research problems and issues.

Study tours to U.S. irrigation projects and research institutions are planned for irrigation specialists from the PIDs, research institutions, and WAPDA. The participants, itineraries, and subjects of the tours are to be carefully coordinated to reinforce and support training and technical assistance and will be approved by the Federal Coordinating Cell of the Office of the Chief Engineering Advisor, GOP. Management and research issues directly related to CWM will be addressed. A total of 71 persons will take part in such tours. Provision is also made for refresher non-degree course-work in the U.S. A total of 90 persons will receive this type of specialized long-term training.

3. Planning and Management Training

Short-term, in-country management training courses will be offered to 45 management level staff of the

PIDs. Management seminars and workshops will also be conducted by local and expatriate consultants. A regular series of meetings of the top administrators will be held to both identify problems and devise solutions. Seventy-two participants per year or a total of 360 will participate in this type of training activity.

The transfer of planning and management skills, a primary project objective, is a far more complex undertaking than technical training. The civil works and research components of the project will serve as working laboratories for implementation of this training component.

4. Training Mechanisms and Training Institutions

A variety of institutions and methods will be utilized to implement the training program. U.S. universities will be utilized to a large extent for technical training at the Ph.D., M.S., and non-degree levels (six to twelve months) and to a lesser extent for management training. They will also be the site for short-term (three to eight weeks) technical courses. Short-term technical courses will also be arranged with U.S. Government agencies such as the Department of Agriculture, Bureau of Reclamation, and Geological Survey.

All technical assistance teams will be responsible for conducting in-country training activities as well as for assisting local institutions to develop training programs. A major project objective will be to strengthen these local institutions to insure long-term in-country capability. TA teams will identify institutions that can best meet specific training needs, help to establish curricula, and assist in conducting the training activities offered at the local institutions. Potential local institutions that could participate include the WAPDA Training Academy at Tarbela, National Institute of Public Administration at Karachi and Lahore, Pakistan Institute of Management, Pakistan Administrative Staff College, Engineering Academy at Lahore, Mechanized Construction of Pakistan Ltd., colleges and universities, and various provincial training institutes.

Training conducted by the technical assistance teams will primarily include seminars of two types. First, a regular series of meetings of the top administrators are to be held about every six to eight weeks. These will constitute a forum for identifying problems and proposing solutions as the project is implemented. A facilitator from the Planning/Management Team (Section III.D.3.) will be responsible for developing the agenda and conducting the meetings. A.I.D. and IBRD representatives will participate in these meetings as appropriate. The second type of seminar/workshop will be

conducted in response to expressed technical, management, or research needs, or to take advantage of a special resource, i.e., technical advisors. The intent here is to have a flexible format for learning that minimizes formal procedures. These short-term training courses will be held utilizing the technical staff of the irrigation agencies, U.S. technical advisors, visiting staff of U.S. institutions assisting in the degree work of participants, and short-term technical staff. An estimated 500 PID and WAPDA staff will attend these courses over the life of the project, in such fields as hydraulics, systems design, siltation and sedimentation, work force organization and mobilization and the like. Two hundred participants from research institutions, PIDs, and WAPDA are expected to attend similar courses which focus on specific research problems, including computer modeling.

The Equipment Management technical assistance team will also have a major training responsibility. It will provide intensive training in inventory management and warehouse operation, workshop management and practices, and operation and maintenance of earthmoving equipment. The team will also help plan components of the PID training program for equipment operators, workshop technicians, line/workshop supervisors, and mechanical organization managers that will be conducted by in-country institutions such as the local Poly Technical Institutes.

5. Summary Training Program

A summary of the proposed training program is shown in Table 9. This level of training is considered to be minimal to meet the needs of the water sector. Actually a very small proportion of the workforce will be involved in the proposed training program. This can best be understood by comparing the proposed person-months of training with the total manpower available. There are about 2000 professionals in WAPDA's Water Wing and the PIDs. (Figures for non-professionals are not readily available.) Over the five-year period during which most training will occur, this staffing level is equivalent to 120,000 person-months of potential service. The total professional training that will be provided by the project to WAPDA and the PIDs will be 3799 person-months.12/ This figure is less than three percent of the 120,000 person-months of service available in WAPDA's Water Wing and the PIDs during this period. In other words, less than three percent of the staff from these agencies, on the average, will be undergoing training at any one time.

12/ This figure does not include the proposed 120 person-months of training for university faculty (under the Non-Degree University Category in Table 9) and 1680 person-months of training for PID equipment operators/workshop technicians and PID supervisors of operators/technicians.

TABLE 9

SUMMARY OF TRAINING PROGRAM

Type of Training	Persons	Person-Months
A. Expatriate Training		
1. Ph. D.	13	546
2. M.S.	59	1416
3. Non-Degree University	90	1080
4. Short-Term/Study Tours	228	228
Sub-Total	390	3270
B. In-Country Training		
1. Technical Courses	700	440
2. Management Seminars	405	209
3. PID Equipment Operator/ Workshop Technicians	320	1600
4. PID Supervisors of Operators/Technicians	80	80
Sub-Total	1505	2329
TOTAL	1895	5599

E. Fixed Amount Reimbursement (FAR) Procedures and Inspection

1. FAR Procedures

a. Subproject Description

Canals and drains to be rehabilitated in all four provinces under the ISR and ISM projects have been divided by the PIDs into schemes or subprojects. These schemes have also already been divided according to source of reimbursement, i.e., A.I.D. and IBRD. Each scheme includes an entire small canal or drain or a particular reach of a larger canal or drain. See Annex P for a list of proposed schemes, some of which will be subdivided into smaller schemes during implementation. These schemes will be the units to which the Fixed Amount Reimbursement (FAR) method will be applied.

b. General Procedures

Fixed amounts for reimbursement for schemes or subprojects will be individually determined during implementation. Current PID procedures require that PIDs prepare an "estimate" document for each scheme that includes a detailed description of the work to be performed, working drawings, and the estimated cost. These estimates will be the basis for determining FARs. Estimates will be submitted by the PIDs to the Supervisory Consultant. Prior to the execution of contracts or work orders, the Supervisory Consultant will verify the estimates, certify that they are reasonable, and recommend to A.I.D., through the FCC, that the FAR amount be established as 70 percent of the total cost estimate for each scheme.

Prior to the signing of the ISM Project Agreement, the Mission plans to hire a consultant under the Project Design Fund to develop, in consultation with A.I.D., the Supervisory Consultant, the FCC, and the PIDs, a detailed plan for implementation of the FAR system, including a clear and mutually acceptable definition of the inspection and reimbursement criteria which will be employed for civil works financed by A.I.D. under the ISM project. This detailed FAR implementation plan will be set forth in a Project Implementation Letter. The system that will be developed will rely to the maximum extent possible on the procedures already being followed by the PIDs while at the same time meeting A.I.D.'s requirements for implementation of the FAR system. The following procedures for preparation, review, and approval of the fixed amounts to be reimbursed, for monitoring of construction work, and for final inspection and certification for payment should therefore be regarded as illustrative:

i. A separate Work Order ("estimate") will be prepared by the PIDs for each scheme to be rehabilitated in accordance with specifications and a format that have been approved by A.I.D.

ii. The PIDs' Work Orders will be reviewed by the Supervisory Consultant and sent with recommendations to A.I.D. through the Federal Coorinating Cell (FCC) before construction begins. It has been agreed by the GOP that A.I.D. will reimburse the GOP an amount equal to 70 percent of the total estimated cost of all approved items on each Work Order. (This figure of 70 percent will also be utilized under the ISR project).

iii. A.I.D., after reviewing each Work Order submitted, undertaking field inspections on a spot-check basis, if necessary, and taking into account the recommendations of the Supervisory Consultant, will approve (or disapprove) individual Work Orders as eligible for A.I.D. funding, will specify the amount to be reimbursed upon the satisfactory completion of the works, and will notify the GOP (FCC) accordingly.

iv. Upon receipt of A.I.D.'s approval through the FCC, the Supervisory Consultant will issue an order to proceed with the construction covered by the Work Order.

v. A.I.D. will monitor execution of all Work Orders that it has approved for reimbursement on a spot-check basis in accordance with approved internal procedures based on A.I.D. Handbook 3. Such monitoring will include field inspection trips and the review of relevant files of the PIDs and the Supervisory Consultant.

vi. A.I.D. will receive periodic reports from the Supervisory Consultant who will monitor execution of each Work Order on a full-time basis in accordance with A.I.D. approved procedures.

vii. When the execution of a Work Order is complete, the Supervisory Consultant will submit a statement of completion to A.I.D. through the FCC, and will recommend that either (a) full reimbursement should be made or (b) no reimbursement should be made.

viii. Upon receipt of a request from the FCC, and based on a review of the Supervisory Consultant's statement of completion and its recommendations, and the Mission's own field inspection, if deemed necessary, A.I.D. will reimburse to the GOP the prescribed amount for each Work Order that has been satisfactorily executed.

B. Administrative Analysis

c. Design Requirements

During the first year of the project, canals within PIDs requiring the least design work will be rehabilitated first. The criterion for approval of design work will be that sound engineering judgement and practices have been followed, as discussed in the Technical Analysis (Section V.A.) During this period, the services of long-term design engineers will be provided, ACOP will collect baseline data and measure hydraulic parameters for use in design work, and some PID and Supervisory Consultant design engineers will receive training on current alluvial channel design theory. All of these inputs are intended to strengthen the capability of the PIDs to undertake more complex rehabilitation design work and to develop design criteria which will minimize future O&M problems.

Beginning in the second year and thereafter, before any portion of a canal system can be considered eligible for reimbursement, a design for the system must be completed that incorporates data collected by ACOP with a detailed analysis utilizing the most current engineering methods. Expatriate design specialists will play an important role in assisting the PIDs to undertake this design work. Each design will be for an entire canal system that must be considered, for design purposes, as a single unit, typically including a main canal with its secondary, tertiary, and quanternary canal branches. Each of these canal systems will include many of the schemes or subprojects described in (a) above.

2. The National Engineering Services (Pakistan) Limited as Supervisory Consultant

During IBRD/GOP/A.I.D. negotiations, it was agreed that IBRD would fully fund the Supervisory Consultant to support both the ISM and ISR projects. NESPAK was selected by the Government of Pakistan, with World Bank approval, through compititive solicitation, to provide these services.

NESPAK was created in 1973 as a quasi-government organization of consulting engineers. NESPAK is run by a Board of Directors, and the Managing Director oversees daily operations. The Secretary of the Ministry of Water and Power serves as the Chairman of NESPAK and provides policy guidance and performance review. The Board of Directors nevertheless lets contracts and manages its operations without involvement of the government hierarchy.

NESPAK is the only Pakistani organization of its kind which has undertaken engineering supervision responsibilities under donor-assisted programs for the GOP. It has previous experience working with IDA-funded irrigation and flood control projects and has provided supervisory consultant services to:

a. review schedules, allocation of works, and program budgets;

b. review procurement of equipment, spares, and assemblies; and,

c. supervise and monitor project reconstruction activities.

As of March 1982, NESPAK had a core staff of 1,264 employees, of which 784 were professional. NESPAK has provided consulting services for a variety of clients in the period FFY 1980/81 for a total of over $12 million. The firm has a well-established reputation in Pakistan and is adequately staffed with highly qualified professionals who are fully capable of performing the work required under the ISM and ISR projects in a professional and objective manner.

3. Relationship Between A.I.D. and IBRD Procedures for Civil Works

As discussed previously, all A.I.D.-financed civil works will be financed in accordance with the Fixed Amount Reimbursement (FAR) system. Prior to initiation of work, cost estimates will be developed by the PIDs in the form of Work Orders; they will be reviewed and certified as reasonable by NESPAK; and then they will be reviewed and approved by A.I.D. At this time also, a fixed amount equivalent to 70 percent of the estimated cost of the Work Order will be specified as the amount which A.I.D. will reimburse to the GOP upon the satisfactory completion of the works. Upon the completion of the works, either the full amount previously agreed upon will be reimbursed or no reimbursement will be made. Inspection and reimbursement criteria will be worked out jointly and agreed to by A.I.D., the GOP, the PIDs, and NESPAK, prior to the initiation of works.

Under the ISR project, civil works activities will be financed by means of cost-reimbursement type contracts. Contracts equal to or greater than Rs 2,000,000 must be formally approved by the IBRD prior to letting. Those contracts less than Rs 2,000,000 will selectively reviewed by the IBRD subsequent to letting. Reimbursement will made on the basis of 70 percent of the actual costs of the civil works. In contrast to the all or none reimbursement approach to be utilized by A.I.D., the Bank will most likely partially reimburse the GOP for incomplete works. While the Bank may not require the application of the detailed inspection and reimbursement criteria which will be developed and applied to all civil works financed by A.I.D., the same technical specifications will be applied by NESPAK to all civil works activities under the program to ensure quality control.

Neither of the donor approaches to be employed will require the PIDs to modify their procedures for preparing cost estimates or Work Orders. Clearly, however, in the case of A.I.D.-financed civil works, it will be important for the PIDs, with the assistance of NESPAK, to develop in advance firm cost estimates since the fixed amount to be reimbursed will be based on the estimated and not the actual costs of the civil works. The different procedures to be employed by both A.I.D. and the IBRD will require that NESPAK manipulate the data provided by the PIDs to satisfy the individual reporting requirements of the donors. This additional work, however, is manageable and should not create an undue burden or require a substantial increased level of effort on the part of NESPAK.

A.I.D. has discussed the requirements of the FAR system with senior NESPAK officials and has concluded that, with the spot-checking which will be undertaken by Mission staff at key decision points in the inspection/reimbursement process, NESPAK is capable of performing the required services in a highly professional, objective, and efficient manner.

F. Evaluation Plan

1. General Discussion

Four formal evaluations are planned over the life of this seven-year project, in March of 1984, 1986, 1988, and 1990. The 1984 evaluation will require about 4 weeks of effort to review secondary source data, conduct interviews, and make field visits. The other three evaluations will each entail about 8 weeks of effort and will include, in addition to the above methods of evaluation, the collection and analysis of primary source data. All evaluations will involve representatives of the PIDs, WAPDA, the Ministry of Water and Power, NESPAK, A.I.D., the IBRD, and the project-financed technical assistance teams. Several of the evaluations will also require the participation of AID/Washington personnel and either local and/or expatriate "outside" consultants. All formal evaluations will be conducted under the auspices of the Federal Project Review Board (FPRB), and the Federal Coordinating Cell (FCC), acting in the capacity of Secretariat of the Board, will arrange for as well as participate in all these evaluations. The FPRB will also be responsible for effecting policy and program changes which may be required as a result of the evaluations.

In addition to these formal project evaluations, bi-annual donor reviews involving GOP, Provincial Government, A.I.D., and IBRD representatives will take place in Islamabad to review, in particular, the performance and progress achieved in meeting the objectives of the covenants in both the IBRD/GOP and A.I.D./GOP Project Agreements. The regularly scheduled meetings of the FPRB, which will take place throughout the project, will also serve as a forum for project monitoring and informal project evaluations.

A variety of data will be generated and available for all formal project evaluations as a result of data-gathering, data analysis, and reporting activities which will take place throughout the life of the project as follows:

a. sediment and flow data collected on all canals and reaches to be rehabilitated under the IBRD and A.I.D. projects by the Alluvial Channel Observation Project (ACOP), an independent research and evaluation unit of WAPDA which will serve as a "consultant" to the FCC and will be funded by the IBRD to perform data collection, analysis, and evaluation services for the program. ACOP will shortly begin to collect baseline data and will receive additional equipment, training, and technical assistance under the project to facilitate the collection of data throughout the project. The data collected will allow a before and after comparison

of the sustainability of the rehabilitation program and the requirements for continued maintenance;

b. data on watercourse flows, cropping patterns, yields, and farmer income which will be collected by the Watercourse Monitoring and Evaluation Cell (WMEC), an independent research and evaluation unit of WAPDA which will serve as a "consultant" to the FCC and will be funded initially by the IBRD and then by A.I.D. to perform data collection, analysis, and evaluation services for the program. This unit has already begun collecting data and has received support from A.I.D. under the on-going Strengthening Water Management Activities Project (391-0452), which is the complementary Mondale rupee project to the on-going A.I.D.-financed On-Farm Water Management Project (391-0413). WMEC will receive additional assistance from the long-term consultants to be provided under the OFWM project. The availability of production impact data for project areas before, during, and at the end of the project will facilitate an evaluation of the progress achieved in meeting the overall goal of the ISR project;

c. the results of research activities which will be undertaken by PID and WAPDA research facilities throughout the life of the project;

d. project management data available from the Management Information System (MIS) which will be installed initially at the FCC and subsequently in all four Provincial Coordinating Cells (PCCs), with the assistance of the project-financed technical assistance teams. The MIS will generate administrative and financial data on all aspects of the ISR and ISM projects;

e. earthmoving and workshop equipment and spare parts data available from the inventory control systems which will be established in all four PIDs, with the assistance of the project-financed technical assistance teams, and the records of the FCC's Central Procurement Office (CPO);

f. quarterly progress reports prepared by the Supervisory Consultant which will document all civil works activities;

g. annual workplans and quarterly progress reports prepared by the four PCCs and consolidated by the FCC;

h. quarterly progress reports prepared by the four project-financed technical assistance teams and the long-term Project Management Advisor; and,

i. the minutes of the quarterly meetings of the FPRB

The following discussion outlines the objectives of each of the four formal evaluations which will take place under this project.

2. March 1984 Evaluation

This end-of-the-first-year evaluation will be, for the most part, a project management "audit." The objectives of this evaluation will be to examine: (a) the adequacy of institutional arrangements, systems of operation and work-plans; and, (b) progress achieved in providing the required inputs to the project. By March 1984, all the long-term consultants should have been in-country several months; comprehensive training and research plans should have been developed; the workshop remodeling activities should have been completed; all of the first tranche of earthmoving and workshop equipment and spare parts should have arrived; and ACOP should have collected sufficient data for use in the design of civil works rehabilitation activities. Necessary modifications in the project implementation schedule, institutional arrangements, and the project financial plan will be made at this time. In particular, the following aspects of the project will be examined:

a. the adequacy of staffing of the FCC and PCCs;

b. institutional roles and working relationships among the FCC, PCCs, FPRB, NESPAK, A.I.D., the IBRD, WAPDA, ACOP, WMEC, the Project Management Advisor, and the long-term technical assistance teams;

c. the status of commodity procurement activities;

d. the status of workshop remodeling activities;

e. the feasibility and relevance of the comprehensive training plan;

f. implementation of the FAR system including an examination of the adequacy of reimbursement and inspection criteria;

g. the adequacy of counterparts for all long-term consultants; and,

h. the feasibility and relevance of the comprehensive research plan prepared by the Research Definition Team.

This evaluation is scheduled to occur around the same time the Mission plans to submit to AID/Washington for approval a Project Paper Amendment covering activities

under the CWM component of the project. To the extent that evaluation results are available, these will be documented in the PP amendment and will to some extent influence the design of the activities included therein.

3. March 1986 Evaluation

This evaluation is scheduled to coincide with the projected completion date for the civil works rehabilitation program and will focus primarily on an evaluation of this component of the project. An attempt will be made at this time to begin to measure the impact of rehabilitation activities on agricultural production. Such questions as the following will be examined:

a. Has there been an improvement in the regularity and volume of water, particularly for those at the tail reaches of the irrigation system?

b. Has there been any change in cropping patterns, inputs or cultural practices of investment in farms based upon the perceptions of improved water regularity and volume?

c. Has there been any measurable increase in production, productivity or income due to the changes made in a. and b. above?

d. Have flooding and other surface water problems decreased?

In addition to the above initial assessment of agricultural production impact, the following aspects of the project will be examined during this year 3 evaluation:

a. progress and problems in implementing the long-term and short-term training programs;

b. the operation of the MIS and the equipment and spare parts inventory and control system at the PIDs and the CPO;

c. progress achieved in the research program including an examination of the application of research results in planning and policy formulation;

d. progress achieved in implementing the CWM pilot program which should have been on-going for about 1½ years; and,

e. the extent of integration between the research program and the long-term training program.

Lessons learned from this evaluation of the rehabilitation works program will be incorporated into the on-going CWM pilot program.

4. March 1988 Evaluation

The March 1988 evaluation is scheduled to coincide with the projected completion date of all project activities with the exception of the CWM pilot program. This evaluation will measure the impact of the project on both institutional improvement and agricultural production including an examination of lessons learned and progress achieved in meeting the goal and purpose of the project as well as end of project status (EOPS) indicators. Prior to this evaluation, clearly defined and quantifiable impact indicators will be developed. Evaluation of the training program will include such indicators as the effectiveness of the bonding requirement, the quality of participants, the extent to which course material is utilized on the job, and the relevance and appropriateness of post-training assignments for participants. In addition, the evaluation will provide the data needed to determine whether the economic projections of the IBRD, which were based on increased agricultural cropping and yields, were realized along the Indus River Basin irrigation system.

5. March 1990 Evaluation

This final formal project evaluation will focus primarily on the impact of the CWM pilot program component of the project and will be described in the proposed amendment to this Project Paper which will provide a detailed analysis and description of the activities to be undertaken.

V. PROJECT ANALYSES

A. Technical Analysis

This analysis deals with the technical feasibility and relevance of the planned civil works rehabilitation activities and the institutional strengthening and research activities under the various components of this project.

1. Civil Works Rehabilitation

a. Construction Methods

Construction methods to be employed in canal and drain rehabilitation will combine the use of earthmoving equipment maintained and operated by the PIDs and labor-intensive methods by small private contractors who rely on human and animal inputs and the use of hand tools. Labor-intensive methods will be employed on waterlogged and congested areas, schemes with short leads, and smaller distributary canals and will comprise an estimated 60 percent of the total earthwork. Heavy earthmoving equipment is required to clean sediment from canals while water is flowing since most canals operate continuously, closing only about 15 days a year. Machinery is also required for drain clearance because wet conditions do not permit the use of manual labor. About 40 percent of all civil works will be done by equipment. This mix of heavy equipment and labor-intensive methods is appropriate in order to utilize available labor economically while at the same time completing all necessary work for which heavy equipment is indispensable.

Some equipment to be used in the project will be new to the PIDs. Hydraulic excavators will be used to remove soil from relatively small canals and drains because they are more efficient than draglines, which have been used in the past. Hydraulic dredges, although they have been in operation in the Sind, will be used for the first time in the Punjab on canals where sedimentation problems are severe. Small hand-operated mechanical compaction equipment will be provided to ensure that earthwork completed by manual labor is properly compacted. The earthmoving equipment to be provided under the project will balance out the equipment inventory of the PIDs whose fleets have been designed primarily for large jobs. Small and medium size equipment will provide the capability to complete a wide range of jobs. Transport units will also provide mobility that is currently lacking.

No significant problems are anticipated in the introduction of this new equipment. The PIDs have demonstrated their flexibility and capability to maintain equipment of various types beyond its normal useful life and under difficult circumstances. In addition, technical assistance and training will be provided to ensure the proper use and maintenance of the equipment. Thus, the proposed construction methods are technically feasible, will be effective in meeting project objectives, and are most appropriate for the setting in which they will be implemented.

b. Labor Constraints

Based on past experience with civil works projects, the IBRD and the PIDs have expressed confidence that the required amount of labor will be available. Manual labor for irrigation system construction has traditionally been provided by local farmers and inhabitants since the time of the British Colonial Administration. Since Independence, both earthmoving machinery and manual labor, arranged through small private contractors, have been used to execute civil works projects.

The recent influx of Afghan refugees into areas of the NWFP and Baluchistan may serve, in part, as a surplus labor force for civil works in those provinces. However, it is possible that labor shortages may be experienced in parts of the Punjab and Sind, where seasonal crop-related demands, coupled with migration to cities and industrial areas (including the Middle East) have substantially reduced surplus labor. However, the IBRD and GOP are projecting and will make every effort to complete the entire civil works program within a three-year period, as stipulated in the IBRD/GOP agreements.

c. Canal Rehabilitation Design

Design for canal rehabilitation will be based on in-depth analyses and data collection where necessary. This is required, rather than simply a restoration to the original design, because:

i. flows have increased beyond design capacity in canals;

ii. maintenance problems such as silting or scouring indicate that original design assumptions may have been incorrect; and,

iii. recent advances in the science of alluvial channel flow make improved designs possible.

Early on in the rehabilitation program, the PIDs and Supervisory Consultant will identify those subsystems which require minimal preliminary engineering and for which immediate rehabilitation is possible. These will be scheduled for rehabilitation first, along with drains requiring routine silt clearance. Work on other canals will be scheduled according to the severity of the problems. Those canals which require greater levels of analysis and design will be scheduled to allow sufficient time to complete the required preparatory work. Factors to be taken into account will include a history of chronic or recurrent problems and the urgency of the need for repairs (i.e., threat of breaches).

The success of this intensive design effort is assured due to the existing capability of ACOP to collect and analyze hydraulic data, as well as the keen interest and commitment on the part of the PIDs to increase their capability in data analysis and design.

d. Construction Specifications

Specifications for rehabilitation work will be prepared by the Supervisory Consultant and approved by A.I.D. prior to the commencement of any construction activities. The Supervisory Consultant will carry out inspection frequently during construction to insure compliance with specifications.

e. Operation and Maintenance (O&M) Procedures

In some instances, guidelines currently used for O&M are very general and broadly applicable. Detailed O&M manuals will be prepared to the extent needed by PIDs for each canal system rehabilitated under the project, with the assistance of technical consultants. These manuals will provide specific instructions required for proper O&M and are desired by the PIDs. The proper use of these manuals will be a major factor in insuring that canals remain in their rehabilitated condition.

f. Criteria for Selection of Schemes to be Rehabilitated

Schemes selected for each year's rehabilitation program will be submitted to A.I.D. for review and approval. Within the Indus system, PIDs will use the following guidelines in selecting canal systems or subsystems for rehabilitation:

i. those located in areas of high cropping intensity/value with high risk of breaking;

ii. those with inequitable water deliveries; and,

iii. surface drains in highly developed agricultural areas which have lost most water-carrying capacity.

Canal systems or subsystems outside the Indus System to be rehabilitated under the project will meet the following criteria:

i. command area not less than 250 acres;

ii. scheme would benefit at least 25 farm families;

iii. the water source must be either a reservoir with a minimum capacity of 2.5 acre feet per cropped acre, a stream with a minimum flow of one cubic foot per second during the period of critical crop water requirement for each 125 acres cropped, or an equivalent combination of a reservoir and stream.

These criteria meet the needs for which the project was designed. They are acceptable to the GOP and conform to the criteria that will be applied under the IBRD's ISR Project.

2. Research Activities

During the design of the ISM project, specific areas of priority research were jointly identified by the GOP and A.I.D. consultants. These conform with the RAP and some have already been fully justified in large measure in GOP planning documents and studies. The research proposed is in response to problems which are being encountered in the development or management of the irrigation systems of Pakistan. The activities involve no new esoteric technology and will be entirely within the capabilities of the institutions involved, given the support proposed under the project in technical assistance, training and equipment. A needs assessment will be undertaken and plans of work will be prepared early in the project by a short-term Research Definition Team, prior to the arrival of the long-term Research Team, to ensure that the research undertaken is feasible, relevant and practical, and that systems exist for the dissemination and application of research results by decision-makers.

3. Institutional Strengthening Activities

In addition to the new technology which will be introduced in rehabilitation design and water management research, new planning and management systems and tools will be introduced and adapted to the Pakistan context with the assistance of technical consultants. A significant amount of technical, vocational, and planning/

management training is planned to ensure the transfer and assimilation of these skills by Pakistani counterparts. A major objective of the institutional strengthening activities will be to establish a local capability both in the PIDs and in indigenous water sector and other relevant training institutions to provide in-service training as well as training for new personnel in the newly acquired skills. As mentioned previously, a systematic needs assessment will be undertaken prior to the procurement of any planning/management, training, and systems analysis equipment, and the new equipment will be phased into the program to ensure that users are properly trained and comfortable with the application of the new technologies.

4. Conclusion

The project as a whole as well as its individual components are technically feasible and sound. The technical assistance and training to be provided will build on the education and experience base existing in the PIDs, WAPDA, and other water sector agencies. Various combinations of training for management, professional, and technical staff, and construction, operation, and maintenance personnel will ensure the transfer and assimilation of practices and technologies currently in use in other parts of the world. Both the civil works rehabilitation and the planning/management and research components of the project will serve as living laboratories for the application of the newly acquired skills. In summary, all project components are based on technically sound analyses, proven methodologies, and on analytical safeguards which assure the prudent use of project funds.

B. Administrative Analysis

Figure 1 shows the institutional relationships among the implementing organizations involved in this project. The key actors will be the Federal Ministry of Water and Power, the semi-autonomous Water and Power Development Authority (WAPDA), which falls under the Ministry of Water and Power, and the four Provincial Irrigation Departments (PIDs). (Implementation of the CWM project component will also involve, among others, the Provincial Agricultural Departments. Since the institutional relationships and administrative mechanisms are,therefore, likely to be somewhat altered and/or expanded, an administrative analysis section will also be included in the proposed Project Paper amendment which will describe the CWM component.)

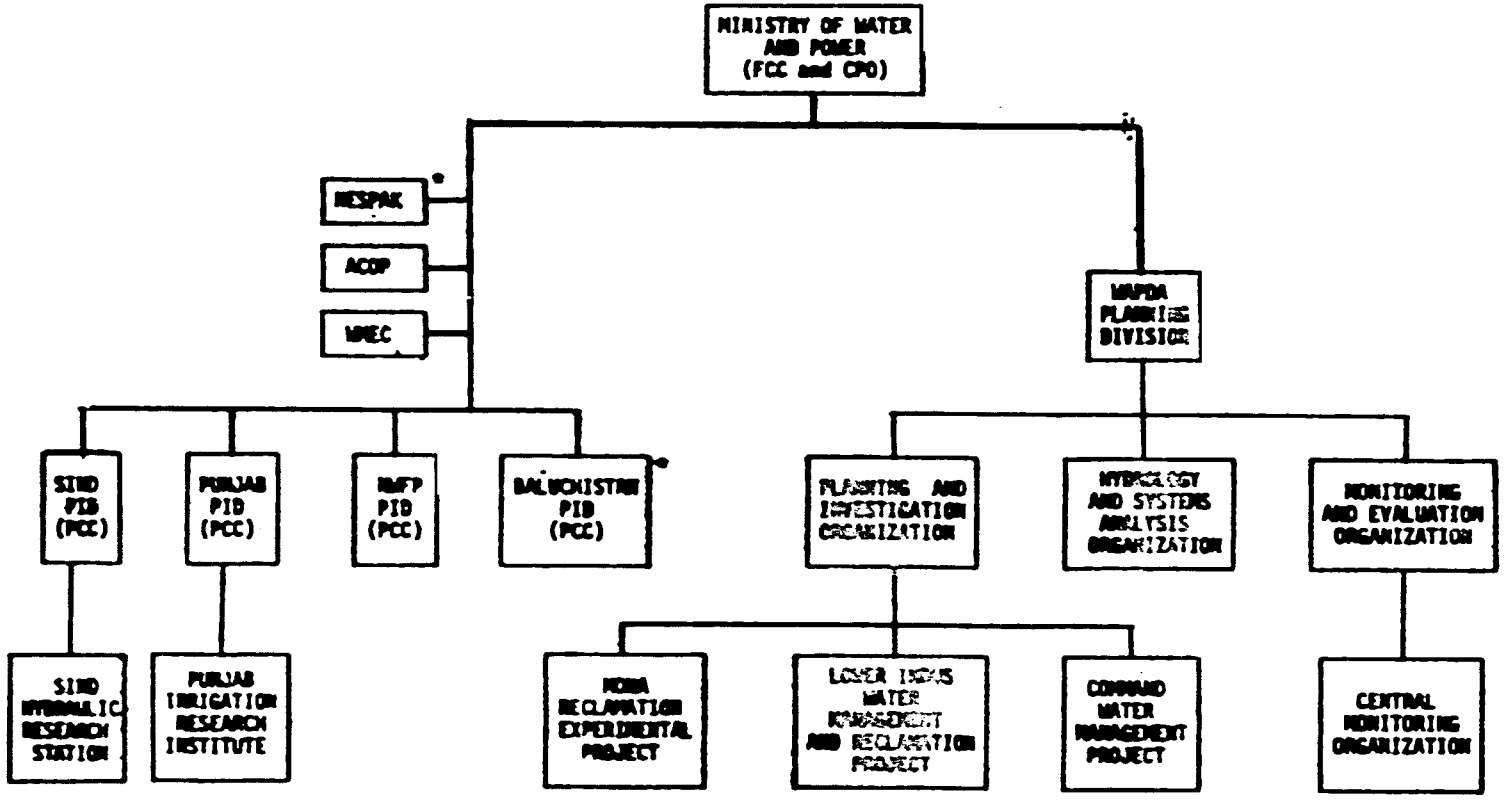
As discussed previously, to ensure the timely and efficient implementation of this project, the following three new entities will be constituted: (1) a Federal Coordinating Cell (FCC) in the Office of the Chief Engineering Advisor (who reports directly to the Secretary) in the Ministry of Water and Power, which will be headed by a Federal Project Coordinator; (2) a Provincial Coordinating Cell (PCC) in each of the four PIDs, which will be headed by a Provincial Project Coordinator who will report directly to the PID Secretary; and, (3) a Federal Project Review Board (FPRB), which will have as its members, the Chief Engineering Advisor in the Ministry of Water and Power as Chairman, the four PID Secretaries, and WAPDA's General Manager for Planning. Representatives of A.I.D., the IBRD, and NESPAK will attend Board meetings as ex officio members, and the Federal Project Coordinator and the Provincial Project Coordinators will attend the meetings from time to time as resource personnel. The duties and responsibilities of the FCC, PCCs, and FPRB are described in detail in Section IV.B.2., Administrative and Monitoring Responsibilities.

With the exception of WAPDA's General Manager for Planning, the FPRB has already been meeting regularly over the last several months and in fact played a major and highly effective role in the design of the ISM Project. Similarly, the FCC and several of the PCCs are already partially staffed and functioning. Adequate funding is available to fully staff the FCC and PCCs. Based on the experience to date and the commitment of the GOP and the PIDs, these three entities should perform the functions for which they were created in a highly professional and effective manner.

The project will rely on the existing organizational structures within the PIDs and WAPDA's Planning Division, as shown in Figure 1, for the implementation of the research and planning components of the project. As a result, no

FIGURE 1

INSTITUTIONAL RELATIONSHIPS AMONG IMPLEMENTING ORGANIZATIONS



DEFINITIONS:

FCC - Federal Coordinating Cell

CPO - Central Procurement Office

PID - Provincial Irrigation Department

PCC - Provincial Coordinating Cell

NESPAK - National Engineering Services (Pakistan) Ltd. (Supervisory Consultant under IBRD-funded contract with FCC)

ACOP - Alluvial Channel Observation Project (Organizationally, this unit falls under WAPDA's Water Resources Management Organization within the Planning Division; under the ISR/ISM projects, however, ACOP will serve as a "consultant" to the PIDs and FCC in data collection and evaluation.)

WMEC - Watercourse Monitoring & Evaluation Cell (Organizationally, this cell falls under WAPDA's Monitoring and Evaluation Organization within the Planning Division; under the ISR/ISM Projects, however, WMEC will serve as a "consultant" to the PIDs and FCC in data collection and evaluation.)

* A Federal Project Review Board, consisting of the Chief Engineering Advisor, Ministry of Water and Power as Chairman, the four PID Secretaries, and WAPDA's General Manager for Planning will meet regularly to ensure the efficient and timely implementation of this project. Representatives of A.I.D., the IBRD, and NESPAK will serve as ex-officio members of the Board, and the Federal Project Coordinator and Provincial Project Coordinators will attend meetings from time to time as resource personnel.

administrative or organizational problems are expected to occur in the implementation of these components of the project. In addition, NESPAK has already been working with the Office of the Chief Engineering Advisor in the Ministry of Water and Power and the excellent professional and effective working relationship which they have developed is readily apparent. Similarly, discussions have been held with ACOP and WMEC, and there is a clear understanding and agreement about their roles, responsibilities, and relationships under the project.

Table 10 provides a summary of the professional staff of the PIDs by province. The training and professional experience of the staff of the PIDs are an adequate base on which to build. The professional staff and established administrative procedures for implementation of the civil works rehabilitation component are already in place. The training and technical assistance which will be provided under the project will enable this core staff to integrate the short-term rehabilitation activities with the long-term institutional development and technology transfer objectives of the program. With the assistance of Supervisory Consultant Engineers to ensure that work is performed according to standards required by the IBRD and A.I.D. Project Agreements, and utilizing familiar administrative procedures for work definition and implementation, the scope of activities falls well within the administrative capabilities of the PIDs.

As an outgrowth of the UNDP/World Bank Indus Basin Planning Project, which produced the RAP, an organization called the Master Planning and Review Division was created in WAPDA in 1976. In 1980, this responsibility was further solidified within WAPDA in an entity called the Planning Division which is responsible for master development planning in Irrigation and Agriculture. The Planning Division has acquired expertise in all disciplines relevant to planning: hydrology, water management, drainage, agriculture, soil science, systems analysis and economics. It has already initiated the feasibility planning study for the pilot CWM program. This Division has several years of project preparation experience. Similarly, the training and professional staff of the research organizations of WAPDA which will be involved in this project are an adequate base on which to build. While WAPDA's Planning Division is the primary participant in the planning and research project components, the embodied experience of the WAPDA Water Wing adds strength to the specific activities proposed under the project. Table 11 provides a summary of the existing staff of WAPDA's Water Wing.

TABLE 10

SUMMARY OF THE PROFESSIONAL STAFF OF THE PROVINCIAL IRRIGATION DEPARTMENTS, 1981

Title of Post	Punjab	Sind	NWFP	Baluchistan	Total
1. Secretary	1	1	1	1	4
2. Additional Secretary (Irrigation)	0	1	0	0	1
3. Additional Secretary (Power)	0	1	0	0	1
4. Deputy Secretary (Power)	1	0	0	0	1
5. Deputy Secretary (Administration)	1	1	0	0	2
6. Deputy Secretary (Operation)	1	1	1	1	4
7. Deputy Secretary (Development)	1	1	0	0	2
8. Chief Engineer	8	4	1	1	14
9. Superintending Engineer	35	20	5	5	65
10. Executive Engineer	99	57	17	14	187
11. Under-Secretary	13	0	0	0	13
12. Section Officer	6	16	4	4	30
13. Executive Engineer (Operation)	8	0	0	0	8
14. Executive Engineer (SCARPs)	7	0	0	0	7
15. Sub-Divisional Officer	282	172	41	37	532
TOTAL	463	275	70	63	871

TABLE 11

SUMMARY OF THE PROFESSIONAL STAFF OF THE WATER WING OF THE WATER AND POWER DEVELOPMENT AUTHORITY, 1981

Title of Post	Division (Office)								
	Planning	Dams	Kalabagh Dam	North	Central	South	Hydro-geology	Central Design Office	Total
1. General Manager	1	1	0	1	1	1	1	0	6
2. Deputy General Manager	1	0	0	0	0	0	0	0	1
3. Chief Engineer	5	2	1	2	2	3	0	2	17
4. Director/Superintending Engineer	10	2	1	0	0	0	1	6	20
5. Director/Project Director	25	4	1	7	14	8	3	1	63
6. Superintending Officer a/	2	4	0	2	0	5	5	0	18
7. Deputy Director	52	7	2	7	9	7	0	19	103
8. Senior Officer a/	71	30	3	36	42	31	23	0	236
9. Junior Officer a/	255	72	11	82	93	108	69	0	690
10. Assistant Officer a/	21	2	0	10	3	0	0	27	63
TOTAL	443	124	19	147	164	163	102	55	1,217

a/ Officers include the following disciplines: engineering, agricultural engineering, geology, hydrogeology, soil scientist, agronomy, economics, research, and statistics.

In summary, effective and appropriate administrative mechanisms have been or will be established to meet the unique implementation requirements of this project. In addition, the organizations involved in the implementation of this project have the required manpower, experience, and already established administrative systems to effectively implement the project. This competence will be enhanced under the project through the provision of training and technical assistance. The project is therefore considered administratively feasible and sound.

C. Social Soundness Analysis

The key social issues relevant to this project include the spread of benefits, the acceptability of the project, and the social obstacles to success.

1. Benefits

The principal benefits which will be derived from this project are: (a) reduced disruption of agricultural production caused by canal breaching (both flooding in areas adjacent to the breach, and the shut-off of water along the entire sub-system during repairs); (b) reduced rain flooding damage to crops through improved surface drainage; (c) equitable and reliable distribution of water, particularly to farmers at tail ends of systems; and, (d) employment opportunities for unskilled laborers involved in civil works and for agricultural workers as production is intensified. Benefits for the combined GOP/AID/IBRD canal rehabilitation efforts have been estimated by the World Bank as follows:

Benefiting farm families	700,000-800,000
Benefiting command area	9.5 million acres
Increase in per capita income	5-20%
Increase in farm employment (project life)	62,000 full-time jobs
Construction employment (project life)	29,000 full-time jobs

2. Distribution of Benefits

Beneficiaries are widely spread throughout the country, following the irrigation system. (Punjab and Sind, however, contain the major share of the irrigation system.) Direct benefits which will come from increased farm productivity will be distributed largely along the existing pattern of land ownership and to some extent by location of farmers within the irrigation system. Thus, two thirds of extended beneficiaries will be small farmers operating less than 12.5 acres. Improved water distribution to tail end watercourses should particularly benefit farmers in such areas, who tend to have lower average incomes than farmers higher in the system. Agricultural workers without land holdings will benefit from the increased construction employment and also on-farm employment opportunities which will result from increased water availability at the tail end watercourses.

3. Impact on Women

This project will not affect the role of women nor provide specific benefits directed at women. They will benefit generally as members of farm families which have more reliable water supplies, reduced threat of floods and increased agricultural productivity and income. Employment opportunities both in civil works and for farm laborers can be expected to accrue primarily to men, although in some cases, both male and female labor from remote "tribal" areas of the Punjab who typically engage in construction work might be involved in the project.

4. Impact of Project Covenants

Two project covenants contained in both the A.I.D./GOP and IBRD/GOP Project Agreements have potential negative consequences in the short-term for individual farmers, although they will have beneficial consequences to farmers in the long-term and to agriculture in an economic sense. The first involves an increase in water rates. The second relates to eventual divestiture of publicly-owned tubewells.

a. Water Charges

Water charges or other appropriate financing arrangements are to be periodically increased in each province so as to achieve a full recovery of O&M costs during the period 1990-1992 for individual provinces. The rationale for this requirement is the desirability of having all O&M works covered by an assured source of revenue and the more efficient use of water which can result if rates are more in accord with actual system costs.

Water charges refer to indirect Irrigation Department taxes on canal water supplies, called "abiana." In reality, they are direct taxes on crop production based on a complicated and largely arbitrary scheduling of rates with respect to provinces, major canal command, season, crop type, acreage planted, and crop failure. The rates are assessed by junior-level Irrigation Booking Clerks, called "Patwaris," based on periodic field and crop inspections.

Farmers may be expected to initially oppose periodic increases in water rates. Efforts to avoid payments by colluding with government employees may rise, and agencies may be partially frustrated in efforts to raise revenues. However, farmers are familiar with current rate structures and may be expected to pay more in the future if the benefits of efficient and timely water deliveries can be both

demonstrated and guaranteed. Moreover, farmers require the canal water and will no doubt accept the need to pay for their water if they are faced with a rigorously enforced GOP program for revenue collection.

b. Tubewell Divestiture

A study of the feasibility of transferring a number of public tubewells, now owned and operated by the Government, to the private sector is to be completed by July 1, 1983. These tubewells are for the most part in the Salinity Control and Reclamation Project (SCARP) areas of the Punjab and Sind, but many are also outside the SCARP zones. Tubewells in highly saline areas are likely to remain under governmental control.

The socio-cultural feasibility of public tubewell transfers in largely unknown, necessitating the exploratory study. In principle, it is expected that the transfers will be opposed initially by farmers now receiving groundwater free of charge, particularly large and influential farmers active in lobbying groups. Public employees, notably tubewell operators, are likely to oppose any transfer as they stand to lose power and income. Farmers may, in most instances, welcome the opportunity to directly manage the tubewells, but they will still oppose paying the transfer and maintenance costs incurred. The GOP commitment at this point relates only to completion of the study. It may in fact prove economical for an existing public tubewell to be shut down altogether if no buyers from the private sector come forth to enable a transfer, and for smaller capacity private tubewell investments to be encouraged.

Tubewell water use, even when used in conjunction with canal water supplies, can have a substantial positive effect on crop productivity, and dependability of tubewell water supply (i.e., availability on short notice in response to crop water requirements) is the key. A dependable source of tubewell water supply, preferably under the control of a fewer number of individuals, can significantly affect productivity throughout a watercourse command where access (sales) to all farmers is customary. Following this rationale, a spread effect of public tubewell transfers and private tubewell operation could be increased productivity for all farmers on a watercourse via increased efficiency in tubewell water use.

5. Rehabilitation Design

The physical design component, ensuring quality control of all works, is intended to improve the conveyance of water in canals to downstream reaches and to ensure that canals do not "silt-up" (where flows are inhibited due to silt accumulations over time). The rehabilitation and O&M components of the project will insure that silt is evenly distributed to all watercourse outlets on a given canal system.

Since this project component will improve conveyance efficiencies which will beneift downstream watercourses on the one hand and equitably distribute silt to all watercourses on the other, it is considered socio-culturally feasible. However, there may be instances where silt deposits increase in watercourses (instead of accumulating in the canals), and labor-intensive efforts to remove silt deposits in watercourses may also have to increase, with some detrimental effects to individual irrigators. A spread effect of this redistribution of silt may be an increased desire for watercourse improvement schemes to help insure that rising quantities of silt flowing through watercourses can be passed on to farmer's fields and not overly accumulate in watercourse channels.

6. Summary

The rehabilitation and improved O&M components of this project involve an established and accepted system which is essential to agricultural production. The physical design component relates directly to the rehabilitation and O&M components and should be welcomed by farmers and administrators alike. Farmers and PID officials understand the importance and relevance of both rehabilitation and maintenance works and the benefits to be obtained. The technology is known to and within the capability of PID officials. Labor for civil works is expected to be available as required, although the possibility of labor constraints in the Punjab and Sind may extend the project beyond the period projected by the IBRD and GOP.

Project activities will result in net benefits in terms of construction and farm employment, as well as increased on-farm income. Increased water rates and public tubewell divestitures may have minor negative impacts on farmers in the short-term. However, the potential long-range benefits of the system covering its O&M costs and the potential to encourage more efficient water use outweigh the possible short-term disadvantages (in terms of additional costs) to farmers. In summary, this project is judged to be socially sound and feasible.

D. Economic Analysis

1. IBRD's Economic Analysis of the Civil Works Component

The World Bank has analyzed the economics of the rehabilitation program. The economic evaluation yielded an Internal Economic Rate of Return (ERR) of 58 percent and a Net Present Value of Rs 4,363 million, or about $ 340 million at an exchange rate of US $ 1.00 = Rs 12.82 as of January 3, 1983. This high ERR, coupled with sensitivity tests showing economic viability under a wide range of significantly adverse conditions, testifies to the economic soundness of the civil works rehabilitation program.

a. Methodology

The Bank used a "with" and "without" analysis to estimate benefits and costs. To assess the ISR project's net benefits, the project area was divided into five sub-areas (two in the Punjab and one each in the Sind, NWFP, and Baluchistan), using representative sub-systems/schemes based on "agro-climatic conditions and type of rehabilitation work proposed to be undertaken on a specific sub-system or small scheme." Benefit and cost streams were computed for each sub-system/scheme and aggregated to arrive at the project's economic cash flows over a 23-year period.

b. Benefits

The project will: (i) benefit 700,000 to 800,000 farm families (about one-sixth of the population inhabiting the project command area) and 9.5 million acres of the canal command area; (ii) increase agricultural per capita income by 5 to 20 percent; (iii) generate 15 million man-days per year of farm employment; and (iv) decrease income disparities within the farming community. The present worth of the identifiable direct foreign exchange impact of the project will total about $230 million.

The principal project benefit is increased agricultural output. The project will increase agricultural production by reducing the risk of failure and improving the reliability and distribution of water supplies. It has been assumed that the incremental output benefits will accrue through: (i) a reduction of acreage adversely affected by canal closure and breaches from 15 percent of the culturable command area in "without the project" condition to about 2 percent "with the project"; (ii) a modest decrease of 2 to 5 percent in both yields and cropping

intensities "without the project" to the same percentage increases "with the project"; and, (iii) increased input utilization encouraged as a result of improved reliability of water supply. Baluchistan, however, is also expected to have an increased water supply due to rehabilitation of small irrigation schemes which would increase crop yields and intensities by 30 and 56 percent, respectively.

The project will also generate significant employment opportunities. Overall direct employment benefits will largely arise from increased input utilization on land already cropped. It is estimated that the incremental labor needed for production will increase from the current level of 195 million man-days to 210 million man-days per year or the equivalent of about 62,000 additional jobs. In addition, construction of civil works will create approximately 8 million man-days of employment in the course of project implementation, primarily for unskilled labor.

The project will also bring about a more equitable distribution of water which would tend to decrease income disparities. Improved distribution of water supplies should generate relatively higher production benefits for farmers on tail end watercourses.

c. Project Costs

The overall financial costs of the rehabilitation component of the program are summarized in Table 12. The total cost of the ISR project is estimated at $118.1 million which includes a GOP contribution of the equivalent of $33.1 million, $40.0 million from IDA, and $45.0 million from A.I.D. (which includes $13.7 million for civil works, $20.2 million for equipment, $1.3 million for technical assistance, $0.3 million for training, and $9.5 million for contingency and inflation).

2. A.I.D.'s Assessment of the Civil Works Component

The IBRD's methodology of economic analysis and the results, based on assumptions detailed on pp. 37-41 of the Staff Appraisal Report (SAR), are acceptable. The economic cash flows, however, can possibly change due to, among other things: changes in project implementation schedules and hence disbursement rates; cost adjustments in several line items, particularly civil works and technical assistance; building into the analysis the Bank's excluded possible replacement costs for a portion of the equipment; and, varying conditions relating to acreage benefitted and yield increases. These changes, as is indicated in the sensitivity analysis in Table 13 can be tolerated, however, without endangering the economic viability of the project or of the provincial sub-systems or schemes.

TABLE 12

Program Costs as Estimated by the IBRD[a]

Cost Summary by Expenditure Category [b]

	LC	FX	Total	LC	FX	Total
	(In Rs M)			(In US $ M)		
1. Civil Works	549.0	106.9	655.9	49.9	9.7 [c]	59.6
2. Equipment	151.8	165.3	317.1	13.8	15.0	28.8
3. Technical Assistance	15.4	17.2	32.6	1.4	1.6	3.0
4. Training	1.3	2.3	3.6	0.1	0.2	0.3
5. Supervision & Administration	0.8	0.1	0.9	0.1	0.0	0.1
BASE COST	718.3	291.8	1,010.1	65.3	26.5	91.8
6. Physical Contingencies	1.8	2.0	3.7	0.2	0.2	0.3
7. Price Contingencies	225.9	59.1	285.0	20.5	5.4	25.9
TOTAL COST	946.0	325.9	1,298.8	86.0	32.1	118.1[d]

Source: World Bank, Staff Appraisal Report (SAR), Irrigation Systems Rehabilitation Project, April 9, 1982.

a/ Economic costs have been derived from these financial costs. Also added to these investment economic costs are the increased annual operation and maintenance expenditures.

b/ The IBRD used the prevailing exchange rate of US $1.00 = Rs 11.00 at the time of preparation of its SAR.

c/ Represents goods and services to be provided by the GOP which involve a foreign exchange outlay by the GOP such as gasoline for vehicles.

d/ Consists of: a $40.0 million IDA credit; $45.0 million A.I.D. grant; and the equivalent of $33.1 million by the GOP (which includes the equivalent of about $15.0 million for taxes and duties on equipment to be paid by the PIDs.)

TABLE 13

SENSITIVITY TEST-INTERNAL ECONOMIC RATE OF RETURN
(%)

	Punjab	Sind	NWFP	Baluchistan	Total Project
1. Base Case	65	59	25	22	58
2. Delays in Benefits a/	42	40	16	20	39
3. Lower Yields b/	39	36	13	17	35
4. Area Benefited c/	37	33	22	20	34
5. Lower Yields and Area Benefited d/	29	25	17	15	26

Source: Op. cit.

a/ Benefits are assumed to be delayed by three years except for Baluchistan where a two-year delay was assumed.

b/ "With the Project" yields were assumed to remain constant relative to present levels except for Baluchistan, where only a 10% increase was assumed.

c/ In Punjab and Sind, the area benefited was assumed to be one-half the base case, whereas in NWFP and Baluchistan, the area benefited was reduced by 10%.

d/ Assumed to decrease in same percentages as b/ and c/ above.

The sensitivity test shows that under many possible adverse scenarios of benefits and costs, the ERR of the project and of the sub-systems or schemes remain well above the assumed 12 percent opportunity cost of capital in Pakistan. Even if the total project costs are increased by 45 percent (from $118.1 million to $170.8 million) 13/, the ERR will remain above 12 percent. The IBRD's April 1982 SAR indicates that total project costs can increase by as much as 79 percent under the worst scenario (item 5 in Table 13) and the ERR would remain above 12 percent.

3. Assessing the Economic Impact of Institutional Development

A.I.D. has added to this program a significant amount of resources for institutional development, primarily in the form of training, technical assistance, research

13/ Subsequent to the preparation of the IBRD's SAR from which the above economic analysis was taken, A.I.D., in collaboration with the IBRD and the GOP, agreed to provide additional funding to the program to finance institutional strengthening, planning, and research activities plus additional equipment for rehabilitation works such that the total program costs, as described in Section V.F., are estimated at $170.8 million.

operating expenses and field demonstration programs, and related equipment. This adds to the cost of the project without directly affecting the kilometers of canals and reaches rehabilitated, or the length of surface drains cleaned. At the same time, it adds to the benefits of the project, which are not, however, amenable to a rate of return analysis.

A major benefit to be derived from the additional funding is the insurance that the project will deliver as proposed, that is, that the combination of reimbursement for completed subprojects and infusion of new earthmoving machinery will actually produce the rehabilitation which is needed. The insurance is in the form of training and technical assistance which will help improve the skills of the PIDs, as well as the efficiency of resources utilization. Rather than "more business as usual," which results from additional funding and doubling the equipment inventory, new or modified methods of operation and maintenance are expected. Improvements in channel design, a desired objective of the project over time, will reduce the accumulation of silt and deterioration of banks and berms, and thereby lower the recurring costs of keeping the system in equilibrium. The extra costs are balanced by the extra certainty that the output targets will be met and will produce a sustainable system with GOP funds for maintenance.

Another major benefit to be derived from the additional funding by A.I.D. is the knowledge generated, transferred, and applied on the potential optimization of the world's largest irrigation system. There is much to be learned, and both A.I.D. and the IBRD recognize that their projects are but the beginning of a multi-year program of gaining control over this vast resource. Insofar as the project-financed research produces results which can be operationalized in the Command Water Management component of the ISM project or incorporated into programs financed by the IBRD, steady movement toward the eventual objective of maximizing land and water resources will have occurred. The benefits are speculative, of course, as are all those involved in research and pilot testing of new innovations. But the potential is within Pakistan for substantial if not multiple increases in agricultural income. The movement toward synthesized control of water, directed by the needs of agriculture, is required to achieve the high potential for growth. The augmented portions of A.I.D.'s project directly affect the timetable by which this growth can occur. The benefits, within a long-term perspective, are judged to be well above the costs which have been added by A.I.D. to the IBRD's civil works project.

E. Financial Analysis

1. General

Financial resources for the program will come from four different sources: (a) the IBRD/IDA's Irrigation Systems Rehabilitation (ISR) Project; (b) A.I.D.'s Irrigation Systems Management (ISM) Project (391-0467); (c) A.I.D.'s Agricultural Commodities and Equipment (AC&E) Program (391-0468); and, (d) the Federal and Provincial Governments of Pakistan. The total estimated cost of the program is $170.830 million, consisting of a $40.0 million IBRD/IDA credit; a $65.0 million grant under A.I.D.'s ISM project; $38.0 million in grant funds under A.I.D.'s AC&E Program; and, a GOP contribution of the equivalent of $27.830 million. The total A.I.D. contribution to the program is equivalent to 60 percent while that of the IBRD and the GOP are 24 percent and 16 percent, respectively. 14/

14/ The Bank's ISR Project was negotiated in March 1982, a Staff Appraisal Report (SAR) was prepared in April 1982, and the IBRD/GOP and IBRD/Provincial Government Agreements were signed in June 1982. The Bank's project is a rehabilitation works project, which will be co-financed by A.I.D., principally through component 1 of A.I.D.'s ISM Project and funding for equipment under A.I.D.'s AC&E Program. The total estimated cost of the ISR Project, as prepared by the IBRD, is $118.1 million, consisting of a $40.0 million IDA credit, an A.I.D. grant of $45.0 million, and a GOP contribution of the equivalent of $33.1 million. The Bank's SAR shows the A.I.D. contribution as follows: $13.7 million for civil works; $20.2 million for equipment; $1.3 million for technical assistance; $0.3 million for training; and, $9.5 million for contingency and inflation. However, subsequent to the signing of the ISR Project Agreements and in collaboration with the IBRD and GOP, A.I.D. agreed to provide additional funding, principally for technical assistance, training, research, and related commodities as well as additional equipment for the rehabilitation works component, and to finance most of the equipment for the program under A.I.D.'s AC&E program. The budget tables in this financial analysis therefore reflect the actual A.I.D. contribution to the program. In addition, whereas the IBRD included duties and taxes for equipment (to be paid by the Provincial Governments) in the estimate of the GOP's contribution to the ISR project, the category of costs has not been included in the budget tables herein since the payment of duties and taxes is merely a financial transfer between GOP agencies and therefore is not regarded as a net GOP contribution to the program.

Three summary tables are provided on the following pages: Table 14 summarizes project costs by fiscal year and source of funding; Table 15 describes project costs by expense category, local and foreign exchange costs, and source of funding; and, Table 16 depicts project costs by project component, expense category, local and foreign exchange costs, and source of funding. Additional data are provided in the Financial Analysis Annex (Annex Q).

The budget tables do not include the $38.0 million earmarked under the AC&E Program to procure equipment for the ISM project. Nor do the tables include the proposed $25.0 million for the CWM pilot program (component 4 of the ISM project), for which the Mission will prepare a Project Paper Amendment and seek approval of an authorization amendment in FY 1984. A revised financial analysis and revised financial tables will be prepared at the time of PP submission to reflect the addition of the $25.0 million in A.I.D. ISM project funding and other sources of funding for the CWM pilot program.

Project costs are defined as anticipated sub-obligations or commitments of funding through, e.g., PIOs, contracts, purchase orders, or work orders for civil works. Inflation was calculated for A.I.D. project costs on the basis of 10 percent per year for U.S. salaries, 15 percent per year for all other foreign exchange costs, and 20 percent per year for local costs, all compounded annually. A contingency factor of 7 percent was applied to all A.I.D. ISM project costs and the GOP's contribution. The IBRD, in its calculations of project costs, included a factor of 32 percent of all costs for both contingency and inflation. Local costs are expressed as dollar equivalents at the exchange rate of U.S. $ 1.00 = Rs 12.82 as of January 3, 1983.

2. Summary Cost Estimates and Financial Plan

a. A.I.D. Contribution

The A.I.D. contribution to this program will come from two sources: (i) $65.0 million under the ISM project; and, (ii) $38.0 million which has been earmarked under the AC&E program for the procurement of equipment, consisting of $26.0 million in FY 1982; $6.0 million in FY 1983; and, $6.0 million in FY 1984. The fiscal year allocation of funds under the AC&E program reflects the proposed commodity procurement schedule for the equipment required under the ISM project and takes into account the expected availability of funding under the AC&E program. Integration of these two sources of funding will be carefully monitored by the Mission.

TABLE 14

SUMMARY OF PROJECT COSTS BY FISCAL YEAR AND SOURCE OF FUNDING a/

(In $ 000)

Source of Funding	FY 1983	FY 1984	FY 1985	FY 1986	Total
A.I.D. Grant					
FX	19,963	2,740	9,259	3,038	35,000
LC b/	14,037	9,260	4,241	2,462	30,000
Total A.I.D. c/	34,000	12,000	13,500	5,500	65,000
GOP b/	4,200	11,500	11,630	500	27,830
IBRD/IDA	11,220	13,750	14,918	112	40,000
Total Contributions	49,420	37,250	40,048	6,112	132,830

a/ Project costs are defined as anticipated sub-obligations or commitments of funding through, e.g., PIOs, contracts, purchase orders, or work orders for civil works.

b/ Expressed as dollar equivalents at the exchange rate of US $1.00 = Rs 12.82 as of 1/3/83.

c/ Does not include: (i) an estimated $38.0 million (consisting of $26.0 million in FY 1982, $6.0 million in FY 1983 and $6.0 million in FY 1984) of equipment for the ISM project which will be procured with funds under the AC&E Program (391-0468); and, (ii) an additional $25 million for the CWM component of the ISM project, for which the Mission will seek authorization in FY 1984, and for which the following obligation schedule is planned: FY 1984 = $10.0 million; FY 1985 = $3.5 million; and, FY 1986 = $11.5 million.

TABLE 15

SUMMARY OF PROJECT COSTS
BY EXPENSE CATEGORY AND SOURCE OF FUNDING a/
(In $ 000)

Expense Category b/	Life of Project Funding					
	A.I.D. Grant			GOP c/	IBRD/IDA	TOTAL
	FX	LC c/	Total d/			
1. Technical Assistance						
a. U.S. Long-Term	17,200	6,151	23,351	-	-	23,351
b. U.S. Short-Term	3,439	1,413	4,852	-	-	4,852
c. Local Consultants	-	801	801	-	1,600	2,401
Sub-Total	20,639	8,365	29,004	-	1,600	30,604
2. Training						
a. U.S. Long-Term	7,691	842	8,433	300	-	8,733
b. U.S. Short-Term	1,472	761	2,233	-	-	2,233
c. In-Country	-	1,056	1,056	1,500	-	2,556
Sub-Total	9,063	2,659	11,722	1,800	-	13,522
3. Commodities						
a. Planning, Mgt. & Sys. Anal.	560	-	560	500	-	1,060
b. Spare Parts for PIOs' Fleets	2,000	-	2,000	-	-	2,000
c. Vehicles	580	1,189	1,769	-	-	1,769
Sub-Total	3,140	1,189	4,329	500	-	4,829
4. Other Costs						
a. Civil Works	-	13,700	13,700	17,300	28,700	59,700
b. Field Research Demonstrations	-	690	690	-	-	690
c. Research Operating Expenses	-	825	825	6,438	-	7,263
d. WMEC Operating Expenses	-	543	543	-	-	543
Sub-Total	-	15,758	15,758	23,738	28,700	68,196
Total	32,042	27,971	60,813	26,038	30,300	117,151
Contingency	2,158	2,029	4,187	1,792	9,700 e/	15,679
GRAND TOTAL	35,000	30,000	65,000	27,830	40,000	132,830

a/ Project Costs are defined as anticipated sub-obligations or commitments of funding through, e.g., PIOs, contracts, purchase orders, or work orders for civil works.

b/ Inflation = 10% of FX salaries, 15% of all other FX costs and 20% of local costs, all compounded annually.

c/ Expressed as dollar equivalents at the exchange rate of US $1.00 = Rs 12.82 as of 1/3/83.

d/ Does not include:(i) an estimated $38.0 million (consisting of $26.0 million in FY 1982, $6.0 million in FY 1983 and $6.0 million in FY 1984) of equipment for the ISM project which will be procured with funds under the ACAE Program (391-0468); and, (ii) an additional $26 million for the CMM component of the ISM project, for which the Mission will seek authorization in FY 1984, and for which the following obligation schedule is planned: FY 1984 = $10.0 million; FY 1985 = $3.5 million; and, FY 1986 = $11.5 million.

e/ Includes both contingency and inflation.

TABLE 16

SUMMARY OF PROJECT COSTS BY PROJECT COMPONENT, EXPENSE CATEGORY, AND SOURCE OF FUNDING a/

(In $ 000)

Project Component b/	LIFE OF PROJECT FUNDING					
	A.I.D. Grant			GOP c/	IBRD/IDA	TOTAL
	FX	LC c/	TOTAL d/			
1. Rehabilitation Works						
a. Commodities h/	2,000	-	2,000	-	-	2,000
b. Technical Assistance	-	-	-	-	1,600	1,600
c. Other Costs	-	13,700	13,700	17,300	28,700	59,700
Sub-Total	2,000	13,700	15,700	17,300	30,300	63,300
2. Institutional Improvement						
a. Technical Assistance	8,962	3,357	12,319	-	-	12,319
b. Training	3,318	955	4,273	592	-	4,865
c. Commodities	739	596	1,335	-	-	1,335
d. Other Costs	-	-	-	-	-	-
Sub-Total	13,019	4,908	17,927	592	-	18,519
3. Planning, Policy Implementation and Research						
a. Technical Assistance f/	11,677	5,008	16,685	-	-	16,685
b. Training	5,748	1,704	7,449	1,218	-	8,667
c. Commodities h/	401	593	994	500	-	1,494
d. Other Costs	-	2,068	2,068	6,428	-	8,496
Sub-Total	17,826	9,363	27,196	8,146	-	35,342
Total	32,842	27,971	60,818	26,038	30,300	117,151
Contingency	2,158	2,029	4,187	1,792	9,700 g/	15,679
GRAND TOTAL	35,000	30,000	65,000	27,830	40,000	132,830

a/ Project Costs are defined as anticipated sub-obligations or commitments of funding through, e.g., PIOs, contracts, purchase orders, or work orders for civil works.

b/ Inflation = 10% of FX salaries, 15% of all other FX costs and 20% of local costs, all compounded annually.

c/ Expressed as dollar equivalents at the exchange rate of US $1.00 = Rs 12.82 as of 1/3/83.

d/ Does not include: (i) an estimated $38.0 million (consisting of $26.0 million in FY 1982, $6.0 million in FY 1983 and $ 6.0 million in FY 1984) of equipment for the ISM project which will be procured with funds under the ACAE Program (391-0468); and, (ii) an additional $26 million for the CMM component of the ISM project, for which the Mission will seek authorization in FY 1984, and for which the following obligation schedule is planned: FY 1984 = $10.0 million; FY 1985 = $3.5 million; and, FY 1986 = 11.5 million.

e/ Includes both contingency and inflation.

f/ A limited amount of short-term technical assistance under this component is earmarked for the CMM feasibility study, which is in progress.

g/ An estimated $32.0 million of the equipment to be procured under the ACAE Program will be in support of the rehabilitation program.

h/ An estimated $6.0 million of the equipment to be procured under the ACAE Program will be in support of research activities under this component.

Allocation of the total A.I.D. contribution of $103.0 million by expense category is as follows: 41 percent for commodities; 28 percent for technical assistance; 15 percent for other costs, which includes civil works (88 percent), field research demonstrations (4 percent), research operating expenses (5 percent), and WMEC operating expenses (3 percent); 11 percent for training; and, 5 percent for contingency. A.I.D. will finance the international travel costs for all participants attending training programs of one year or less in duration. A participant training travel waiver, which exempts the GOP from having to cover these costs, has been signed by the USAID/Pakistan Mission Director and is included in Annex C.

Of the total $65.0 million ISM project grant, $35.0 million or 54 percent will be used to finance foreign exchange costs, (as will all of the $36.0 million from the AC&E Program). The remaining $30.0 million or 46 percent of the ISM project grant will be used to finance local costs associated with civil works (46 percent), technical assistance (28 percent), training (9 percent), research operating expenses and field research demonstrations (6 percent), vehicle operating expenses (4 percent) and contingency (7 percent). To the maximum extent possible, A.I.D. grant funds which are used to finance local costs will be disbursed in U.S. dollars in order to maximize the balance of payments impact of this program in accordance with the overall objectives of the renewed USG-GOP economic and development assistance program. A FAA Section 612(b) certification has been signed by the USAID/Pakistan Mission Director and is included in Annex C.

Allocation of the total A.I.D. contribution of $103.0 million by project component is as follows: 46 percent for rehabilitation works; 32 percent for institutional improvement; 17 percent for planning, policy implementation, and research; and, 5 percent for contingency.

The planned obligation schedule for the ISM project grant of $65.0 million is as follows: FY 1983 - $34.0 million; FY 1984 - $12.0 million; FY 1985 - $13.5 million; and, FY 1986 - $5.5 million. The obligation schedule reflects the facts that: (i) all long-term technical assistance contracts will be initially funded in FY 1983 for a period of two years, with the subsequent two-year tranche to be provided in FY 1985; (ii) all reimbursements for civil works activities are expected to be completed during the first three years of the project; and, (iii) all long-term training must be fully funded (in PIO/Ps) at least six months prior to the initiation of training.

b. GOP Contribution

The GOP will provide the equivalent of $27.830 million or 16 percent of the total cost of the program. The GOP allocation by expense category is as follows: 85 percent for other costs, consisting of civil works (73 percent) and research operating expenses (27 percent); 7 percent for training; 2 percent for commodities; and, 6 percent for contingency. Included in the GOP's contribution is funding for the software for WAPDA's new computer (for which A.I.D. ISM project funds will be used to purchase ancillary equipment); travel expenses for long-term participants (training programs of over one year in duration); salaries for personnel while in long-term training status; partial funding for remodelling of seven PID workshops; and, salaries and operating expenses for the PIDs and research facilities.

In addition to the above, several of the GOP's current and planned activities for water resources development will, directly or indirectly, support the objectives of this project. As is indicated in the tables in Annex Q, the GOP, during FFY 1981/82 allocated Rs 1,551.3 million for water sector programs (including surveys and investigations; drainage, reclamation and tubewells; flood works; surface irrigation/open canals; dams; meteorological services; Indus Basin; and others), and, excluding this project, has reserved Rs 1,979.3 million for water resources development works during FFY 1982/83. The GOP has agreed to make provision in its financial and program planning documents (PC-1s) to include adequate funds for its contributions to both the ISM and ISR projects, including sufficient funds for O&M requirements in accordance with the schedules and covenants contained in IBRD Project Agreements which will also be reflected in the A.I.D. Project Agreement.

c. IBRD/IDA's Contribution

The IBRD/IDA's $40.0 million credit represents 24 percent of the total costs of this program. The IBRD allocation by expense category is as follows: 72 percent for civil works; 4 percent for technical assistance; and, 24 percent for contingency and inflation. IBRD funds will be used exclusively to finance local costs under the program. Of the total estimated cost of $59.7 million for civil works under this program, the IBRD will contribute $28.7 million or 48 percent while A.I.D. will contribute $13.7 million or 23 percent, with the remaining 29 percent to be provided by the GOP. The Bank's allocation for civil works includes partial funding for remodelling of

7 PID workshops. The $1.6 million earmarked by IBRD for technical assistance includes full funding for the Supervisory Consultant (NESPAK), full funding for ACOP, partial funding for WMEC, and limited budget support for the FCC. The Bank estimates that civil works activities will be completed in three years. The large contingency/inflation factor in the IBRD program financial plan should provide a sufficient cushion for possible cost overruns due to price escalations and/or delays in implementation.

F. Environmental Analysis

Under this project, portions of the existing canal and drainage network will be rehabilitated, and the institutional capacity of GOP water sector agencies to plan, manage, research, operate and maintain the system will be strengthened. As a result, the hazards of flooding from canal breaches and crop damage from inadequate drainage, which now exist because of the deteriorated condition of the system, will be reduced. In addition, the project will result in greater control over water use and attendant benefits for agricultural production. Overall, the project will have a highly positive effect on the environment. An Initial Environmental Examination (IEE), which recommends a negative determination, is included as Annex N. 15/

G. Narcotics Impact Statement

There is no direct linkage between this project and the illicit cultivation of opium poppies or the manufacture of heroin. Poppies are not grown on lands serviced by public irrigation systems. Nevertheless, to assure that this continues to be the case and to further the U.S. Government's continued efforts, in conjunction with the GOP, to curtail opium poppy cultivation and the processing of opium into heroin in Pakistan, the following poppy clause will be included in the Project Agreement:

> "The Government of Pakistan (GOP) agrees to undertake appropriate measures to prohibit the cultivitation of opium poppy and/or the processing of opium into

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15/ An IEE, which recommended a negative determination for this project, was prepared by the Mission and approved by AID/Washington in June 1982. However, since the time of preparation of the IEE, several changes have occurred in the overall design of the project in terms of funding levels, life of the project, and the nature of the project components. Whereas the rehabilitation works component, on which the original IEE was based, has remained the same and hence the rationale behind the Mission's recommendation for a negative determination is still valid, a revised IEE is being submitted for approval to reflect the changes which have occurred. The Mission plans to submit a separate IEE for component 4, the CWM pilot program, at the time of submission of the Project Paper amendment.

heroin within any area benefiting from the project. In the event that a determination is made that the cultivation of opium poppy and/or the processing of opium into heroin is occurring in an area programmed to benefit or benefiting from the project, no assistance under this project directly benefiting that area shall commence and, if commenced, such assistance shall be suspended until the prohibited activity is eliminated. If the prohibited activity found to exist is not fully eliminated within a specified period of time to be agreed upon by the United States Government and the GOP, all assistance directly benefiting that area may be terminated. If, during the life of the project, it is determined that the prohibited activity is occurring in an area which has benefited from the project, and the prohibited activity is not eliminated within a period of time to be agreed upon by the United States Government and the GOP, the GOP shall reimburse A.I.D. for all assistance that the GOP has received from A.I.D. which has resulted in direct benefits to that village or area in which the prohibited activity is occurring."

VI. CONDITIONS, COVENANTS AND NEGOTIATING STATUS

A. Conditions Precedent to Disbursement

1. Conditions Precedent to First Disbursement

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee shall furnish or have furnished to A.I.D., in form and substance satisfactory to A.I.D., within sixty (60) days after the signing of the Project Agreement:

a. a written opinion of Counsel acceptable to A.I.D. that the Project Agreement has been duly authorized and/or ratified by, and executed on behalf of the Grantee and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms;

b. a written statement setting forth the names and titles of persons holding or acting in the Office of the Grantee and representing that the named person or persons have the authority to act as the representative or representatives of the Grantee, together with a specimen signature of each such person certified as to its authenticity.

c. a written statement authorizing A.I.D. to proceed with the procurement of technical consultants and project commodities and with the implementation of the training plan and other project activities.

2. Conditions Precedent to First Disbursement in a Specific Province

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project for project activities in a specific province, or to the issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the Grantee shall furnish or have furnished to A.I.D. in form and substance satisfactory to A.I.D., a written statement from the responsible Provincial Official(s) of that Province indicating Provincial approval of the Project.

3. Conditions Precedent to the Commencement of Civil Works Rehabilitation Activities

Except as A.I.D. may otherwise agree in writing, prior to the commencement of work on civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Grantee shall:

a. furnish documentation, in form and substance satisfactory to A.I.D., establishing that suitable arrangements have been made by the Grantee for a Supervisory Consultant to assist in project implementation and that said Consultant is mobilized and ready to review rehabilitation work design and work plans, inspect rehabilitation work, and monitor construction progress;

b. prepare and furnish to A.I.D., in form and substance acceptable to A.I.D., a detailed inspection system that describes procedures to be followed to insure that rehabilitation work conforms to specifications.

4. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works commenced after the first twelve months from the date of the signing of this Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Grantee shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation establishing that the Grantee has established within the Federal Coordinating Cell, or other appropriate administrative structure, a Central Procurement Office to coordinate and administer the commodity procurement process, including consolidating Provincial requests for spare parts during the life of the Project.

5. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities in a Specific Province Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works in a specific province commenced after the first twelve months from the date of the signing of this Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Grantee shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation establishing that the Provincial Government for the Province for which reimbursement is sought has completed all irrigation equipment workshop remodelling in a manner acceptable to A.I.D. This condition will be applied on a Provincial basis, i.e., reimbursement for civil work rehabilitation will be made after the first project year for work completed in any province that has fulfilled this condition precedent.

B. Covenants

1. The Grantee shall cause to be carried out by each Province periodic increases in water charges, or other appropriate financial arrangements, to cover an increasing percentage of the cost of operation and maintenance of irrigation facilities located in that Province, in order that the full cost of such operations and maintenance is being recovered by the following dates:

Sind	July 1, 1988
Punjab	July 1, 1990
NWFP	July 1, 1991
Baluchistan	July 1, 1992

2. The Grantee shall cause the SCARP Transition Study already initiated to be completed by July 1, 1983.

3. The Grantee shall cause each Province to anually increase funds available for operation and maintenance for canal, surface drainage, and flood protection bunds. The levels of funding proposed by each Provincial Irrigation Department for said operation and maintenance shall be reviewed anually by the Provincial Authority and shall be furnished to A.I.D. by March 1 of each year for review and comment.

4. In carrying out the civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Grantee shall maintain, or cause to be maintained, the integrity of the minimum designed freeboard in rehabilitated channels.

5. The Grantee shall assure that a Federal Project Review Board, to include the Provincial Irrigation Department Secretaries, the Chief Engineering Advisor of the Ministry of Water and Power, and the General Manager of the WAPDA Planning Division, meets regularly and serves as a review and decision-making body for overall implementation of the project.

C. Negotiating Status

As mentioned previously, the GOP has already negotiated and signed an agreement with the IBRD/IDA for the ISR Project. A.I.D. and IBRD officials have held numerous joint discussions with the GOP on major issues and conditions. A.I.D. representatives attended the IBRD/GOP negotiations in Washington, D.C. in March 1982. A condition of effectiveness of the Bank's project is that the A.I.D. Project Agreement be signed and the initial conditions precedent be met.

Three major covenants which address long-standing policy issues, namely, water charges, divestiture of public tubewells and O&M financing, have already been negotiated, agreed to by the GOP, and are included in the Agreements between the IBRD and the GOP and Provincial Governments. This also applies to the covenant on maintenance of the channel freeboard. The covenants on water charges and O&M financing reinforce each other by indirectly linking revenue to expenditure requirements. They will increase resources available for O&M to enable the PIDs to maintain the system over the long-term and will encourage more efficient water use by raising the effective cost of canal water, which has long been under-priced. All three covenants will be included in the A.I.D./GOP Project Agreement in nearly identical language.

The Conditions Precedent have been discussed informally with the GOP, and no major difficulties are foreseen in their acceptance. A letter from the GOP requesting A.I.D. financing for the project has been received. During Project Agreement negotiations, USAID/Pakistan will incorporate into the Agreement appropriate language to cover these terms and conditions.

VII. ANNEXES

FM SECSTATE WASHDC
TO AMEMBASSY ISLAMABAD PRIORITY 3934
BT
UNCLAS STATE 303657

A-PAC

E.O. 12065: N/A

TAGS:

SUBJECT: IRRIGATION SYSTEM REHABILITATION PIT 391-0467

1. APAC APPROVED PIP OCTOBER 15. THE FOLLOWING GUIDANCE IS PROVIDED FOR PP PREPARATION.

2. CONCUR WITH MISSION THAT A JOINT PP/APPRAISAL TEAM CONSISTING OF BANK AND AID PERSONNEL IS REQUIRED TO COMPLETE THE FINAL DESIGN OF THE PROJECT.

3. FOR CO-FINANCING: IT IS GENERALLY AGREED THAT THE BANK SHOULD TAKE THE LEAD IN ADDRESSING MANY OF THE FINANCIAL ISSUES WITH THE GOP. NEVERTHELESS, A COMPREHENSIVE DESCRIPTION AND ANALYSIS OF CO-FINANCING MANAGEMENT AND THE MECHANISM(S) FOR AID FUNDS TO COMPLEMENT BANK INPUTS IS NECESSARY. THIS INCLUDES FINANCIAL PLANNING, MONITORING AND EVALUATION OF THE AID INPUTS. AS A BY FIRST STEP, MISSION SHOULD MEET WITH BANK ATTACHE TO REVIEW CONDITIONS, DETERMINE HOW THE ISSUES WILL BE TREATED, AND WORK OUT THE DIVISION OF LABOR TO ACCOMPLISH OBJECTIVES.

4. EQUIPMENT PROCUREMENT. WE ASSUME THAT AID- PROVIDED EQUIPMENT WILL BE USED FOR THE IMPROVEMENT AND MAINTENANCE OF THE IRRIGATION CANAL NETWORK. KEEPING SUCH EQUIPMENT OPERABLE IS A DEMANDING TASK. ARE THERE ADEQUATELY TRAINED MECHANICS AVAILABLE TO PERFORM MAINTENANCE? IS THERE AN AVAILABLE SUPPLY OF REPLACEMENT PARTS WHICH ARE PROPERLY WAREHOUSED? ARE THERE MECHANICAL SHOPS ADEQUATELY EQUIPPED FOR HEAVY MAINTENANCE/REBUILDING OF DEADLINED EQUIPMENT? APAC DETERMINED THOSE COMMODITIES REQUESTED FOR ADDRESSING PROBLEMS OF WATERLOGGING AND SALINITY SHOULD BE INCORPORATED WITHIN THE AG COMMODITIES AND EQUIPMENT PROJECT (391-0469). SEE SEPTEL ON AG COMMODITIES AND DISCUSSION BELOW.

5. SALINITY AND WATERLOGGING: APAC CONCLUDED THIS AREA SHOULD NOT BE A COMPONENT OF THE PROJECT AT THIS TIME. APAC NOTED THAT MANY STUDIES HAVE DEMONSTRATED WATERLOGGING AND SALINITY IN PAKISTAN ARE DIFFICULT PROBLEMS TO RE-

UNCLASSIFIED

[illegible]. WE SEE IT AS A LONG AND COSTLY EFFORT TO OVERCOME. BECAUSE OF THE DESIRE TO PROVIDE FAST DISBURSING ASSISTANCE UNDER THIS PROJECT, SALINITY AND WATERLOGGING INTERVENTIONS SHOULD BE TREATED SEPARATELY. A DECISION TO INCORPORATE THESE ELEMENTS WITHIN THIS PROJECT AT A LATER DATE OR EVEN AS A COMPLEMENTARY PROJECT MAY BE FEASIBLE AFTER THE BRITISH STUDY ON THE SUBJECT HAS BEEN COMPLETED AND EVALUATED.

6. BASIC TO THE DESIGN AND PLANNING OF THE PP IS A THOROUGH ANALYSIS OF WHY THIS EXTENSIVE NETWORK OF CANALS AND OTHER COMPONENTS OF THE IRRIGATION SYSTEMS HAS DETERIORATED. IT SHOULD CAREFULLY ANALYZE CURRENT PREVENTIVE AND CORRECTIVE MAINTENANCE PROGRAMS, IDENTIFY CONSTRAINTS THAT EXIST IN THOSE PROGRAMS, AND SUGGEST APPROACHES TO ENSURE THAT FURTHER DETERIORATION OF THE SYSTEM(S) WILL BE SIGNIFICANTLY REDUCED. (THE RECENTLY COMPLETED BANK APPRAISAL REPORT SHOULD PROVIDE SOME USEFUL INSIGHTS INTO THIS PROBLEM.)

7. OVERALL MANAGEMENT OF THE WATER DISTRIBUTION SYSTEM WITHIN PAKISTAN APPEARS TO BE A PERPLEXING PROBLEM IN TERMS OF RESPONSE CAPACITY AND ABILITY TO ANTICIPATE NEEDS OVER THE LONG HAUL. IS IT APPROPRIATE IN THIS PROJECT TO INCLUDE MORE ELEMENTS OF MANAGEMENT TRAINING AND CONSIDER INCORPORATION OF COMPUTER MODELING AND MONITORING TO THESE IRRIGATION SYSTEMS?

8. APAC CONCURS WITH MISSION THAT THE POLICY ISSUE RELATED TO THE LEVEL AND STRUCTURE OF WATER RATES IS CRUCIAL. PP SHOULD CAREFULLY ANALYZE GOP CAPABILITY AND DETERMINATION TO IMPOSE WATER CHARGES AT A RATE SUFFICIENTLY HIGH TO GENERATE REVENUE NEEDED FOR MAINTENANCE.

9. PP PREPARATION: SUGGESTED TDY REQUIREMENTS TO ASSIST MISSION IN PP WERE OUTLINED IN VAN RAALTE/LION MEMO OF OCTOBER 6, 1981. EARLY RESPONSE FROM THE MISSION WILL BE APPRECIATED SINCE THERE IS HEAVY COMPETITION IN OBTAINING CONSULTANT EXPERTISE IN WATER RELATED ACTIVITIES. CLARK

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5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESF.

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

Yes.

Yes.

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; 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 amount)?

(a) Congressional Notification and Congressional Presentation

(b) Yes, assistance is within the FY 1983 operational year budget.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,00, will there be

(a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	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?	No further legislative action is required.
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)	Yes, project meets the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources.
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, Mission Director's 611(e) certification is included in the Project Paper.

6. FAA Sec. 209. Is project susceptible to 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.

The project will be undertaken as a co-financed activity with the World Bank through its IDA affiliate. The project will not specifically encourage regional development programs but could support such programs through the provision of adequate supplies of irrigation water.

7. FAA Section. 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; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

(a) Yes. As a result of the major improvements contemplated in the management of irrigation water, agricultural production and productivity should increase significantly and agricultural exports, on which Pakistan depends for its foreign exchange earnings, will increase.

(b) Yes. Private farmers will be provided with an important means to increase production and income which will foster a more perfect competitive market; the proposed policy changes with respect to public tubewell divestiture and water user rates as well as the increased involvement of private construction contractors in canal rehabilitation work should also foster private initiative and competition.

(c) No.

(d) Yes, to some extent, by supporting the divestiture of public tubewells to the private sector.

(e) Yes. A major component of this project is institution-building and technology transfer as a result of which the capabilities of the GOP and the PIDs to plan, design, operate, and maintain as well as undertake relevant research related to the proper management of irrigation water for agricultural progress will be increased.

(f) No.

8. FAA Sec. 601(b) Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

U.S. private enterprises will participate as suppliers of both goods and services under the project.

9. FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	This project is financed by ESF funds. Nevertheless, the GOP and the Provincial Governments will contribute the equivalent about $27.8 million over the life of the project to help finance the local costs of the project. The Mission Director has certified the disbursement of U.S. dollars in lieu of U.S. Treasury-owned excess rupee to cover some of the local costs under this project. This action is consistent with one of the major objectives of the renewed economic assistance program to Pakistan which is to maximize the balance of payment impact of the program.
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?	U.S.-owned excess Pakistani rupees have been fully programmed in support of other projects.
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 1982 Appropriation 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 in such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N.A.
13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does	Yes. An Initial Environmental Examination (IEE) is included in the Project Paper.

the project or program take into consideration the problem of the destruction of tropical forests?	N.A.
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N.A.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria	This is an ESF-funded Project.
a. FAA Sec. 102(b), 111, 113, 281(a). 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	N.A.

otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts 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?

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used? N.A.

c. FAA Sec. 10[illegible]. Is emphasis 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)? N.A.

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 is the latter cost-sharing requirement being waived for a "relatively least developed" country)? N.A.

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"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character."	N.A.
f. 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?	N.A.
g. 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 intellectual resources to encourage	N.A.

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

2. Development Assistance Project Criteria (Loans Only) — This is an ESF-funded project.

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? — N.A.

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)? — N.A.

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic or political — Yes. This project will increase the productivity and income of the rural poor by ensuring reliable, safe and stable water delivery on irrigated farm lands, thereby effecting a more equitable income distribution conducive to political and economic stability.

stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	Yes. This project focuses on helping the poor majority in rural areas by expanding the base for productive investment and services in rural areas, will encourage U.S. private investment in Pakistan, and, to the maximum extent possible, will involve the Pakistani private sector, both as a participant and beneficiary of this project, thereby reflecting the policy directions of FAA Section 102.
c. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	No.
d. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?	No.
d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	N.A.

ANNEX C.1

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
MISSION TO PAKISTAN

Cable : USAIDPAK

HEADQUARTERS OFFICE
ISLAMABAD

Office of the Director

IRRIGATION SYSTEMS MANAGEMENT PROJECT, 391-0467

FAA SECTION 611 (e) CERTIFICATION

I, Donor M. Lion, the principal officer of the Agency for International Development in the Islamic Republic of Pakistan, having taken into account, among other things, the maintenance and utilization of projects in the Islamic Republic of Pakistan previously financed or assisted by the United States, do hereby certify, pursuant to Section 611 (e) of the Foreign Assistance Act of 1961, as amended, that, in my judgement, the Islamic Republic of Pakistan has both the financial capability and the human resources capability to effectively implement, utilize, and maintain the proposed Irrigation Systems Management Project, 391-0467.

This judgement is based upon the project analyses as detailed in the Irrigation Systems Management Project Paper and is subject to the conditions imposed therein.

Donor M. Lion

Donor M. Lion
Director
USAID/Pakistan

January 9, 1983
Date

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
MISSION TO PAKISTAN

Cable : USAIDPAK

HEADQUARTERS OFFICE
ISLAMABAD

Office of the Director

IRRIGATION SYSTEMS MANAGEMENT PROJECT, 391-0467

FAA SECTION 612 (b) CERTIFICATION

A major purpose of the $1.625 billion economic assistance program negotiated between the Governments of the United States of America and Pakistan, acknowledged by both governments and a primary reason for both governments having decided to develop an economic assistance package, is to provide balance of payments assistance to Pakistan.

I have carefully reviewed the advisability of disbursing United States dollars in lieu of United States-owned excess foreign currency to pay for local costs of projects being implemented in Pakistan. In light of the United States Government's objectives concerning the program, I have determined that it would be prejudicial to U.S. interests and goals to pay for all local currency costs with United States-owned rupees. Such a procedure would prevent the U.S. from providing the maximum amount of balance of payments support under the economic assistance package, and would consequently undercut one of the basic objectives of the program. The objective of providing balance of payments assistance to Pakistan can best be achieved by disbursing United States dollars to pay for local costs of the program. Section 612 (b) of the Foreign Assistance Act of 1961, as amended, authorizes the administrative official approving the voucher to determine that local costs will be funded with direct payment of dollars for the program. Pursuant to this provision, Handbook 19 requires that the Mission Director (or his designee) make a determination as to the reason in any instance where United States dollars are used (disbursed) when United States-owned foreign currency is available. Where dollars are used for local cost financing, USAID/Pakistan will, therefore, make disbursements to the Government of Pakistan in U.S. currency.

FAA SECTION 612 (b) CERTIFICATION (Continued)

In addition to disbursing United States dollars for local costs, USAID/Pakistan plans to use the United States-owned excess rupees known as "Mondale Rupees", which are available under the provisions of Section 104 of the Agricultural Trade Development and Assistance Act, 1954, as amended, to finance some of the local costs associated with United States dollar-financed activities, thereby increasing the overall development impact of the proposed $1.625 billion economic assistance program.

In view of the above rationale, I, Donor M. Lion, principal officer of the Agency for International Development in Pakistan, pursuant to Section 612 (b) of the Foreign Assistance Act of 1961, as amended, do hereby certify the need to disburse United States dollars to cover local currency costs in lieu of using United States-owned excess rupees under the Irrigation Systems Management Project.

Donor M. Lion

Donor M. Lion
Director
USAID/Pakistan

January 9, 1983
Date

بسم الله الرحمن الرحيم

EJAZ AHMAD NAIK
Secretary
Tel: 20629,

Telegram: ECONOMIC
Telex: ECDIV No. 05-634

No. 3(4)CM-VI/81
Government of Pakistan
MINISTRY OF FINANCE AND
ECONOMIC AFFAIRS
(ECONOMIC AFFAIRS DIVISION)

Islamabad the 22nd January, 1983

Dear Mr. Lion:

As part of the agreement of our two governments on a six-year $ 1.825 billion economic assistance program, the Government of Pakistan formally requests from A.I.D. ninety million dollars (U.S.$90,000,000) in United States assistance to fund an Irrigation Systems Management Project.

2. The Irrigation Systems Management Project, co-financed with the World Bank through its IDA affiliate, will assist the GOP and the four Provincial Irrigation Departments (PIDs) to: rehabilitate currently deteriorated surface irrigation and drainage systems; improve Pakistan's institutional capacity to plan, manage, operate, and maintain the systems so that reliable and equitable supplies of water are available to the irrigated agriculture sector; and, finance a feasibility study and pilot test of a Command Water Management Program in the four provinces.

3. Subject to the availability of funds, ninety million dollars would be provided over a seven year period. I understand that the USAID Mission to Pakistan will seek approval from AID/Washington, at the time of submission of the Project Paper, of sixty-five million dollars for the activities described below, which constitute Phase I of this project. I further understand that next year, the USAID mission to Pakistan will prepare and submit to AID/Washington for approval, a Project Paper Amendment which will provide a justification and detailed description of the activities under Phase II, for which the remaining twenty-five million dollars will be utilized,

P.../2

and that these activities will be jointly defined and agreed to by both our governments during the coming year.

4. Under Phase I of the project, funds will be used for technical assistance, training, commodities, and reimbursement for civil works to:

a. ensure reliable, safe and stable water delivery by rehbilitating about 14,000 km. of canals;

b. ensure prompt disposal of surface water by rehabilitating about 3,500 km. of drains;

c. develop improved canal operation and maintenance procedures;

d. improve canal rehabilitation design criteria to minimize maintenance requirements;

e. upgrade seven Provincial Irrigation Workshops in the four provinces;

f. develop a new procurement and inventory management system for heavy and workshop equipment and spare parts; and,

g. complete priority research and a feasibility study which will serve as the basis for the implementation of a Commanl Water Management Pilot Program.

5. I also understand that, subject to the availability of funds, approximately thirty-eight million dollars (U.S. $ 38,000,000) will be provided under the Agricultural Commodities and Equipment Program, consisting of U.S. $ 26,000,000 in U.S. Fiscal Year 1987, U.S. $ 6,000,000

P.../3

in U.S. Fiscal Year 1983, and U.S. $ 6,000,000 in U.S. Fiscal Year 1984, to finance heavy and workshop equipment and spare parts and hydraulic measurement and research equipment for this program.

6. The Government of Pakistan assures the United States Government of its full cooperation in carrying out the Irrigation Systems Management project. The manpower, financial, and other inputs required of us will be provided in an expeditious manner.

7. We look forward to a continued, combined effort by both our governments to yield a productive and beneficial program for the people of Pakistan.

Yours sincerely,

(EJAZ AHMAD NAIK)

Dr. Donor M. Lion,
Director,
USAID/Pakistan,
Islamabad.

AID 1020-25(11-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1983 to FY 1990
Total U. S. Funding $65.0 million
Date Prepared: [illegible]

Project Title & Number: Irrigation Systems Management (391-0467)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: - To increase agricultural production and farmer income	Measures of Goal Achievement: In project areas: -Increased agricultural per capita income by 5 to 20 percent -Increased yields and cropping intensities by 2 to 5 percent in Sind, Punjab and NWFP and by 30 to 56 percent in Baluchistan -Increased agricultural input utilization -Decreased income disparities within the farming community (cont'd on p.2)	-GOP, IBRD, A.I.D. and other donor records on agricultural production and farmer income -Data collected by WMRC -Project evaluations	Assumptions for achieving goal targets: -GOP policies will continue to encourage canal and drain rehabilitation and maintenance, increased agricultural production and increased farmer income -Other agricultural inputs and support services will be available to farmers
Project Purpose: -To increase the capabilities of institutions involved in irrigation system planning, design, research, operation and maintenance, and to bring about policy changes needed for proper irrigation water management	Conditions that will indicate purpose has been achieved: End of project status: -PID capabilities improved by trained staff and additional equipment -In-service training programs institutionalized by PIDs where needed -Priority canal systems rehabilitated such that future operation and maintenance problems will be minimized -Improved planning, design, and water management capabilities in government organizations (cont'd on p.2)	-Data collected by ACOP and WMRC -A.I.D., GOP, Provincial Government, WAPDA, IBRD, and NWFRP project records and reports -MIS in the FCC and FCCs -Project evaluations -Consultant reports -Site inspections -Project-financed research findings	Assumptions for achieving purpose: -Adequate personnel and budgetary support will be provided by the GOP -GOP and provincial agencies will adapt and utilize new technologies and systems for improved irrigation water management -WAPDA and PID personnel involved in research activities at all organizational levels will be receptive and responsive to the policy and operational reforms required to undertake research and eventually to improve the overall irrigation system (cont'd on p.2)
Outputs: -Reliable, safe, and stable water delivery by rehabilitated canals -Prompt disposal of surface water by rehabilitated drains -Increased farm employment -Increased irrigation system construction employment throughout the project life -Improved rehabilitation design criteria based upon the collection of hydraulic data to minimize maintenance requirements -Improved operation and maintenance procedures (cont'd on p.2)	Magnitude of Outputs: - 14,000 km - 3,500 km - 42,000 full-time jobs - 29,000 full-time jobs - in all 4 provinces - in all 4 provinces	-Data collected by ACOP and WMRC -A.I.D., GOP, Provincial Government, WAPDA, IBRD, and NWFRP project records and reports -MIS in the FCC and FCCs -Project evaluations -Consultant reports -Site inspections -Project-financed research findings	Assumptions for achieving outputs: -Qualified participants are selected for training -the PAR system is a feasible implementation procedure for civil works -Remodelling of PID maintenance workshops proceeds on schedule and within the PIDs' budgets -Technical consultants are effective in working with WAPDA and PID personnel (cont'd on p.2)
Inputs: 1. A.I.D. -Short and long-term expatriate and Pakistani technical assistance -Short and long-term U.S. and in-country training -Vehicles, computers, and related commodities, planning/management equipment and supplies and spare parts for earthmoving equipment -Reimbursement for civil works (PAR system) -WMRC operating expenses -Field Research Demonstrations (cont'd on p.2)	Implementation Target (Type and Quantity): See financial analysis, implementation schedule and commodity, technical assistance, and training plans in the project paper	-A.I.D., GOP, Provincial Government and IBRD project records and financial documents -Project evaluations	Assumptions for providing inputs: -A.I.D. and GOP and Provincial Government proposed funding levels are approved by their respective governments and disbursements are made on a timely basis -Appropriate overseas training programs can be identified -Local works are undertaken according to agreed upon standards and procedures and are certified for reimbursement under the PAR system (cont'd on p.2)

AID 1020-25 (1-79)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1983 to FY 1988
Total U.S. Funding [illegible] million
Date Prepared: [illegible]

Project Title & Number: Irrigation Systems Management (391-0467)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Goal: [illegible]	Conditions that will indicate purpose has been achieved: End of project status -Improved research capability at the following institutions: -Punjab Irrigation Research Institute -Hydrology and Systems Analysis Organization, WAPDA; -Central Monitoring Organization, WAPDA; -Mona Reclamation Experimental Project, Punjab; -Lower Indus Water Management and Reclamation Research Project, Sindh; and -Khai Hydraulic Research Station.	Indicators that about 15-20 percent of acreage of the vulnerable canal areas adversely affected by canal closures and breaches	Assumptions for achieving goal target:
Project Purpose:	Water charges are increased and rationalized such that water charges are more in line with water use. Adequate funding is available for O&M through increased water rates, reduced expenditures for publicly owned tubewells, and/or other financial arrangements. Canal freeboard is maintained on rehabilitated canals. Lower costs of maintenance Adequate and efficient maintenance plans and schedules in use (cont'd on p.2)		Assumptions for achieving purpose: -Farmers will respond favorably to the opportunities offered them by the improved management of water
Outputs: -Professional Irrigation Workshops expanded to the four provinces -WAPDA, university, and FID personnel will have completed long-term and short-term training in the U.S., including non-degree, M.S. and Ph.D. degree conditions and short-term in-country training courses -A new procurement and inventory management system for earthmoving and workshop equipment and spare parts developed and institutionalized -A Management Information System (MIS) developed and institutionalized (cont'd on p.2)	Magnitude of Outputs: - 7 - 1,095 personnel trained - in all 4 provinces - in all 4 FIDs and the Federal Ministry of Water and Power (cont'd on p.2)		Assumptions for achieving outputs: -Training programs effectively transfer skills and technology -Research results are disseminated and used by decision-makers
Inputs: 2. GOP -WAPDA salaries and operating expenses -Land equities -Availability of FID maintenance workshops -Travel of long-term (over one year) participants -Salary of participants while in training status -Locally-procured commodities -In-country training -Civil works (cont'd on p.2)	Implementation Targets (Type and Quantity):		Assumptions for providing inputs: -The GOP meets the conditions precedent for this project -Appropriate consultants can be recruited to provide the required technical assistance

[illegible]

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY [illegible] to FY [illegible]
Total U.S. Funding [illegible] million
Date Prepared: [illegible]

Project Title & Number: Irrigation System Management (391-0457)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: To contribute objective to which this project contributes —	Conditions that will indicate purpose has been achieved: End of project status -Operations plan and manual available for each rehabilitated canal -Reduced downtime due to maintenance-related breakdowns -Fewer breaches and associated damage -Adequate canal capacity, shortened duration and decreased cost of maintenance during and after storms -In aggradation/degradation of beds -In sloughing/erosion of banks	—	Assumptions for achieving goal targets: —
Project Purpose: —		—	Assumptions for achieving purpose:
Outputs: -Priority research studies in water management completed -A CIS feasibility study completed for the implementation of a CIS pilot program consisting of one subproject in each of the four provinces -Existing systems available for water management utilization (watershed, ground, and surface)	Magnitude of Outputs: • at least 6 • 1 • several	—	Assumptions for achieving outputs: —
Inputs: 1. [illegible] -Subcontracts for civil works -Local consultants (IRRIGAT, ICID and [illegible]) -Budget support for PDC -Funds for remodelling of PID maintenance workshops	Implementation Target (Type and Quantity) —	—	Assumptions for providing inputs: —

VEHICLE WAIVER REQUEST

I. Background

A. Cooperating Country	: Pakistan
B. Authorizing Document	: Project Authorization
C. Project	: Irrigation Systems Management Project 391-0467
D. Geographic Code of Project	: 000 and Pakistan
E. Importer of Commodity	: USAID/Pakistan on behalf of WAPDA and the Provincial Irrigation Departments, Government of Pakistan
F. Description of Commodity	: 20 Trailbikes (80-125 cc), estimated at $2,000 each.
G. Total Value	: $40,000
H. Nature of Funding	: ESF Grant
I. Probable Procurement Source	: Japan

II. DISCUSSION

The Irrigation Systems Management Project is designed to assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface canals and drains; to improve the capabilities of federal and provincial institutions involved in irrigation system planning, design, research, operation, and maintenance; and, to bring about policy changes needed for proper irrigation water management. The project will consist of four components: (1) Rehabilitation Works; (2) Institutional Improvement; (3) Planning, Policy Implementation, and Research; and, (4) Command Water Management Pilot Program. In addition to funds for civil works, A.I.D. will finance the services of twenty-five (25) long-term expatriate consultants, commodities for rehabilitation works and research activities, field research demonstration activities training, and research operating expenses. The nature

of project activities will require extensive field visits by A.I.D.-financed consultants and GOP officials to undertake research, to provide consulting services to all four Provincial Irrigation Departments, and to undertake formal in-country training programs as well as to provide on-the-job training. Vehicles will be procured under the project for both the long-term consultants and also GOP officials involved in water management research programs. The Mission is currently reviewing its requirements for pick-up trucks, four-wheel drive passenger and utility vehicles and may later request a source/origin waiver for them.

Trailbikes

These items will be used by GOP research staff to enter areas inaccessible by passenger vehicles. Individual research staff members who often work alone or in pairs travel to such areas to collect data for water management research and extension purposes. They will be afforded timely and efficient conveyance in meeting project objectives by the use of 80-125 cc trailbikes which are able to travel over rough trails. The U.S. does not manufacture vehicles of this type.

III. AUTHORITY

Section 636(i) of the Foreign Assistance Act of 1961 requires A.I.D. to procure U.S.-manufactured vehicles but also provides that the requirements may be waived under special circumstances. A.I.D. Handbook 1, Supplement B, Chapter 4C2D(1)(a) describes some of the special circumstances which may support a waiver, including the "inability of U.S. manufacturers to provide a particular type of needed vehicle..." Delegation of Authority No. 40, Handbook 5, states the retention by the Administrator of authority to waive source/origin requirements in this instance.

IV. CERTIFICATION

In approving this waiver request, you will be certifying that exclusion of procurement from free world countries other than the cooperating country and Geographic Code 941 countries would seriously impede attainment of U.S. foreign policy objectives and the objectives of the Foreign Assistance Program.

V. RECOMMENDATION

That you approve a waiver of Section 636(i) of the FAA and a source/origin waiver to permit procurement of the required vehicles from A.I.D. Geographic Code 935 (Special Free World).

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
MISSION TO PAKISTAN

Cable : USAIDPAK

HEADQUARTERS OFFICE
ISLAMABAD

THE DIRECTOR

USAID/PAKISTAN MISSION DIRECTOR'S WAIVER FOR A.I.D. PAYMENT OF INTERNATIONAL PARTICIPANT TRAVEL COSTS

A.I.D. Handbook 10, Chapter 15B1, provides that the cost of international travel, including incidental costs en route as well as the cost of travel between the participant's city and the points of departure and return in the participant's home country, shall be paid by the host government or other sponsor unless, in the case of Mission-funded programs, the Mission Director has justified and authorized full or partial waivers and has so notified S&T/IT.

Training and institution-building are important components of the $1.625 billion economic assistance program negotiated between the Governments of the U.S. and Pakistan. USAID/Pakistan's experience, however, has been that the Government of Pakistan (GOP), due to serious foreign exchange and budgetary constraints, has been historically unable to fund international travel costs for short-term training programs. The consequence has been that Pakistani participants have, on numerous occasions, been denied worthwhile and much needed training inhibiting the achievement of project targets.

I have carefully reviewed the advisability of requiring full GOP funding for travel costs for participant training of one year or less and the alternative of funding such travel with grant and loan funds provided through USAID/Pakistan to the GOP. Recognizing the objectives of many of our projects and the fact that project success will be enhanced by encouraging opportunities for short-term training, I have determined that it would be prejudicial to U.S. interests to require that the GOP pay the entire international participant travel costs for training programs of one year or less.

Therefore, on all Mission-funded training programs up to and including one year, USAID/Pakistan shall be responsible for the entire cost of the round-trip economy class air ticket and other necessary incidental costs en route. Where a PIO/P has been originally written for a program of one year or less, but, after the participant has initiated his or her program, the program is extended so that it exceeds one year in total, USAID/Pakistan shall also fund the round-trip ticket. The justification for funding programs that are extended is to minimize administrative problems which are otherwise likely to occur.

On the basis of the above justification and pursuant to Handbook 10, Chapter 15B1a, I, Donor M. Lion, principal officer of the Agency for International Development in Pakistan, do hereby waive the requirement that the host government fully fund international travel for training courses of one year or less and authorize payment with USAID/Pakistan loan and grant funds for travel costs as specified above.

Donor M. Lion

Donor M. Lion
Director
USAID/Pakistan

November 17, 1982

Date

DRAFT PROJECT AUTHORIZATION

Name of Project: Irrigation Systems Management

Number of Project: 391-0467

Pakistan

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Irrigation Systems Management Project for the Islamic Republic of Pakistan involving planned obligations of not to exceed U.S. dollars sixty-five million($65,000,000) in grant funds over a seven(7) year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/ allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The Project, which will be co-financed by the World Bank (IBRD) through its International Development Association (IDA) affiliate under the Irrigation Systems Rehabilitation (ISR) Project, is designed to assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface canals and drains; to improve the capabilities of federal and provincial institutions involved in irrigation system planning, design, research, operation and maintenance; and, to bring about policy changes needed for proper irrigation water management so that reliable and equitable water supplies are available to the irrigated agriculture sector in Pakistan. The Project consists of four distinct but complementary and interrelated components as follows:

a. Rehabilitation Works

The objectives of this component are to assist the GOP to: (i) rehabilitate and maintain about 14,000 km of surface canals and about 3,500 km of surface drains; and, (ii) strengthen its human and physical resources and management operations to plan and design civil works activities and effectively operate and maintain the entire system.

b. Institutional Improvement: Management and Technical Skill Development

Institutional improvement will take place at both the provincial (PID) and federal levels. In order to increase the capability of PIDs to operate and maintain the entire system, the following activities will occur: (i) new earthmoving and workshop equipment and spare parts will be provided to increase existing machinery stocks; (ii) PID maintenance workshop

will be upgraded; (iii) improved control systems will be developed and institutionalized to enable the PIDs to efficiently manage and operate machinery for preventive maintenance of civil works; (iv) design capacity will be improved to reduce continuing maintenance demands; (v) substantial management training will be provided for PID personnel; and, (vi) a Management Information System will be developed and institutionalized to generate information needed for management decision-making. In order to increase the capability of federal level bodies, namely, the Ministry of Water and Power and the Water and Power Development Authority (WAPDA), to coordinate both water policies and storage supplies, the following activities will occur: (i) the establishment of a Federal Coordinating Cell (FCC) to ensure effective implementation, coordination, and supervision of the project; (ii) the establishment of a Central Procurement Office (CPO) to routinely order spare parts and to serve as an expeditious channel for emergency orders; and, (iii) the expansion and application of a water management computer modelling system in WAPDA to monitor total water supplies and scheduled distribution.

c. Planning, Policy Implementation, and Research

The objectives of this component are to : (i) strengthen the capacity of the PIDs to engage in the planning process for future projects in the water sector and to continue, with WAPDA, the transformation of policy guidelines into action programs; and, (ii) strengthen existing critical research programs in areas of water management both within and outside the Indus System.

d. Command Water Management

This component is intended to integrate the management of irrigation water at all levels within canal commands. The objectives of this pilot effort are to : (i) substantially increase agricultural production in selected pilot areas through improved water management; (ii) develop water management techniques and programs which can be replicated throughout the country; (iii) reduce inequities in actual water deliveries at all levels; and, (iv) build within the provincial agencies (i.e., Irrigation and Agriculture) and WAPDA a continuing capability for planning, implementing, and operating integrated programs for irrigated agriculture. Funds will be provided under the Project to assist the GOP to undertake a CWM feasibility study. On the basis of the outcome of the feasibility study, USAID/Pakistan will prepare a Project Paper amendment and will seek approval of an authorization amendment to provide additional funds toward the total cost of implementing a CWM pilot program in all four provinces between FY 1984 and FY 1990.

1. 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 and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Goods and Services

Goods and services financed by A.I.D. under this Project shall have their source and origin in the Cooperating Country or in the United States except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States and the Cooperating Country.

b. Condition Precedent to First Disbursement

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee shall furnish or have furnished to A.I.D., in form and substance satisfactory to A.I.D., within sixty (60) days after the signing of the Project Agreement, a written statement authorizing A.I.D. to proceed with the procurement of technical consultants and project commodities and with the implementation of the training plan and other project activities.

c. Conditions Precedent to First Disbursement In a Specific Province

Except as A.I.D. may otherwise agree in writing, prior to any disbursement under this Project for project activities in a specific province, or to the issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the Grantee shall furnish or have furnished to A.I.D. in form and substance satisfactory to A.I.D., a written statement from the responsible Provincial Official(s) of that Province indicating Provincial approval of the Project.

d. Conditions Precedent to the Commencement of Civil Works Rehabilitation Activities

Except as A.I.D. may otherwise agree in writing, prior to the commencement of work on civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Grantee shall:

i. furnish documentation, in form and substance satisfactory to A.I.D., establishing that suitable arrangements have been made by the Grantee for a Supervisory Consultant to assist in project implementation and that said Consultant is mobilized and ready to review rehabilitation work design and work plans, inspect rehabilitation work, and monitor construction progress;

ii. prepare and furnish to A.I.D., in form and substance acceptable to A.I.D., a detailed inspection system that describes procedures to be followed to insure that rehabilitation work conforms to specifications.

e. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works commenced after the first twelve months from the date of the signing of the Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Grantee shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation indicating that the Grantee has established within the Federal Coordinating Cell, or other appropriate administrative structure, a Central Procurement Office to coordinate and administer the commodity procurement process, including consolidating Provincial requests for spare parts during the life of the Project.

f. Conditions Precedent to Disbursement for Civil Works Rehabilitation Activities In a Specific Province Commenced After the First Twelve Months of the Signing of the Project Agreement

Except as A.I.D. may otherwise agree in writing, prior to reimbursement by A.I.D. for rehabilitation works in a specific province commenced after the first twelve months from the date of the signing of the Project Agreement, or to the issuance by A.I.D. of documentation pursuant to which such reimbursement will be made, the Grantee shall have furnished to A.I.D., in form and substance satisfactory to A.I.D., documentation establishing that the Provincial Government for the Province for which reimbursement is sought has completed all irrigation maintenc workshop remodelling in a manner acceptable to A.I.D. This condition will be applied on a Provincial basis, i.e., reimbursement for civil work rehabilitation will be made after the first project year for work completed in any province that has fulfilled this condition precedent.

g. Covenant as to Water Charges

The Grantee shall cause to be carried out by each Province periodic increases in water charges, or other appropriate financial arrangements, to cover an increasing percentage of the cost of operation and maintenance of irrigation facilities located in that Province, in order that the full cost of such operation and maintenance is being recovered by the following dates:

Sind	July 1, 1988
Punjab	July 1, 1990
NWFP	July 1, 1991
Baluchistan	July 1, 1992

h. Covenant as to SCARP Transition Study

The Grantee shall cause the SCARP Transition Study already initiated to be completed by July 1, 1983.

i. Covenant as to Operation and Maintenance(O&M) Funding

The Grantee shall cause each Province to annually increase funds available for operation and maintenance for canal, surface drainage, and flood protection bunds. The levels of funding proposed by each Provincial Irrigation Department for said operation and maintenance shall be reviewed annually by the Provincial Authority and shall be furnished to A.I.D. by March 1 of each year for review and comment.

j. Covenant as to Canal Freeboard

In carrying out the civil works rehabilitation activities for which reimbursement will be requested from A.I.D., the Grantee shall maintain, or cause to be maintained, the integrity of the minimum designed freeboard in rehabilitated channels.

k. Covenant as to Federal Project Review Board

The Grantee shall assure that a Federal Project Review Board, to include the Provincial Irrigation Department Secretaries, the Chief Engineering Advisor of the Ministry of Water and Power, and the General Manager of the WAPDA Planning Division, meets regularly and serves as a review and decision-making body for overall implementation of the project.

4. The following waver to A.I.D. regulations is hereby approved: a source/origin waiver from A.I.D. Geographic Code 000 to A.I.D. Geographic Code 935 to permit the purchase of eighteen (18) right-hand drive station wagons; three (3) right-hand drive pickup trucks; fifteen (15) right-hand drive jeeps; and twenty (20) small (80-125 cc) trail-bikes and spare parts.

APPROVED: _____
M. Peter McPherson
Administrator

DATE: _____

CONGRESSIONAL NOTIFICATION

PLANNED PROJECT SUMMARY SHEET

Country	:	Pakistan
Project Title	:	Irrigation Systems Management
Project No.	:	391-0467
Appropriation Category	:	Economic Support Funds
Life of Project	:	FY 1983 - FY 1990
Intended Obligation FY 1983	:	$34.0 million ESF Grant

This is to advise that A.I.D. intends to obligate $34.0 million of Economic Support Funds in FY 1983 for the Pakistan Irrigation Systems Management Project.

The Irrigation Systems Management Project, co-financed with the World Bank, is designed to assist the Government of Pakistan and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface canals and drains and to improve Pakistan's institutional capacity to plan, manage, research, operate and maintain the systems so that reliable and equitable water distribution is available to the irrigated agriculture sector.

ANNEX: Activity Data Sheet

PROGRAM: PAKISTAN

ACTIVITY DATA SHEET

ANNEX I
Page 1 of [illegible]

TITLE	FUNDS	Obligations to date (thousands of dollars)		
IRRIGATION SYSTEMS MANAGEMENT	ECONOMIC SUPPORT FUNDS	FY 86: 34,000	LIFE OF PROJECT: 63,000	
NUMBER: 391-0447	FUNDING MECHANISMS: Grant ☒ Loan ☐ Continuing ☐	Initial Obligation FY 83:	Estimated Final Obligation FY 86:	Estimated Completion Date FY 88:
	Grant			

Purpose: To increase the capabilities of institutions involved in irrigation system planning, design, research, operation and maintenance, and to bring about policy changes needed for proper irrigation water management.

Background: Pakistan has the world's largest contiguous irrigation system, commanding 34.5 million acres in 43 canal commands which feed a vast network of watercourses and farm channels. Much of the system is in badly deteriorated condition. Frequent canal breaches result in flood damage and disruption of service to major subsystems while repairs are made. These conditions result from deferred maintenance due to inadequate resources and institutional weaknesses at both the federal and provincial levels. Funding and equipment available to the Provincial Irrigation Departments (PIDs) are limited, and planning, design, operation and maintenance and research capabilities need to be improved.

Project Description: This seven year project, which will be co-financed by the World Bank (IBRD) through its International Development Association (IDA) affiliate under its Irrigation Systems Rehabilitation (ISR) Project, is designed to assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface irrigation and drainage systems and to improve Pakistan's institutional capacity to plan, design, research, operate and maintain the systems so that reliable and equitable water supplies are available to the irrigated agriculture sector. While the IBRD project focuses almost exclusively on rehabilitation works, the A.I.D. project addresses, in addition, water and institutional policies and practices through reform, directed planning and research programs, and action programs to implement policy reforms. The A.I.D. project also takes the first steps toward the long-term goal of integrating water, land, and farmer resources, known as the Command Water Management (CWM) concept.

Both A.I.D. and IBRD financing will be administered in a parallel manner for rehabilitation of civil works. Most of the equipment to be financed by A.I.D. will be provided under the A.I.D.-supported Agricultural Commodities and Equipment Program (391-0446). In addition, both Project Agreements will contain the same covenants which are aimed at ensuring that adequate financing of operation and maintenance (O&M) costs are available to prevent the deterioration of rehabilitated canals and drains.

The A.I.D. project consists of four distinct but complementary and interrelated components: (1) Rehabilitation Works, the objective of which is to assist the GOP to rehabilitate and maintain about 14,000 ha of surface canals and about 3,300 ha of surface drains; (2) Institutional Improvement: Management and Technical Skill Development, the objective of which is to strengthen at both the federal and provincial levels, human and physical resources and management operations to plan and design civil works activities and effectively operate and maintain the entire system, through the provision of equipment, training, and technical assistance; (3) Planning, Policy Implementation, and Research, the objectives of which are to : (a) strengthen the capacity of the PIDs to engage in the planning process for future projects in the water sector and to continue, with WAPDA, the transformation of policy guidelines into action programs; and, (b) strengthen existing critical research programs in areas of water management both within and outside the Indus System; and, (4) Command Water Management (CWM), the objectives of which are to : (a) substantially increase agricultural production in selected pilot areas through improved water management; and, (b) build within the provincial agencies (i.e., Irrigation and Agriculture) and WAPDA a continuing capability for planning, implementing, and operating integrated programs for irrigated agriculture. Funds will be provided under this project to assist the GOP to undertake a CWM feasibility study. On the basis of the outcome of the study, a Project Paper amendment will be prepared by the Mission to provide additional funding toward the total cost of implementing a CWM pilot program in all four provinces between FY 1984 and FY 1990.

Relationship of Project to A.I.D. Country Strategy: The overall A.I.D. strategy in Pakistan relies on a blend of resources to reactivate a long-term relationship in development cooperation. Projects are intended to meet basic human needs, contribute to long-term development, build a foundation for more rapid economic growth, and relieve balance of payments difficulties. There is a major focus on building institutional capacity in both the public and the private sectors to enable Pakistan to better plan, manage, implement, and bear the recurring costs of development activities. The overall goal of activities in the agriculture sector is to increase productivity and farmer income. Over the coming years, A.I.D. will be supporting the GOP in several programs to achieve this goal. It will be met through this project by improvement in the management of irrigation water resources throughout Pakistan. The irrigation system in Pakistan is the life blood of the nation, serving some 33 million acres out of a total cropped area of 44.5 million acres. Timely delivery of water in sufficient quantities is among the most important factors in increasing the productivity of Pakistan's agricultural lands.

Host Country and Other Donors: The GOP is expected to contribute the equivalent of $17.[illegible] million over the life of the project in the form of staff salaries and operating expenses, civil works, maintenance workshop remodelling, training, and commodities. In addition, the GOP has agreed to make appropriate financial arrangements through such means as increased water rates and/or divestiture of public tubewells to generate sufficient funds to cover the total operation and maintenance costs of the canals and drains in all four provinces by specified dates during the period 1990-1992.

Over a dozen donors are currently providing complementary assistance to Pakistan, totalling $1.1[illegible] billion, in ground and surface water development and improved on-farm water management. All of these projects focus primarily and in some cases exclusively on civil works activities. None of the projects address the policy, institutional, planning, management, operation and maintenance, and technical requirements of the agencies involved in implementing these projects. This project is most closely related to the IBRD's $60 million Irrigation Systems Rehabilitation (ISR) Project, and the UNDP's $1.6 million DCAAP Transition and Command Water Management Project, which focuses on planning and research activities for water resources management.

Beneficiaries: Beneficiaries are widely spread throughout the country, following the irrigation system. The Punjab and Sind, however, contain the major share of the irrigation system. Direct benefits which will come from increased farm productivity will be distributed largely along the existing pattern of land ownership and to some extent by location of farmers within the irrigation system. Thus, two thirds of intended beneficiaries will be small farmers operating less than 12.5 acres. Improved water distribution to tail end watercourses should particularly benefit farmers in such areas, who tend to have lower average incomes than farmers higher in the system. Agricultural workers without land holdings will benefit from the increased construction employment and also on-farm employment opportunities which will result from increased water availability at the tail end watercourses.

Major Outputs	All Years
Canals Rehabilitated	14,000 ha
Drains Rehabilitated	3,300 ha
GOP, PID, and WAPDA personnel trained	1,001
PID Maintenance Workshops Remodelled	7
Management Information System Installed	5
Irrigation Equipment and Spare Parts Procurement and Inventory Management System Installed	4
Priority Water Management Research Studies Completed	6
Command Water Management Feasibility Study Completed	1

A.I.D. Planned Inputs	Life of Project ($ 000)
Technical Assistance	19,[illegible]
Training	11,[illegible]
Commodities	4,[illegible]
Civil Works	13,[illegible]
Other Costs (including Research Operating Expenses, Field Research Demonstrations, and Contingency)	[illegible]
Total	[illegible]

U.S. Financing by Account (thousands of dollars)	Obligations	Expenditures	Unexpended
Through September 30, 1985	-	-	-
Estimated Plan for 1986	-	-	-
Estimated through September 30, 1986	-	-	-
		Future Year Obligations	Estimated Total Cost
Proposed Plan for 1987	34,000	31,000	63,000

PROPOSED CONTRACTORS OR AGENCIES

U.S. private firms and universities to be selected by competitive solicitation

Best Available Document

DRAFT PROJECT DESCRIPTION FOR INCLUSION IN PROJECT AGREEMENT

A. Project Goal and Purpose

The overall sector goal to which this project contributes is to increase agricultural production and farmer income by improving the management of irrigation water resources. The purpose of the project is to increase the capabilities of institutions involved in irrigation planning, design, research, operation, and maintenance, and to bring about policy changes needed for proper irrigation water management.

B. Project Components

This seven-year project, which will be co-financed by the World Bank (IBRD) through its International Development Association (IDA) affiliate under the Irrigation Systems Rehabilitation (ISR) Project, is designed to assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface canals and drains, and to improve federal and provincial capability to plan, design, research, operate and maintain the country's irrigation systems so that reliable and equitable water supplies are available to the irrigated agriculture sector.

This project is intimately linked to the IBRD's $40 million ISR project. While the IBRD project focuses almost exclusively on rehabilitation works, the A.I.D. project addresses, in addition, water and institutional policies and practices through reform, directed planning and research programs, and action programs to implement policy reforms. The A.I.D. project also takes the first steps toward the long-term goal of integrating water, land, and farmer resources, known as the Command Water Management (CWM) concept.

Both A.I.D. and IBRD financing will be administered in a parallel manner for rehabilitation of civil works in a ratio of about one-third to two-thirds. IBRD will also fully fund the services of a local Supervisory Consultant firm for all rehabilitation activities and partially finance the services of a local evaluation/research organization. A.I.D. will partially finance the services of the local evaluation/research organization and will fully fund all the expatriate technical assistance, training, earthmoving and workshop equipment and spare parts as well as hydraulic measurement and research equipment. Most of the equipment to be financed by A.I.D. will be provided under the A.I.D.-supported Agricultural Commodities and Equipment Program

(391-0468). In addition, both Project Agreements contain the same covenants which are aimed at ensuring that adequate financing to operation and maintenance (OEM) costs are available to prevent [illegible] deterioration of rehabilitation canals and drains.

The A.I.D. project consists of four distinct but complementary and interrelated components. The fourth component, Command Water Management, will be described in detail in a Project Paper Amendment which the USAID/Pakistan Mission plans to submit to AID/Washington for approval in FY 1984. Funds will be provided for technical assistance, training, commodities, reimbursement for civil works, and research operating expenses and field research demonstrations to support the following activities :

1. Rehabilitation Works

The objectives of this component are to assist the GOP, in cooperation with the IBRD/IDA under its ISR project, to: (a) rehabilitate and maintain about 14,000 km of surface canals and about 3,500 km of surface drains; and, (b) strengthen its human and physical resources and management operations to plan and design civil works activities and effectively operate and maintain the entire system.

2. Institutional Improvement: Management and Technical Skill Development

Institutional improvement will take place at both the provincial (PID) and federal levels. In order to increase the capability of PIDs to operate and maintain the entire system, the following activities will occur: (a) new earthmoving and workshop equipment and spare parts will be provided to increase existing machinery stocks; (b) PID maintenance workshops will be upgraded; (c) improved control systems will be developed and institutionalized to enable the PIDs to efficiently manage and operate machinery for preventive maintenance of civil works; (d) design capacity will be improved to reduce continuing maintenance demands; (e) substantial management training will be provided for PID personnel; and, (f) a Management Information System will be developed and institutionalized to generate information needed for management decision-making. In order to increase the capability of federal level bodies, namely, the Ministry of Water and Power and the Water and Power Development Authority (WAPDA), to coordinate both water policies and storage supplies, the following activities will occur: (a) the establishment of a Federal Coordinating Cell (FCC) to ensure effective implementation, coordination, and supervision of the project;

(b) the establishment of a Central Procurement Office (CPO) to routinely order spare parts and to serve as an expeditious channel for emergency orders; and, (c) the expansion and application of a water management computer modelling system in WAPDA to monitor total water supplies and scheduled distribution.

3. Planning, Policy Implementation, and Research

The objectives of this component are to: (a) strengthen the capacity of the PIDs to engage in the planning process for future projects in the water sector and to continue, with WAPDA, the transformation of policy guidelines into action programs; and, (b) strengthen existing critical research programs in areas of water management both within and outside the Indus System.

4. Command Water Management

This component is intended to integrate the management of irrigation water at all levels within canal commands. The objectives of this pilot effort are to: (a) substantially increase agricultural production in selected pilot areas through improved water management; (b) develop water management techniques and programs which can be replicated throughout the country; (c) reduce inequities in actual water deliveries at all levels; and, (d) build within the provincial agencies (i.e., Irrigation and Agriculture) and WAPDA a continuing capability for planning, implementing, and operating integrated programs for irrigated agriculture. Funds will be provided under the project to assist the GOP to undertake a CWM feasibility study, which is already in progress. On the basis of the outcome of the feasibility study, a Project Paper Amendment will be prepared by USAID/Pakistan to provide additional funding toward the total cost of implementing a CWM pilot program in all four provinces between FY 1984 and FY 1990.

C. Implementation Plan

1. Illustrative Implementation Schedule

All ISM project activities, except those under the Rehabilitation Works and the Command Water Management (CWM) components, are scheduled to take place over a period of five years from the date of signing of the Project Agreement. Rehabilitation works activities will take place over a period of three years in accordance with the implementation schedule of the ISR project. Implementation of the CWM pilot program is expected to begin in the summer of 1984 and continue until the A.I.D. Project Assistance Completion Date (PACD), which is April 30, 1990

Implementation of the ISR project is scheduled to take place over a period of three years. The ISR Project Agreement was signed in June 1982. However, since the date of effectiveness of the ISR project will be about March 1983, the ISR's revised completion date will be March 1986.

a. Institutional Arrangements and Procurement of Technical Assistance

Prior to the signing of the ISM Project Agreement, funds from the A.I.D.-financed Project Design Fund (391-0470) will be used to hire a short-term consultant to assist the Mission prepare a detailed plan for implementation of the Fixed Amount Reimbursement (FAR) system for civil works. Within the first three months after the signing of the A.I.D. Project Agreement, the Federal Coordinating Cell (FCC), the Provincial Coordinating Cells (PCCs), and the Federal Project Review Board (FPRB) should be fully staffed and operational. In addition, the IBRD-funded contract between the GOP (FCC) and NESPAK will have been signed, and Project Implementation Orders for Technical Services (PIO/Ts) will have been prepared by A.I.D. for: (a) the short-term Research Definition Team; (b) the long-term Project Management Advisor; (c) the long-term Equipment Management Team; (d) the long-term Engineering Team; (e) the long-term Research Team; and, (f) the long-term Planning/Management Team. It is expected that all the long-term advisors will be in-country within nine months after the signing of the Project Agreement. During this nine-month period, short-term expatriate and local consultants will be hired under Indefinite Quantity Contracts (IQCs) or other arrangements to provide equipment management, engineering, and planning/management services until the arrival of the long-term consultants. The Research Definition Team is scheduled to arrive within the first three months after the Agreement is signed.

In addition, within the first month of the project, the Alluvial Channel Observation Project (ACOP), under the direction of the FCC and with IBRD funding, will have begun collecting baseline hydraulic data with existing staff and equipment on flows and sediment for canals to be rehabilitated in the first year of the project. Similarly, the Watercourse Monitoring and Evaluation Cell (WMEC), under the direction of the FCC with IBRD funding, will have begun collecting baseline production impact data. Local consultants will also be hired within the first three months under the ISM project to assist the PIDs finalize designs for the remodeling of workshops. Preliminary designs have already been prepared during the design stage of the ISM project.

Finally, it is expected that the Central Procurement Office (CPO) in the FCC will be fully staffed and operational by the end of the first year of the project.

b. Procurement of Equipment

The procurement of the majority of earthmoving and workshop equipment and spare parts is already underway by two Procurement Services Agents (PSAs) with funds under the FY 1982 tranche of the AC&E Program (391-0468). This equipment should arrive in-country between August and December of 1983. It is anticipated that all workshop remodeling activities will be completed by January 1984 such that the PIDs will have adequate facilities to house and maintain this equipment. The additional earthmoving and workshop equipment and spare parts which will be procured by these PSAs with funds under the FY 1983 tranche of the AC&E Program should arrive in-country between March and August of 1984.

Upon the signing of the ISM Project Agreement, A.I.D. will issue Project Implementation Orders for Commodities (PIO/Cs) to procure all project vehicles and household and office furnishings for all long-term expatriate technical consultants. Arrangements will also be made, as soon as the FY 83 AC&E PAAD Amendment has been authorized and funds obligated, to obtain the services of a PSA to procure the hydraulic measurement equipment for ACOP and the PIDs with funds from the FY 1983 tranche of the AC&E Program. Procurement of the planning and management equipment and systems analysis equipment under the ISM project by the long-term Planning/Management Team will begin after the team arrives and will be undertaken in tranches over a period of several years. A needs assessment will be undertaken prior to the procurement of any systems analysis equipment. Similarly, procurement of the required research equipment, which will be procured with funds under the FY 1984 tranche of the AC&E Program, is not expected to begin until the summer of 1984, by which time the Research Definition Team will have undertaken a needs assessment and the long-term research technical assistance team will have arrived in-country and assisted the COP and PIDs to finalize equipment lists and specifications. It is anticipated that the CPO will begin procuring spare parts for the PIDs' equipment fleets with funds under the ISM project beginning in the fall of 1984 and continuing throughout the life of the project.

Rehabilitation Works Activities

Once the A.I.D. Project Agreement is signed and the initial conditions precedent met, IBRD funds will be released.

IBRD-financed rehabilitation activities will begin immediately after these events have occurred and the PCCs and FCC are in place. A.I.D.-financed rehabilitation activities will begin after a mutually acceptable system of reimbursement and inspection has been worked out in detail and agreed to by all relevant parties, which is expected to occur by the third month after the A.I.D. agreement is signed. Rehabilitation activities are expected to be implemented over a period of three years.

Rehabilitation activities during the first year of the project will focus on those canals requiring limited design work. Initially, the work will be undertaken with the equipment currently on hand with the PIDs. By the end of the first year of the project, it is anticipated that the majority of new earthmoving equipment and workshop equipment and spare parts (the latter for existing inoperable equipment as well as the new equipment) will be in place in the provinces such that the pace with which rehabilitation activities occur will be accelerated. In addition, ACOP will begin collecting data on flows and sediment early on in the project with existing staff and equipment. With the arrival of hydraulic measurement equipment during the first year of the project and the training of additional staff (including some from the PIDs), ACOP will be in a position to provide the necessary hydraulic data required for the design of the more complex rehabilitation works which will be undertaken beginning in year 2 of the project. The Design Engineers on the long-term Engineering Team, who are expected to arrive within nine months after the Project begins, will assist the PIDs to incorporate the ACOP data as well as current technologies in alluvial channel design into the design of schemes to be rehabilitated in years 2 and 3. Prior to the arrival of the long-term Equipment Management Team, short-term local and/or expatriate consultants will be hired to train workshop technicians and equipment operators in the use of the new machinery.

d. Command Water Management (CWM) Project Component

The CWM feasibility study, which is being undertaken by the GOP with technical assistance from A.I.D. (under the Project Design Fund (391-0470)) and UNDP (with the IBRD as executing agency) began on July 1, 1982 and is expected to be completed by October/November 1983. IEM project funds will be used to provide additional short-term technical assistance for this effort. Based on the findings of the feasibility study, A.I.D. will prepare and submit to AID/Washington for approval in March 1984, an amendment to this Project Paper to provide additional funds for a CWM pilot program in all four provinces. Implementation of the CWM pilot program, which will also be a co-financed activity, will take place over a period of six years.

e. Training and Evaluation Activities

Most of the training activities under this project will take place over a five year period beginning in FY 1983. Long-term degree candidates are expected to begin their programs of study in FY 1984 and FY 1985. A detailed traini plan (especially for the in-country training portion of the program) will be developed with the assistance of the long-term technical assistance teams and the Project Management Advisor early in the second year of the project.

Formal evaluations are scheduled to take place in March of 1984, 1986, 1988, and 1990. In addition, it is anticipated that the Management Information System (MIS), which will be installed initially in the FCC, will be operational within s months after the arrival of the long-term Planning/Managemen Team, i.e., within 15 months after the project begins.

2. A.I.D. Responsibilities

A.I.D. will be responsible for: (a) contracting with all technical consultants; (b) purchasing directly all vehicl and all household and office equipment and supplies for long term consultants and arranging for the procurement of the systems analysis, planning and management equipment, hydraul measurement and research equipment, earthmoving and workshop equipment, and spare parts for new earthmoving equipment and for existing inoperable earthmoving equipment; (c) arranging for long-term and short-term training outside of Pakistan; (d) advance approval of the design and cost estimates for all work orders under the Rehabilitation Works component, periodic inspection of works, and certification for payment all such works financed by A.I.D. under this project; and (e) providing sufficient staff to participate in the sch project evaluations and to liaise with GOP, Provincial Gover and WAPDA staff in the implementation of this project.

3. GOP/PID/WAPDA Responsibilities

The major implementing organizations under t s project will be the Federal Ministry of Water and Power, the four Provincial Irrigation Departments (PIDs), and WAPDA. To facilitate the implementation of the ISM and ISM project, the Ministry of Water and Power has established a Federal Coordinating Cell (FCC) in the Office of the Chief Engineeri ing Advisor. The FCC will be headed by a senior engineer, designated as the Federal Project Coordinator, who will be supported by accounting and clerical staff. Budgetary arrangements for all these positions have already been made by the Ministry. The FCC will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities on a day-to-day basis;

b. review annual work plans of the PIDs to ensure consistency with the project targets and project implementation schedules, and prepare consolidated work plans;

c. review quarterly and annual progress reports of the PIDs and prepare consolidated reports for submission to A.I.D. and the IBRD;

d. review financial reports of the PIDs, maintain project financial records, and prepare appropriate consolidated financial reports for submission to A.I.D. and the IBRD;

e. make arrangements with the Federal Ministry of Finance, through the Ministry of Water and Power, to provide adequate funds required by the PIDs for the execution of civil works;

f. serve as the authorized representative of the GOP in the procurement of project-financed commodities;

g. review reimbursement applications submitted by the PIDs and certified by the Supervisory Consultant;

h. monitor and supervise the work of the Supervisory Consultant;

i. monitor and supervise the work of the independent local research and evaluation units (ACOP and WMEC);

j. coordinate and monitor the work of all project-financed expatriate and local consultants;

k. coordinate and oversee the implementation of all training activities under the projects including in particular, the development and administration of the overseas training program;

l. administer the operations of the Central Procurement Office for the procurement of spare parts;

m. coordinate and participate in all project evaluations;

n. ensure that all required PC-1's and other GOP documentation related to this program are prepared and approved in a timely manner;

o. serve as the main channel of communications between the PIDs on the one hand and the IBRD and A.I.D. on the other hand; and,

p. serve as the Secretariat of the Federal Project Review Board (see below).

At the provincial level, a Provincial Coordinating Cell (PCC), which will report directly to the PID Secretary and will be headed by a Provincial Project Coordinator, will be established in all four provinces. The PCC in each province will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities in the province on a day-to-day basis;

b. select the schemes to be rehabilitated;

c. prepare the plans and detailed designs of schemes to be rehabilitated in accordance with PID and ISR/ISM project procedures;

d. prepare lists of required equipment, spare parts, and machine tools with specifications;

e. provide required information to the Supervisory Consultant for the preparation of reimbursement applications;

f. prepare quarterly and annual progress reports for submission to the FCC;

g. prepare annual provincial work plans for submission to the FCC;

h. maintain separate project financial accounts and prepare financial reports as required for submission to the FCC.

i. ensure that adequate funds are available for workshop remodeling and oversee the construction activities to ensure their timely completion;

j. coordinate and implement all training programs in the province and ensure that qualified participants are selected for all training activities;

k. participate in all project evaluations;

l. ensure that equipment procured under the project is properly utilized and maintained;

m. ensure that adequate counterparts are in place to work with project-financed consultants;

n. participate as resource personnel as required at meetings of the Federal Project Review Board; and,

o. serve as the main focal point for communications and liaison functions between the province and the FCC.

The other key implementing organization under the project will be WAPDA. The General Manager for Planning will be the coordinator of all ISR/ISM project activities involving WAPDA. He will have the following responsibilities:

a. supervise and monitor all ISR/ISM project activities undertaken by WAPDA on a day-to-day basis;

b. prepare consolidated quarterly and annual progress reports of all project activities undertaken by WAPDA organizations;

c. prepare lists of required equipment and spare parts with specifications;

d. maintain separate project financial accounts and prepare financial reports as required for submission to the FCC;

e. coordinate and implement all training programs involving WAPDA staff and ensure that qualified participants are selected for all training programs;

f. ensure that research results are widely disseminated to appropriate decision-making bodies;

g. participate in all project evaluations;

h. ensure that equipment procured under the project is properly utilized and maintained;

i. ensure that adequate counterparts are in place to work with project-financed consultants;

j. review project work plans of the following PDA organizations to ensure consistency with project [illegible] and project implementation schedules:

i. Planning Division;

ii. Planning and Investigation Organization;

iii. Mona Reclamation Experimental Project;

iv. Lower Indus Water Management and Reclamation Project;

v. Command Water Management Project;

vi. Hydrology and Systems Analysis Organization;

vii. Monitoring and Evaluation Organization; and,

viii. Central Monitoring Organization; and,

k. serve as the main focal point for communications and liaison functions between WAPDA and A.I.D. and the IBRD.

To provide effective overall leadership, establish policy and program guidelines, review and solve major project implementation problems, and serve as a continuing forum for the PIDs, the Federal Government, and WAPDA to monitor progress of the projects, the GOP has established a Federal Project Review Board (FPRB), which will meet at least quarterly throughout the life of the projects. The Board consists of the Chief Engineering Advisor of the Ministry of Water and Power, as Chairman, the four PID Secretaries, and the General Manager for Planning in WAPDA. Representatives of A.I.D., the IBRD, and the Supervisory Consultant (NESPAK) will attend Board meetings as ex officio members. In addition, the Federal Project Coordinator and the Provincial Project Coordinators will attend Board meetings from time to time as resource personnel.

4. Supervisory Consultant

Because the FCC is a newly established office which will play a major role in the implementation of both the ISR and ISM projects, provision has been made under the ISR project to hire a local Supervisory Consultant (NESPAK) to assist the FCC to effectively coordinate and monitor all program activities. In addition, the Supervisory Consultant, given its major role in the implementation of the rehabilitation works program, will serve as a unifying force in rationalizing the administrative and financial procedures for inspection and reimbursement under both the A.I.D. and IBRD-financed projects. The Supervisory Consultant team will report directly to the Federal Project

Coordinator in the FCC and will be under his direct supervision. The Consultant team will perform the following services:

a. review plans and designs for all civil works;

b. review PIDs' annual project work plans to determine, among other things, compliance with GOP/IBRD and GOP/A.I.D. Project Agreements on eligibility of schemes to be rehabilitated, schedules, targets, and proposed levels of funding for rehabilitating schemes; and schedules, targets and levels of funding for O&M program work;

c. inspect all rehabilitation works during construction and all schemes upon completion to determine compliance with standards required for reimbursement by A.I.D. and the IBRD;

d. evaluate, for inclusion in a project completion report, the quality of completed civil works and the efficiency of the PIDs' equipment utilization and maintenance, including comparison of labor intensive and heavy equipment methods;

e. assist the FCC to monitor project progress and to prepare consolidated quarterly and annual progress reports and project completion reports; and,

f. assist the PIDs to integrate project-financed equipment, spare parts, and machine tools into existing fleets and operations to ensure efficient utilization.

The Supervisory Consultant team will consist of approximately 10 full-time members and two part time members. One coordinator will be located in Islamabad in close proximity to the FCC and others will be located in the four provinces, as mutually agreed to by the FCC, Provinces, and NESPAK.

5. Independent Research and Evaluation Units

Two units within WAPDA, the Alluvial Channel Observation Project (ACOP) and the Watercourse Monitoring and Evaluation Cell (WMEC), will be responsible for collecting and analyzing data for design and evaluation purposes under the ISR/ISM projects. While organizationally, ACOP falls under WAPDA's Water Resources Management Organization within the Planning Division and WMEC falls under WAPDA's Monitoring and Evaluation Organization within the Planning Division, under the ISR/ISM projects, both will serve as "consultants"

to the PIDs and the FCC in data collection, analysis, and evaluation. Both will report directly to the Federal Project Coordinator in the FCC. ACOP's services under the program will be fully funded under the IBRD project. The IBRD project will also provide funding to WMEC for project activities in FY 1983 and FY 1984. The A.I.D. project will provide financial support to this cell for project activities beginning in FY 1985 and continue funding until the end of the project.

6. Project Management Advisor

In order to ensure that the diverse components of the ISR/ISM projects are successfully integrated and to provide a direct linkage between the A.I.D. Mission and field operations, ISM project funds will be used to hire, under a direct A.I.D. Personal Services Contract, an experienced and senior individual to serve as the A.I.D. Project Management Advisor. This Advisor will report directly to the A.I.D. Project Officer.

ILLUSTRATIVE

SUMMARY OF PROJECT COSTS BY EXPENSE CATEGORY AND SOURCE OF FUNDING

(In 000s)

Expense Category	FY 1983 A.I.D. Grant	FY 1983 GOP	FY 1983 IBRD/IDA	FY 1983 TOTAL	Life of Project Funding a/ A.I.D. b/ Grant	Life of Project Funding a/ GOP	Life of Project Funding a/ IBRD/IDA	Life of Project Funding a/ TOTAL
1. Technical Assistance								
a. U.S. Long-Term	15,841	-	-	15,841	23,351	-	-	23,351
b. U.S. Short-Term	2,108	-	-	2,108	4,052	-	-	4,052
c. Local Consultants	126	-	500	626	801	-	1,600	2,401
Sub-Total	17,875	-	500	18,375	29,004	-	1,600	30,604
2. Training								
a. Long-term	5,007	90	-	5,233	8,433	300	-	8,733
b. Short-term	320	-	-	320	2,233	-	-	2,233
c. In-Country	205	195	-	300	1,056	1,500	-	2,556
Sub-Total	5,532	285	-	5,933	11,722	1,800	-	13,522
3. Commodities								
a. Planning/Management/Systems/Analysis	560	500	-	1,060	560	500	-	1,060
b. Spare Parts for Pilot Fleets	-	-	-	-	2,000	-	-	2,000
c. Vehicles	695	-	-	695	1,769	-	-	1,769
Sub-Total	1,255	500	-	1,755	4,329	500	-	4,829
4. Other Costs								
a. Civil Works	6,560	3,000	8,000	17,560	13,700	17,300	28,700	59,700
b. Field Research Demonstrations	156	-	-	156	690	-	-	690
c. Research Operating Expenses	291	140	-	431	5,360	6,430	-	7,800
Sub-Total	7,015	3,140	8,000	18,155	18,750	23,730	28,700	68,190
TOTAL	31,797	3,925	8,500	44,222	68,813	26,030	30,300	117,151
Contingency	2,203	275	2,720	5,198	6,187	1,792	9,200	15,679
GRAND TOTAL	34,000	4,200	11,220	49,420	75,000	27,830	39,500	132,830

a/ Does not include $38.8 million earmarked under the A.I.D.-financed Agricultural Commodities and Equipment Program (391-0468) consisting of $26.8 million in FY 1982, $6.0 million in FY 1983, and $6.0 million in FY 1984 to finance earthmoving and workshop equipment and spare parts and hydraulic measurement and research equipment for use in this project, subject to the availability of funds to A.I.D. for this purpose.

b/ Subject to the availability of funds to A.I.D. for this purpose and to the mutual agreement of the parties to proceed at the time of each subsequent increment.

c/ Does not include funding for the proposed Command Water Management Pilot Program (component 4 of the A.I.D. project).

Best Available Document

AGRICULTURAL COMMODITIES AND EQUIPMENT PROGRAM (391-0468)

LIST OF EARTHMOVING AND WORKSHOP EQUIPMENT FOR USE IN ISM PROJECT

ITEM NO.	DESCRIPTION
	EARTHMOVING & ANCILLIARY EQUIPMENT
1.	Bulldozer, 200 HP
2.	Bulldozer, 140 HP
3.	Bulldozer, 75 HP
4.	Scraper, Elevating 8/11 cu.yd.
5.	Dragline, 2.5 cu.yd.
6.	Dragline, 1.5 cu.yd.
7.	Dragline, 0.75 cu.yd. (with crane attachment)
8.	Backhoe, 0.75 cu.yd.
9.	Excavator, Telescopic Boom, 0.75 cu.yd.
10.	Compactor, Self Propelled, 6 ton
11.	Compactor, Sheepsfoot, Towed
12.	Compactor, Self Propelled, 1 ton
13.	Compactor, Hand Vibratory Plate
14.	Compactor, Self Propelled, 4 ton
15.	Dump Truck, 10 ton
16.	Dump Truck, 8 ton
17.	Front End Loader, 2.5 cu.yd.
18.	Low Bed Tractor Trailer, 50 ton
19.	Low Bed Tractor Trailer, 35 ton
20.	Flat Bed Truck, 8 ton
21.	Water Truck, 2500 U.S. Gallons
22.	Fuel Truck, 2500 U.S. Gallons
23.	Fuel Trailer, 600 U.S. Gallons
24.	Lubrication Truck
25.	Dredge
26.	Mobile Crane, 35 ton
27.	Weed Cutting Boat, 12 HP
28.	Cable Tool Water Well Driller
29.	Generating Set, 50 KW
30.	Mobile Light Plant, 10 KW
31.	Ditch Cleaning Machine
32.	Spare Parts for Items 1-31 and for Existing Equipment

ITEM NO.	DESCRIPTION
	WORKSHOP EQUIPMENT
A.	GENERAL SHOP
1.	Floor Crane, 4 ton
2.	Sprocket and Bearing Puller
3.	Hydraulic Jack 50 ton
4.	Hydraulic Jack 25 ton
5.	Red Devil 110 lbs. Hammers, High Torque Air Wrenches, and Heavy Duty Sanders
6.	Lift Hydraulic, 10 ton
7.	Electric Welding Plant, 400 Amp.
8.	Mobile Welding Unit, Arc and Gas, Diesel
9.	Overhead Crane 20 ft. Span, 8 ton Chain Hoist
10.	Air Compressor, 350 cfm., Trailer Mounted
11.	Air Compressor, 150 cfm
12.	Cabinet Benches, Vices
13.	Track Press
B.	MACHINE SHOP
1.	Shaper, 36" Pass
2.	Mill (Knee Type)
3.	Planner, 10 ft. (Travelling Bed)
4.	Surface Grinder
5.	Tool Grinder
6.	Drill Press, Column 3/4"
7.	Power Hack Saw
8.	Pedestal Grinder, 12" Stone
9.	Crankshaft Build-up Machine
10.	Precision Instruments
11.	Wrenches: Master Mechanic Set, Heavy Duty
12.	Electric Hand Drill, 3/4"
13.	Crankshaft Grinder
14.	Floor Crane, 2000 lbs.
15.	Radial Drill 24"
16.	Lathe, 14 ft., 12" Swing
17.	Lathe, 8 ft., 17" Swing

ITEM NO.	DESCRIPTION
18.	Lathe, 6 ft., 12" Swing with Tapper Attachment
19.	Lathe, 4 ft., 8" Swing
20.	Spot Welder
21.	Radial Drill, 24"
22.	Benches, Cabinets, Vices
23.	Precision Tooling and Supplies
24.	Floor Crane, 2000 lbs.
C.	MOBILE SHOP
1.	Lathe/Mill Combination
2.	Injector Tester
3.	Hydraulic Hose Machine
4.	Hose Assembly Machine
5.	Bench Drill Press
6.	Owatana Pullers
7.	Wrenches,Mechanic Set
8.	Hydraulic Jack,25 ton
9.	Winch (Front Power Take Off)
10.	Tripod
11.	Bench Grinder
12.	Hydraulic Tester
13.	Gasoline-Electric Starter
D.	ENGINE OVERHAUL SHOP
1.	Engine Stand
2.	Valve Refacer
3.	Valve Seat Grinder
4.	Head Shop Valve
5.	Portable Cylinder Boring Machine, $5\frac{1}{4}$" x 14"
6.	Owatana Liner Pullers
7.	Injector Tester
8.	Injector Pump Calibrator, 8 Cylinder
9.	Mobile Shop Crane, 5 ton
10.	Engine Tune-up Kit
11.	Battery Charger, 60 Amp.
12.	Allison Transmission Tools
13.	Hoist, 20 ton Tripod

ITEM NO.	DESCRIPTION
14.	Electric Drill, 3/4"
15.	Impact Wrenches
16.	High Pressure Steam Cleaner
17.	Honing Machine
18.	Laping Machine
19.	Mechanic Tools, English-Metric
20.	Electric Test Stand, Alt., Gen.
21.	Engine Analyser
22.	Impact Wrenches
23.	Benches, Cabinets, Vices
24.	Pin Press
25.	Air-Compressor, 150 cfm
E.	HYDRAULIC SHOP
1.	Hydraulic Test Bench Pump 600 psi
2.	Hydraulic Cleaning Unit
3.	Owatana Cylinder Pulling Unit
4.	Hose Assembly Machine
5.	Hose Cutting Machine
6.	Cleaning Tank
7.	Tools
F.	BRAKE SHOP
1.	Mobile Crane, 4 Ton
2.	Compressor (Air), Electric, 150 cfm
3.	Brake Drum Lathe
4.	Disc Brake Lathe, 16" Diameter
5.	Brake Shoe Grinder
6.	Owatana Pullers
7.	Tool Kit (Wrenches)
8.	Tire Remover
9.	Tire Rim Remover
10.	Benches, Cabinets, Vices

AGRICULTURAL COMMODITIES AND EQUIPMENT PROGRAM (391-0468)
ILLUSTRATIVE LIST OF HYDRAULIC MEASUREMENT EQUIPMENT FOR USE IN ISM PROJECT

ITEM NO.	DESCRIPTION
1.	Sonic Sounders including Spares
2.	Chart Paper Rolls for Sonic Sounders
3.	Recording Current Meters with Accessories
4.	Pygmy Current Meters with Accessories
5.	Fresh Water AA Type Current Meters
6.	Dual-channel Strip Chart Recorder, High Impedance, Multi-Range with Spares and Accessories
7.	Digitization Tablet with Diskette Recorder for Sonic Chart Analysis
8.	Mobile Tow-Type Trailers to be Equipped as Mobile Sediment Labs
9.	Visual Accumulation Tubes for Particle Size Analysis with Accessories and Consumables
10.	Programmable Pocket Calculators with Accessories
11.	Fiberglass Flat Bottom Boats
12.	15 HP Outboard Motor Boat Engines including Spares
13.	Components of Hydraulic Measuring Equipment such as Improvisement Sets, Reels, Weights, Wading Rods, Suspended and Bed Material Samplers and other Accessories of Discharge and Sediment Measuring Equipment
14.	Surveying Equipment, such as Levels, Staves and other Accessories
15.	Expendable Equipment Needed for Hydraulic/Sediment/Morphologic Measurements
16.	Sampling Bottles, Cards, Tags, Stoppers, Crates, and Plastic Bags for collection of Suspended/Bed Material Samples
17.	Vehicles and Office Supplies such as Electric Typewriter for Technical Typing and Main Paper Copier with reduction and reproducing capability

AGRICULTURAL COMMODITES AND EQUIPMENT PROGRAM(391-0468)

ILLUSTRATIVE LIST OF RESEARCH FACILITY EQUIPMENT

FOR USE IN ISM PROJECT

ITEM NO.	DESCRIPTION

I. PUNJAB IRRIGATION RESEARCH INSTITUTE

A. New Research Equipment

1. Strip Chart Recorder
2. Single Trace and Double Trace Strip Chart Recorder, Heath-Kit Type
3. X-Y Recorder
4. Chart Paper Rolls
5. Perspex Poliots
6. Perspex MN Cement Tunnel
7. Depth Recorder
8. Field Strength Meter
9. I.T. 3121 Curve Tracer
10. I.U. 2202 Portable Digital Multimeter
11. Heath-Kit Type I.C. Tester I.T. 7400
12. A. Ott Type C-2 Current Meter for Small Hydraulic Models, with all Accessories
13. Transducer Indicator
14. Pressure Transducer
15. Pressure Transducer, Flush Mounted, Strain Gauge Type 0-50 PSI, Carrier and Demodulator/ Indicating Equipment, 10 Channels.
16. Automatic Curve Reading Apparatus
17. Automatic Level Transmitter with Recorder
18. Engraving Machine, Pantograph, with all Accessories
19. I.C. Tester
20. Dual Channel Storage Oscilloscope D.C. - 15 HZ
21. (a) C.C.T.V. Video Tape Recorder and 2 Nos. Video Cameras with all Accessories
    (b) Underwater Video Camera for use in Tubewells to match the above recorder
22. S.E. Carrier Equipment with Rack, with 3 pressure and 3 Nos. wave recorders
23. S.E.L. Light Beam Recorder, 8-Channels, with 8 Nos. galvanometer: 0-50 c/s Plus two Dummy galvanometers
24. Automatic Velocity Plotting apparatus
25. SR-4 Strain gauge with indicator and power supply
26. Band Saw (for Metal & Plastics)
27. Metal Working Shaper, 12 inch
28. Machine Tools
29. Electronic Test Instruments

ITEM NO.	DESCRIPTION
30.	Sunshine Recorder
31.	Micro-Current Meter with Recorder
32.	Public Address System Complete with cord type and cordless microphones
33.	Epidiascope with all accessories including stand
34.	Cassette recorder/player with quartz or glass head; amplifier for stereophonic recording, with equilizer microphones speakers and all other accessories
35.	Cassette to Cassette Printer
36.	Plastic Laminating Machine
37.	Machines for making Transparencies
38.	Calibrating Tank for Miniature current meters with spare motor gears and indicator
39.	Point Gauges A/S
40.	Pitol tubes
41.	Manometer with 1-meter Scale
42.	Moisture Gauge with all Accessories
43.	Pressure Meter Testing Equipment for Soil Investigation
44.	Magnetic/Optic 16 mm Film Sound Projector
45.	Muffle Furnace
46.	Water Still
47.	Ultrasonic Distance Meter
48.	Hydraulic Press, 5 tons
49.	Logitudinal Dividing Machine, Kessel Type L-12, with all standard and special accessories
50.	Logitudinal Dividing Machine, Kessel Type L-4, with all standard and special accessories
51.	Color Pattern Generator for Pal System
52.	Digital Memory Scope
53.	Curve Tracer Leader
54.	Survey Levels
55.	16 mm Movie Camera
56.	Electric Point Gauges
57.	Bed Contour Recorder
58.	Surface Polarimeter
59.	Benzyl Tube
60.	Boring Equipment for installing lateral tubewells, with all attachments, accessories and parts
61.	Portable pH Meter, Model 101 and spare parts
62.	Wheat Stone Bridge, Doren, Portable
63.	Soil Moisture Tensiometer
64.	Power Earth Auger
65.	Soil Moisture Bouyoucos Bridge
66.	Soil Moistures Bouyoucos Soil Blocks
67.	Sample Extruder
68.	Fall Cone Liquid Limit Tester

ITEM NO.	DESCRIPTION
69.	Magnetic Stirrer
70.	Maruto Large Electric Oven
71.	Portable Direct Shear Apparatus
72.	Portable Unconfined Compression Test
73.	Automatic Pore Pressure Apparatus
74.	Triaxial Apparatus
75.	High Capacity Triaxial Apparatus
76.	Three Dimensional Consolidation Apparatus
77.	Eley Volumeter with Speedy Moisture Tester
78.	Auger Soil Sampling Apparatus (Truck Mounted)
79.	Soil Moisture and Temperature Meter
80.	C.B.R. Apparatus
81.	Mobile Soil Laboratory (Truck Mounted with Utility Equipment)
82.	Sieve 200 Mesh
83.	Soil Test Permeameter
84.	Visutal Accumulative Tube
85.	New Speedy Calibrator
86.	Triaxial Latex Membranes
87.	Hyvac Oil
88.	Aclytic Plastic Sheets
89.	Spare Parts and Accessories for Multichannel Oscillograph Reaches
90.	Spare Parts for Strip Chart Reaches
91.	Spare Parts for Current Meter
92.	Spare Parts for Pressure and Wave Measuring Equipment
93.	Spare Parts for Other Electronic Measuring and Test Instruments
94.	Spare Parts for Lath, Meters, and other Electronic Machines and Equipment
95.	Electronic Components and parts
96.	Spare Parts for Radioisotope Equipment
97.	Spare Parts for Printing Machines

B. <u>Photographic Laboratory Equipment and Spare Parts</u>

1. METOFORM P22 for Color Processing
2. METOCHROME 31/P22
3. a. METORETTE 110
   b. Roll Film Holder
   c. Miniature Film Holder
   d. Paper Holder, 8x10
4. METOTEMP 1
5. a. Chemical Tank with Bubble Distribution and Automatic Temperature Control
   b. Miniature Film Tensioning
   c. Frame
   d. Tank Bar
6. METOFORM 45
7. a. METOBOX 406
   b. Drip Protector Tray

ITEM NO.	DESCRIPTION

8. METODRY 65 with Stand
9. METOROLL 135 Cutting Machine
10. Technorama Camera with Accessories
11. Color Enlarger 5x7 with Accessories
12. Color Enlarger 45 with Accessories
13. Durst M705 and M705 Color Enlarger
14. Rollei-flex camera SL 66 with all Accessories
15. Draun Hobby Flash gun (Heavy duty) with Spare Batteries Tube
16. Dark-room lights, wall type, with extra filters
17. Camera, Asahi Pantex Electro, with three interchangable lenses
18. 16 mm Movie Camera with Accessories
19. Slide Projector, P-360 Rollei
20. Projection Screen, Automatic
21. Spare Parts for Photographic Equipment

C. Publication Equipment and Spare Parts

1. IBM Electric Composer
2. Offset Process Camera
3. IBM Selectric Typewriter
4. High Pressure Mercury Lamp
5. Spare Parts of A.B. Dick Offset Printing Machine
6. IBM Plain Paper Copier
7. Air Conditioner for Process Lab
8. Steel Cabinets
9. Spare Parts for Publication Equipment

D. Spare Parts for Equipment Out of Service

1. Spare Parts and Accessories for use with Gould Brush Light Beam Oscillograph Mark 2300

   a. Fotolyser Lamp
   b. Time Line Generator
   c. Signal Limiter
   d. Record Timer
   e. Amplitude Grid Masks
   f. Galvanometers
   g. 100 M.A. Plugin Fuse
   h. 10 M.A. Plugin Fuse
   i. Remote Control Unit
   j. D.C. to A.C. Inverter
   k. Low Gain Amplifier

ITEM NO.	DESCRIPTION

2. Spare Parts and Accessories for Hewlett Packard Strip Chart Recorder

   a. Accessory Box
   b. Chart Paper
   c. Ink Cartridge (various colors)
   d. Chart Drive Motor
   e. Servomotor for Pen Drive
   f. Spare Pens
   g. Chart Speed Reduction Gear
   h. Lubricating Oil
   i. Drive Chain
   j. Spare Resistance Capacitors, Transistors, Diodes and other components and parts

3. Spare Parts and Accessories for Engraving Machines
4. Spare Parts for U.V. Recorder
5. Galvanometers for U.V. Recorder
6. Time Line Generator for U.V. Recorder
7. Spare Parts and Accessories for S.E. Carrier Amplifier for Transducer and Wave Recorders
8. Spare Parts and Accessories for Echo Sounding Equipment
9. Counters for A. Ott Current Meters A/S
10. Spare Parts for A. Ott Current Meter
11. Electronic Parts and Components and Other Consummable Material
12. Spare Parts for Neyrpic and Gurley Current Meters
13. Spare Parts for Rustrak Recorders

E. Spare Parts for Equipment in Service

1. Spare Parts for Logan 3' Lathe
2. Spare Parts for Atlas Milling Machine
3. Cutters for Milling Machines
4. Thread Cutter for Milling Machines
5. Spare Parts for A. Ott Current Meters A/S
6. Electronic Components and Parts
7. Spare Parts for Pressure Transducers and Wave Measuring Equipment
8. Spare Parts for Bell & Howell/16mm Film Projector

II. LOWER INDUS WATER MANAGEMENT AND RESEARCH PROJECT

A. Laboratory Equipment

1. Solubridge R.D.26
2. pH Meter
3. Weighing Balance (Mettler Type)
4. Weighing Balance (Top Loading)

ITEM NO.	DESCRIPTION

5. Flame Photometer with Accessories
6. Spectrophotometer with Accessories
7. Centrifuge
8. Dispersion Apparatus for Soils Mechanical Analysis
9. Microkjeldhal Apparatus
10. Vacuum Pump
11. Oven, Electric (0-200°C)
12. Water Still
13. Water Bath, Eletric, Thermostatically Controlled
14. Shaker
15. Calculators, Scientific
16. Laboratory Reagents

B. Field Equipment

1. Soil Sampling Tubes
2. Measuring Tapes
3. Weighing Balance (String)
4. Infiltration Rings with Covers
5. Galvanometer
6. Jetting Unit
7. Neutron Soil Moisture Probe and Counter with Access Tube
8. Manometer Tube Tensiometer
9. Water Stage Recorders
10. Plant Protection Equipment
11. Overhead Projector
12. 35mm Cameras
13. 35mm Slide Projector (Trays & Case)
14. Portable Screens
15. Recording Equipment
16. Soil Augurs
17. Soil Sampling Hammers
18. Spades
19. Slokles
20. Khurpas (Digging Device)
21. Kasolas
22. Field Chains (Iron)
23. Wooden Box for 24 Water Samples
24. Tarpaulin (20' x 20' sheet)
25. Watertable Depth Pipe

C. Farming Equipment

1. Tractor, 47 HP
2. Scraper, 6 feet
3. Land Leveller
4. Front-end Loader
5. Plough, 3 bottom

ITEM NO.	DESCRIPTION

6. Disc Harrow
7. Seed Drill
8. Utility Trailer
9. Cultivator
10. Equipment for Mechanical Workshop

D. Office Furniture and Equipment

1. Tables and Chairs
2. Steel Cabinets
3. Steel Bookcases
4. Racks
5. Benches
6. Stools (Cushioned)
7. Confidential Boxes
8. Clocks
9. Typewriters
10. Duplicating Machine
11. Calculators
12. Air Conditioner
13. Drawing Instruments (L.S.)

III. CENTRAL MONITORING ORGANIZATION, WAPDA

A. Tubewell Rehabilitation Research

1. CC TV Camera
2. Gamma Logger
3. Velocity Logger
4. Temperature Logger
5. Caleper Logger
6. Acoust Logger
7. Compressors
8. D & T Units
9. Pumping Sets
10. Water Jetting Sets
11. Welding and Generating Sets

B. Analog and Digital Modeling

1. Dual Trace Oscilloscopes
2. Pulse Generators
3. Waveform Synthesizers with Programmers
4. Stabilizers
5. Analog Analyzers
6. Current Probes
7. Operational Amplifiers
8. Power Supply Units

ITEM NO.	DESCRIPTION

9. Waveform Generators
10. Digital Measuring Systems with Plug-ins
11. Califration Fixture
12. D.C. Power Supply Units (Regulated)
13. AVO Meters

C. Water Quality, Soil Monitoring and Agriculture Studies

1. Atomic Absorpotion Spectrophotometer
2. Apectrol Sources (Hollow Cathode Lamps)
3. Membrane Air Compressor
4. Flame Photometers
5. Spectrophotometers
6. pH Meters
7. Ceramic Plate Extractor
8. Manifold Soil Moisture Equipment
9. Soil Moisture Equipment
10. Rotaps (Sieve Shakers)
11. Conductivity Meters
12. Water Distilling Apparatus
13. Analytical Balances
14. International Centrifuge Machines

IV. HYDROLOGY AND SYSTEMS ANALYSIS ORGANIZATION, WAPDA

Computer Accessories

1. Control Unit
2. Device Adaptor
3. Display Stations
4. Audible Alarms
5. 78 Key Keyboards
6. Printer
7. Direct Access Storage Unit
8. Model Upgrade HO 2 to HG 2 Unit
9. 4K Control Storage Unit
10. Related Software Packages

V. MONA RECLAMATION AND RESEARCH PROJECT

To be identified

VI. SIND HYDRAULIC RESEARCH STATION

To be identified

IBRD'S IRRIGATION SYSTEMS REHABILITATION(ISR) PROJECT

1. Description of the ISR Project

The objectives of the IBRD's Irrigation Systems Rehabilitation Project are to: "(a) increase agricultural production by (i) providing a more reliable water supply by reducing risk of failures in the irrigation network, and (ii) reducing crop losses from rain flooding by improving the surface drainage system; (b) provide a more equitable irrigation water supply to all farmers by increasing deliveries to watercourses in the tail reaches of the minors and distributaries through a program of silt removal from selected channels; (c) strengthen the capability of the PIDs' O&M program, so as to improve the efficiency of the systems' operations, and assure continued maintenance of the installed facilities; and (d) serve as a phase I model of a larger and continuing program of a similar nature that could be replicated in future projects".

The IBRD plans to achieve these objectives through a three-year (1983-1985) rehabilitation program of selected surface and irrigation drainage systems that have badly deteriorated because of deferred maintenance. Rehabilitation of public and private tubewells, closed surface drains, and flood protection facilities are excluded from the ISR project although the equipment provided under the project (which will be funded by A.I.D.) could be employed for flood protection works. In addition to funds for civil works and equipment, the ISR project provides funds for a limited amount of technical assistance and training, and funds for supervision and administration.

a. Project Elements

i. Civil Works

The project provides for earthwork, stone pitching, and repair of hydraulic structures for about 14,000 km of canals as well as the cleaning and resectioning of about 3,500 km of surface drains. About 60 percent of the civil works will be accomplished through labor intensive methods. IDA will reimburse the GOP for 70% of the costs of the rehabilitation.

ii. Equipment

The equipment component comprises earthmoving equipment required for construction of embankments, sediment removal

and improving the efficiency of labor intensive operations. Also provided for is workshop equipment and machine tools for the equipment repair and maintenance workshops of the Provincial Irrigation Departments. All of this equipment will be funded by A.I.D.

iii. Technical Assistance

The project provides for 102 man months of expatriate assistance in warehouse operation, equipment preventive maintenance and repair, and O&M procedures. Provision is also made for local supervisory consultants "to assist the Ministry of Water and Power and PIDs in monitoring project progress and quality of work, equipment, budgeting control, processing reimbursement applications, preparing reports and annual work programs" and "a qualified local organization to carry out an independent evaluation of the project and assist PIDs in monitoring the project".

iv. Training

The training component comprises about 25 study tours to both developed and developing countries with comparable irrigation, surface drainage, and flood protection facilities· on-the-job training for staff members with equipmen- workshop and warehouse responsibilities.

v. Supervision and Administration

The Project also provides funds for limited staffing of the Federal Coordinating Cell under the direction of the Chief Engineering Advisor located in the Ministry of Water and Power.

b. Project Financing

The proposed project financing is shown in the following table:

ISR PROJECT FINANCING
($ Million)

Project Element	Total Cost	GOP	External Financing IDA	AID	Total
1. Civil Works	59.6	17.2	28.7	13.7	42.4
2. Equipment	28.8	8.6	-	20.2	20.2
3. Technical Assistance	3.0	-	1.6	1.4	3.0
4. Training	0.3	-	-	0.3	0.3
5. Supervision and Administration	0.1	0.1	-	-	-
6. Contingency	26.3	7.2	9.7	9.4	19.1
Total	118.1	33.1	40.0	45.0	85.0

2. Relationship with the ISM Project

A.I.D.'s Irrigation Systems Management and the IBRD's Irrigation Systems Rehabilitation Projects are complementary tools for achieving increased agricultural production by providing a more reliable and equitable irrigation water supply and strengthening the capabilities of the relevant Federal and Provincial agencies to manage water resources more effectively. The two projects emerge out of a common experience of past assistance in the water sector and the composition of each has been influenced to a significant extent by frequent discussions between the IBRD and A.I.D. Both projects support broad policy changes relating to water user rates and the divestiture of public sector tubewells. Evaluation of the rehabilitation program will be done jointly and the coordination of both projects will be the responsibility of a newly created Cell in the Federal Ministry of Water and Power.

3. Coordination

USAID/Pakistan has been closely associated with the development of the IBRD's ISR Project since October 1981. A series of discussions with Bank officials culminated in A.I.D. participating in the final IBRD-GOP negotiations held in Washington in March 1982. During project implementation, day-to-day contact will be maintained with the Bank's resident engineer in Islamabad.

The Federal Coordinating Cell in the Ministry of Water and Power will be the main forum for coordinating project activities. Provincial Project Coordinators of the rank of Chief Engineer will also be appointed in the four Provinces. The Provincial Project Coordinators will relate to the Federal Coordinating Cell which, in turn, will coordinate with A.I.D. and IBRD. GOP-USAID-IBRD meetings will be held periodically to the extent required to ensure maximum coordination.

HISTORY OF THE DEVELOPMENT OF THE IRRIGATION SYSTEMS MANAGEMENT PROJECT

The chronology of events which led to the design and development of the Irrigation Systems Management Project is outlined below:

1. The possibility of strengthening the operation and maintenance capability of the PIDs was discussed in general terms by GOP and World Bank (IBRD) officials in December 1979.

2. The National Engineering Services (Pakistan) Limited (NESPAK) was contracted by the GOP to prepare a feasibility report for canal rehabilitation and maintenance.

3. NESPAK's March 1981 draft report served as the principal reference document for an IBRD pre-appraisal mission that visited Pakistan in June 1981. An Aide Memoire dated June 10, 1981, reported the findings of this mission.

4. An amended draft of the NESPAK report, dated August 1981, was prepared.

5. A September 18, 1981 World Bank Staff Appraisal Report (SAR) was prepared on the basis of findings of the pre-appraisal mission, and in conjunction with this, IBRD included $50 million in its FY 82 lending program to assist in financing this project.

6. Warren Fairchild, leader of the June 1981 IBRD pre-appraisal mission, returned to Pakistan in September 1981 to discuss the SAR with GOP and provincial officials. Ronald Curtis, Chief, O/ARD, USAID/Pakistan, attended several of these discussions.

7. An Aide Memoire dated October 20, 1981 was prepared by the IBRD to present the findings of this follow-up mission. The document presented four alternative levels of funding for the project, and noted that discussions with USAID would be pursued to secure co-financing. A project funding level (alternative IV) was agreed to by both the IBRD and GOP at this time.

8. O/ARD staff, with AID/W participation, discussed the details of co-financing and reached agreement on key points with the IBRD.

9. The proposed IDA credit was reduced, and A.I.D. agreed to consider financing the $45 million shortfall.

10. In March 1982, the AC&E PAAD was approved, providing funds for procurement of equipment required for the rehabilitation component of the ISM project.

11. Formal negotiations were held in March 1982 in Washington between the World Bank and GOP representatives. Agreement was reached on the covenants for a study of public tubewell divestiture, water user rates and O&M funding. It was also agreed that the IDA Loan would be activated for disbursement only after the A.I.D. project was approved and the initial conditions precedent under the A.I.D. project were met. Representatives of USAID/Pakistan and AID/Washington attended the negotiations.

12. The Staff Appraisal Report was revised according to the agreements reached at the negotiations and was issued in April 9, 1982.

13. In May and June 1982, an A.I.D. project design team conducted a field assessment of the proposed rehabilitation activities and assisted in planning all components of the project. This team included a senior WAPDA official. All PIDs were visited and involved in the design process.

14. On July 12, a major discussion and negotiation session was held involving representatives of the Ministry of Water and Power, WAPDA, NESPAK, all four PIDs and USAID/Pakistan. At this meeting, there was a discussion of project plans, A.I.D.'s requirements for inspection and FAR procedures, design requirements for reimbursement, and equipment requirements for rehabilitation.

15. In July and August 1982, local and expatriate consultants and an AID/W official assisted the Mission to refine the design of the overall project as well as, in particular, training and management components of the project, in close consultation with in-country training institutions.

16. In July 1982, the CWM Feasibility Study was begun by WAPDA.

17. In August 1982, contracts were executed with procurement services agents to procure under the AC&E program earth-moving and workshop equipment for the rehabilitation component of the ISM project.

18. In October 1982, an equipment specialist visited all PIDs to assist in finalizing the list of equipment to be procured for rehabilitation activities, as well as to assist in writing specifications.

19. In October - December 1982, a local consulting company assisted the PIDs to identify spare parts to be procured for equipment currently on hand and to prepare layout plans for workshop structural improvements.

20. In November 1982, following review of the A.I.D. Project Paper by the PIDs, WAPDA, the Ministry of Water and Power, and Federal and Provincial planning organizations, USAID/Pakistan representatives travelled to each province and discussed the contents of the paper in detail with all concerned agencies.

21. In December 1982, the Project Paper was revised to reflect the views and comments of all concerned GOP agencies and finalized for submission to AID/Washington in January.

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Project Location	:	Pakistan
Project Title and Number	:	Irrigation Systems Management, 391-0467
Funding	:	A.I.D.: FY 1983 = $34.0 million LOP* = $65.0 million : GOP = LOP = the equivalent of $27.830 million (at the exchange rate of U.S.$1.00= Rs 12.82 as of 1/3/83)
Life of Project	:	FY 1983 - FY 1990
IEE Prepared by	:	S. Zahid Noor, Environmental Officer, Office of Energy and Engineering, and Shahabuddin Khan, Program Specialist, Office of Project Development and Monitoring, USAID/Pakistan, Islamabad
Environmental Action Recommended	:	Negative Determination
Mission Director's Concurrence	:	Signature Donor M. Lion Donor M. Lion Date January 9, 1983
Decision of Environmental Officer of the Bureau for ASIA	:	Approved: _____ Disapproved _____ Date _____

* Does not include: (1) $38.0 million for equipment to be funded under the A.I.D. Agricultural Commodities and Equipment Program (391-0468) and a $40.0 million credit under the IBRD/IDA's Irrigation Systems Rehabilitation Project.

I. Country Setting

Pakistan has a total area of 308,313 square miles, is situated between 24 and 37 degrees north latitude and 61 and 78 degrees east longitude, and is politically divided into four provinces: Punjab, Sind, Northwest Frontier Province (NWFP), and Baluchistan. The country's area and population distribution by region are as follows:

Region	Area[1/] (in Sq.Miles)	% of Total	Population[2/] (in 000)	% of Total
Punjab (including Islamabad)	79,634	25.91	47,451	56.64
Sind	54,407	17.70	18,966	22.64
NWFP & Tribal Areas	39,283	12.78	13,060	15.58
Baluchistan	134,051	43.61	4,305	5.14
Total	307,375	100.00	83,782	100.00

The regional distribution of the population mirrors the country's topographical and climatic conditions. The arid flatland and barren mountains are sparsely inhabited. More than half of Pakistan's population is in the Punjab which has only a quarter of the area. By contrast, Baluchistan, which accounts for almost half of the area, has only 5.1 percent of the population. The population density is highest in the intensely irrigated northeastern corner of the Punjab and the deltaic regions of the Southern Sind.

Approximately 60 percent of Pakistan's land area consists of mountainous terrain and elevated plateaus, the rest being lowland, generally below 300 meters in elevation. The lowlands are comprised of the vast Indus River Basin and a narrow stretch of coastline alongside the Arabian Sea. The NWFP and Baluchitan, situated in the northwest and southwest of the country,respectively, are characterized primarily by mountainous terrain and plateaus. Except for a small portion of the northern Punjab, which is a plateau, most of the Punjab and the whole of the Sind are made up of low plains of the Indus River Basin. Attachment 1 is a map of Pakistan showing the topography of the country.

1/ Survey of Pakistan.

2/ GOP Census of March 1981.

Because of the great variation in topography, Pakistan's climatic conditions are also quite diverse. Rainfall in isolated northern mountain areas averages more than 80" per year, whereas some dry regions in the south receive barely 5" of rain annually. More than 75 percent of Pakistan is exceedingly dry with less than 10" of rainfall annually.

Pakistan is among the world's largest predominantly arid nations. As in all such countries, rainfall is insufficient for cultivation. But unlike most other arid lands, much of Pakistan lies within the drainage basin of a major system of rivers. The Indus and its four tributaries discharge more than 200 billion meters of water annually. Pakistan has the world's most extensive contiguous irrigation network, serving about 71 percent of its cultivated land.

Pakistan is predominantly an agricultural country. The agriculture sector of the economy employs nearly 60 percent of the labor force, accounts for two-fifths of the country's national income, and supplies nearly 50 percent of its exports. About 72 percent of the population lives in rural areas and is economically dependent on agriculture or agro-based industries. The total cultivated area in Pakistan in 1979 was about 50 million acres, of which approximately 35 million was irrigated and the rest rainfed.3/ Of the irrigated areas, about 27 million acres (or more than 50 percent of the total cultivated area) are irrigated by canals, about 7 million by tubewells, and the rest from other sources, such as wells and karez.4/ While most of the canal irrigation is in the Punjab and Sind from the Indus River System, considerable portions of land in the NWFP and Baluchistan are also cultivated by canals drawn out from rivers other than the Indus system and small dams made on mountain rivulets. Attachment 2 is a map of Pakistan showing the canal irrigation system.

The ISM project will be implemented in all four provinces of Pakistan with major impact in the Punjab and Sind. Annex P of this Project Paper lists, by province, those canals and drains which will be rehabilitated under the World Bank's (IBRD) Irrigation Systems Rehabilitation (ISR) Project, which will be co-financed by A.I.D. under the ISM project.

3/ "Agricultural Statistics of Pakistan - 1979", Government of Pakistan, Ministry of Food, Agriculture, and Cooperatives, 1979.

4/ Karez is a type of underground canal used for irrigation in Baluchistan. Emanating from sources near mountain foothills, the water is directed towards the plains under cover to reduce loss by evaporation.

II. Project Description

This project will assist the Government of Pakistan (GOP) and the four Provincial Irrigation Departments (PIDs) to rehabilitate currently deteriorated surface canals and drains; to increase the capabilities of federal and provincial institutions involved in irrigation system planning, design, research, operation and maintenance; and, to bring about policy changes needed for proper irrigation water management. The project consists of four components: (A) Rehabilitation Works; (B) Institutional Improvement ; (C) Planning, Policy Implementation, and Research; and, (D) Command Water Management Pilot Program. The project components dealing with institutional and manpower development and irrigation water management research will, by their nature, have little or no direct impact on the environment. According to A.I.D.'s environmental procedures, these components are categorically excluded from requirements for an Initial Environmental Examination, Environmental Assessment, or Environmental Impact Statement. Water management research activities will be largely studies only and those few field research demonstrations involving watercourses and tubewells will be undertaken on a limited scale and will have little or no impact on the environment. The Mission plans to submit to AID/Washington in FY 1984 a Project Paper Amendment which describes the activities to be undertaken under the CWM pilot program component and to seek approval of an authorization amendment to provide additional funding for this project component. Since the CWM project component will involve civil works activities, an Initial Environmental Examination (IEE) will be prepared for this project component and submitted to AID/Washington for approval at the same time the PP Amendment is submitted. Accordingly, only the Rehabilitation Works component is described in this IEE.

The irrigation distribution system is in a seriously deteriorated condition primarily because of inadequate funding for maintenance. Most canals are now operating with inadequate or no freeboard (distance from water surface to bank top), berms have eroded away, operating road widths are inadequate, outside embankments have deteriorated, sedimentation has reduced water carrying capacities, and many structures are in need of repair. The cross-sectional area of most canals has been reduced due to erosion of banks and siltation (silt carried by the water settling to the bottom of the canal). Because of increasing demands for water, many canals are carrying quantities well in excess of their design capacity. Canal breaches are common, resulting in huge losses of water and vast areas deprived of water for several days while repairs are carried out.

Most surface drains have become clogged with sediment and vegetation. The inability of these drains to remove excess stormwater is a major constraint to crop production.

The IBRD has designed a project to rehabilitate the irrigation canals and surface drains. Some of the funds under the ISM project will be used to co-finance the IBRD project. Under the initial 3-year or first phase of the canal rehabilitation program, selected surface irrigation and surface drainage sub-systems that have badly deteriorated because of deferred maintenance will be rehabilitated. Equipment, reimbursement for civil works by means of the Fixed Amount Reimbursement (FAR) System, as well as technical assistance and training will be financed by the ISM project.

The ISM project will provide required earthwork and stone pitching for rehabilitation of canals and drains, which in the case of the Indus system will be limited to current operating or design capacities, whichever is greater. The majority of this earthwork is intended to: (A) raise the height of the canal banks to obtain required operating freeboard and, (B) widen the canal banks to improve safety of operation. Hydraulic structures in the Indus System will also be repaired in line with existing capacities.

Small compacting equipment provided by A.I.D. will be made available on a rental basis by Provincial Irrigation Departments (PIDs) to private contractors employing labor-intensive techniques. Generally, labor-intensive methods will be employed on waterlogged and congested areas, schemes with short leads, and minors and smaller distributaries. This labor-intensive work will amount to about 60 percent of the earthwork. Where substantial quantities of earthwork with long leads or underwater excavation are involved, the work will be carried out by heavy earthmoving equipment. It is estimated that about 30 percent of the earthwork relating to canal rehabilitation and nearly all of the surface drainage rehabilitation or in total about 40 percent of all civil works will be done by equipment.

Rehabilitation of the drainage systems primarily involves earthwork. Most of the drains are badly clogged and require clearing and cleaning. Virtually all of this work must be done by draglines. Small and medium capacity draglines will be provided by A.I.D. to supplement the existing equipment fleet used for this work.

III. Description of Environmental Impacts

A. Land Use

There will be no change in the landscape since no new canals or drains will be constructed under the ISR/ISM projects. Primary physical activity will involve only the reshaping of existing canals through compaction and raising of embankments. Much of the earth required for strengthening canal embankments will be supplied by dredging silt from the canals. Where sufficient silt is not available for this purpose, soil will be obtained from adjacent waste lands or from farmlands from which owners are desirous to have soil removed. There will not be an adverse impact on such farmland. In fact, on lands that are too high for canal irrigation, the removal of soil will be beneficial for farmers. Farmers often want to reduce the elevation of high fields for this purpose but have no place to dispose of the excess soil. Consequently, the work is either not done or the removed soil is left in piles and reduces the acreage of cultivated land. The proposed project activity will thus have a positive impact on the environment.

Waste land areas from which earth is removed will remain unfilled. This may have a potential adverse effect on the environment due to accumulation of rain water. However, this slight adverse impact will be more than offset by the positive impact mentioned above.

B. Water

There will be no change in the physical, chemical, or biological state of water. In some cases, water flow rates will be increased as a result of the project, but increases will be only up to the flow rate for which the canal was originally designed. As a result of the project activity, the canal water will be carried more safely than is now the case. The incidence of canal breaches also result in accumulated water in undesirable places, thus creating adverse effects on the environment. The activity will have a positive effect on the environment since it will reduce the incidence of breaches.

C. Social and Economic Effects

Reduction in loss of canal water as well as better drainage of surplus ground water will have a positive effect on agricultural production. In addition to the rehabilitation component of the project, other planned program activities in such areas as planning and design, research, and training and management, will increase the efficiency and

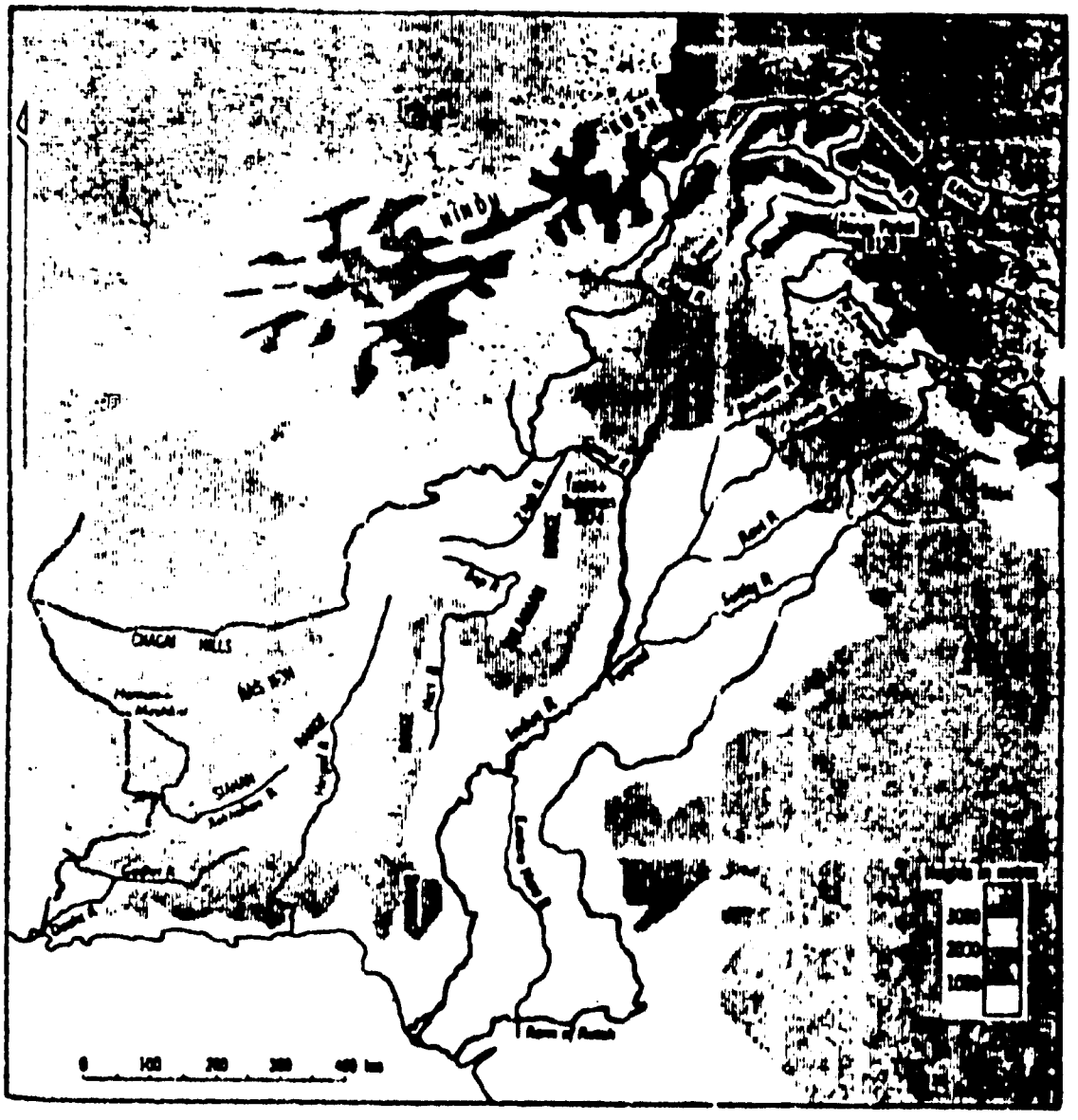
effectiveness of the operations and maintenance of the entire canal system which will have significant economic and social benefits. Implementation of the project will also create employment opportunities. The project will, therefore, have a positive social and economic impact.

IV. Recommendation

The project will have little or no adverse effect on the natural environment. In fact, the social and economic impact of the project as well as the impact on land and water use will be highly favorable. An Environmental Assessment is not required. It is, therefore, recommended that a Threshold Decision for a Negative Determination be approved.

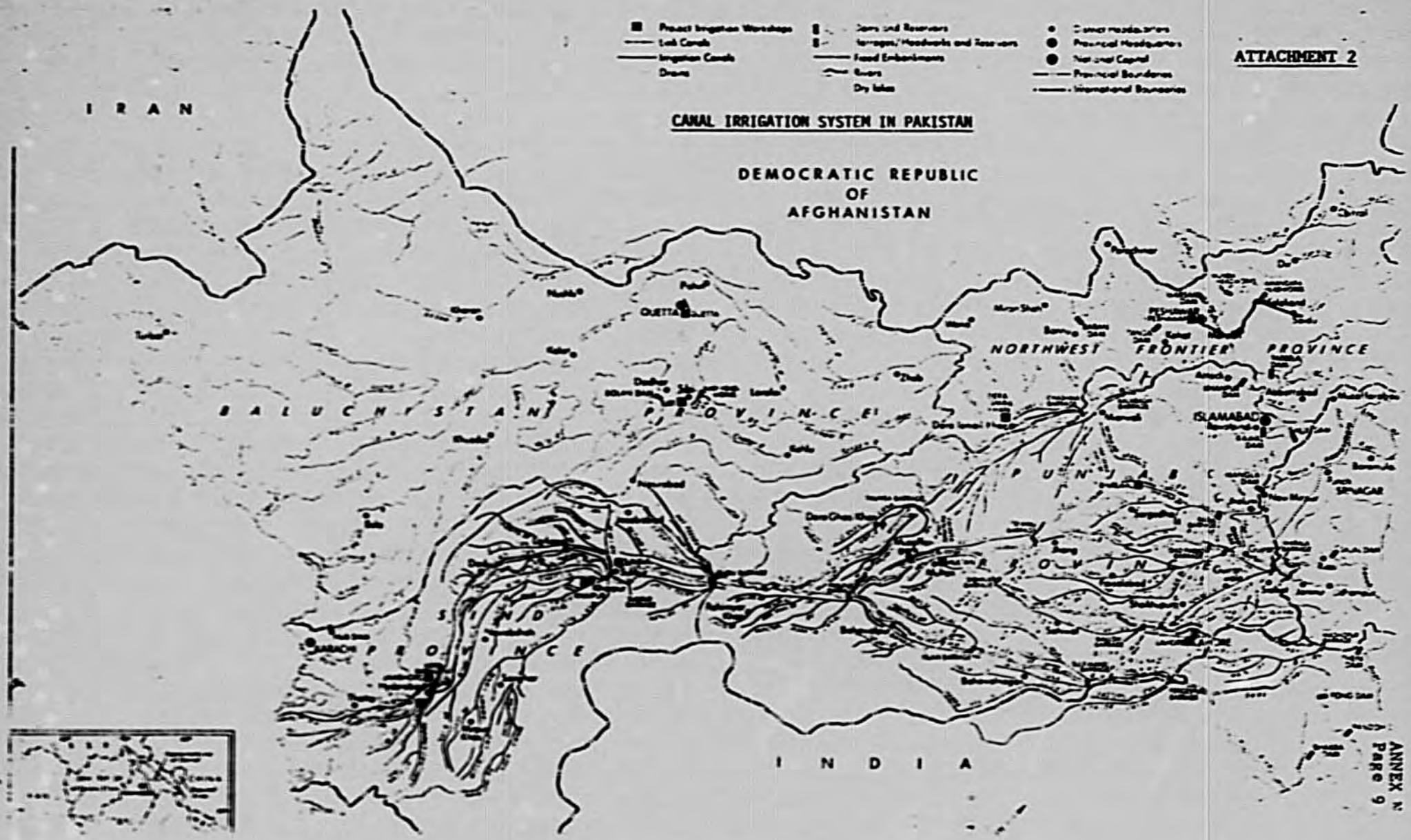
ATTACHMENT 1

TOPOGRAPHICAL MAP OF PAKISTAN



Best Available Document

ATTACHMENT 2



ANNEX N
Page 9

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ATTACHMENT 3

CHECKLIST

A. Direct Changes. Questions 1-19 fit into the blank space in the following question:

Does the implementation of this proposal require or cause significant (insert question here) within the project area?

N 1. Change in capacity to support an abundance of [illegible] kinds of plants and animals,

N 2. Alteration of important microclimates,

N 3. Change to specific places or routes which are of strategic biologic significance (such as breeding grounds, feeding areas, migration routes, winter or dry season range),

N 4. Alteration of supply, flows, or quality and location of waters,

Y 5. Alteration of surfaces, including vegetation, soils, [illegible]

N 6. Alterations of air quality,

N 7. Modifications of flows or cycles of nutrients, (such as might be caused by devegetation, irrigation leaching, exports of food, cattle, minerals, applications of fertilizers etc.),

N 8. Changes affecting the susceptibility of soils to accelerated erosion,

N 9. Alteration of extant agricultural systems, especially in genetic diversity of crops, animals, and combinations thereof.

N 10. Changes to human population, including relocation, (such as resettlement, infrastructure, family planning, etc.),

N 11. Change in contexts which might effect transmission of diseases of man, animal, plants.

N 12. Changes in nutritional status of human population(s).

N 13. Change to the rates and quantities of concentrated energy transformation (such as fertilizer use, power generation, adoption of petroleum engine, etc.),

N 14. Changes to the rates and quantities of non-renewable resource use,

N 15. Transformation of [illegible] of land which may be of cultu significance (such as holy places, cemeteries, supple [illegible] fishing or hunting, or medicinal herb gatheri

Y 16. Changes which alter either the potential for environmental hazards or the capacity to cope with them.

Y 17. Possibility that waste products from the proposed activities will be fully utilized, contained within the premises, or properly disposed of.

N 18. Modification of capacity to utilize and distribute locally abundant resources, skills, information and materials.

N 19. Replacement of local land use systems of proven sustainability with others of questionable longevity.

B. Indirect Consequences. Although this section re-runs the previous topical questions, they are to be considered in a context of potential links to areas outside the immediate project region or site. Consideration should also be given to interrelationships between institutions and technology as they affect capacity to change in scale and intensity of environmental impacts.

Respond in the same way, with a Y, N or ? to the questions.

For areas or sectors outside the immediate or direct concern of the proposed project, are there significant probabilities that:

N 1. Some changes to habitats will alter capacity to support diverse and self-regulating sets of plant and animal populations?

N 2. Alteration of lands of marginal productivity will affect their capacity to provide a broad array of ecosystem services (such as: watershed protection provides nutrient cycling, water quality maintenance, oxygen, gatherable products, and aesthetic satisfactions)?

N 3. Non-reversible commitments of biologic resources will occur?

Y in flow-rate 4. There will be changes in the qualities, flow rates, and consumption of waters?

N 5. Change to the rates, quantities, containment and cycling routes of waste products, including agricultural by-products, will occur.

Y 6. There will be changes in the capacity of people to protect themselves from environmental hazards (such as disease transmission, flood, drought, cold, water pollution, pest populations etc.).

N 7. The locations chosen for infrastructure development will alter values of lands or places so as to cause serious changes in intensities of use that in turn alter ecologic viability (such as: a road may lead to settlement near the borders of a previously protected forest, leading thus to unintentional destruction).

N 8. Change to regional relationships of resource allocation would require either changes to or coordination with another project or country.

N 9. Changes in food supply structure would create changes in nutrition, health and/or poverty levels?

N 10. Given the circumstances of technology and social conditions, this proposal will be perceived as using the natural resources in a conservative and efficient manner? (does the project sacrifice the long range options of one ethnic group or national class for the benefit of another? Or, are the long range options knowingly being traded off?).

N 11. Alternations of landscape will affect the character of places which have significance to the history, ethnic identity, aesthetic well-being or cultural continuity of the people(s) involved.

N 12. Serious commitment to high energy content inputs will alter social structures, marketing connections, political dependencies, agricultural systems and resource availabilities.

N/A 13. This project will assist people to organise sustainable health services and technology in relation to changes in environmental conditions. (such as diet, disease vectors, sanitation, shelter).

N/A 14. The institutions developing from this proposal will have continuity of environmentally aware participant involvement in supervision and monitoring, including questions of conflict, both legal and political.

Y 15. The developments sought will contribute to the establishment of incentives to conservation of natural resources.

N 16. The project will create changes which may become national or international political controversies.

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INCOMING TELEGRAM

Department of State

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E.O 12356 N/A
SUBJECT: IRRIGATION SYSTEMS MANAGEMENT (391-0467)
- PROJECT PAPER - INITIAL ENVIRONMENTAL
- EXAMINATION (IEE), ANNEX N

1. MISSION WILL MAKE ALL POSSIBLE EFFORTS DURING THE PROJECT IMPLEMENTATION STAGE TO MITIGATE THE NEGATIVE IMPACTS WHICH MAY ARISE FROM EXCAVATION OF BORROW-PITS. SUCH NEGATIVE IMPACTS INCLUDE POSSIBLE INCREASE IN THE POTENTIAL FOR VIABLE MOSQUITO VECTORS OF MALARIA AND OTHER DISEASES AND SOIL EROSION. IN FACT, PRECAUTIONARY MEASURES HAVE ALREADY ACCOUNTED FOR IN THE DESIGN OF THE CONSTRUCTION SPECIFICATIONS OF THE PROJECT. AN EXCERPT FROM THE SPECIFICATIONS GOVERNING BORROW-PITS EXCAVATION IS REPRODUCED BELOW:

- NO BORROW-PIT SHALL BE EXCAVATED ON OR CLOSE TO RAIL OR
- ROAD-WAYS, VILLAGE TRACK, CANALS, LEVEL CROSSING OR
- EXISTING EMBANKMENTS. BORROW-PITS SHALL NOT BE LOCATED
- NEAR RESIDENTIAL AND COMMERCIAL AREAS BUT IN CASE IT IS
- UNAVOIDABLE, THE DEPTH OF SUCH BORROW PITS SHALL BE
- MINIMAL AND WHERE POSSIBLE, ARRANGEMENT SHALL BE MADE
- TO DRAIN THEM. THE SIDES OF ALL SUCH BORROW-PITS SHALL
- HAVE A SLOPE OF ONE IN THREE. ANY BORROW-PIT WHICH WILL
- NOT CONFORM TO THESE SPECIFICATIONS SHALL BE PROPERLY
- FILLED IN WITH SUITABLE MATERIAL AND CONSOLIDATED TO
- CORRECT LINES AND GRADES AT THE CONTRACTOR'S EXPENSE.

2. WHERE NECESSARY TECHNICAL ASSISTANCE WILL BE SOUGHT FROM HPN STAFF AND ADVISORS AND DIRECTORATE OF MALARIA CONTROL, GOP, UNDER THE MALARIA CONTROL II PROGRAM.

3. IN VIEW OF THE SPECIFICATIONS REPRODUCED IN PARA I ABOVE, MISSION ANTICIPATES INSIGNIFICANT PROBLEMS DUE TO EROSION IN THE BORROW-PITS. HOWEVER, BUREAU'S REGIONAL ENVIRONMENTAL ADVISOR WILL BE CONSULTED TO FURTHER MINIMIZE THE NEGATIVE IMPACTS, IF ANY, DUE TO BORROW-PITS EXCAVATION. SPIERS

UNCLASSIFIED

LIST OF CONSULTANT REPORTS ON FILE AT USAID/PAKISTAN

1. Report on Operations/Planning/System Management, USAID Irrigation Systems Management Project, by Reuben J. Johnson, June 1982.

2. Report on Improving O&M Capability/Research/Management, USAID Irrigation Systems Management Project, by Jerome Schaack, June 1982.

3. Report on Suggested Training and Research Activities, USAID Irrigation Systems Management Project, by M. Badruddin, July 1982.

4. Report on Irrigation System Management Plan, by Dr. James B. Mayfield, Department of Political Science, University of Utah, Salt Lake City, Utah 84112.

5. Report on Uses of Microcomputers on the ISM Project, by Merlyn Kettering, July 1982.

6. Present Structure and Management Practices of Irrigation Water Delivery System in Pakistan, by Associated Consulting Engineers (ACE) Ltd.,Karachi, Pakistan, May 1982.

7. Report on Equipment & Stores Maintenance Training: Vocational & Management, USAID Irrigation Systems Management Project, by Emmay Associates Ltd., Lahore, Pakistan, June 1982.

8. Reports Prepared by a Consulting Team Planning Canal and Drain Rehabilitation Activities During the Period May 10 to June 9, 1982. (Team Members: Khalid Mahmood, Civil and Mechanical Engineering Department, George Washington University; Clifford Lucas, Chief of Civil Maintenance, O&M Division, California Department of Water Resources; William Curtis, Consultant, retired from U.S. Corps of Engineers; and, James Watson, Consultant, retired from USAID.)

9. Recommendations on Upgrading Irrigation Research Institutes by Dr. Khalid Mahmood, George Washington University, June 1982.

CREDIT NUMBER 1239 PAK

Development Credit Agreement

(Irrigation Systems Rehabilitation Project)

between

ISLAMIC REPUBLIC OF PAKISTAN

and

INTERNATIONAL DEVELOPMENT ASSOCIATION

Dated June 3, 1982

On File at USAID/Pakistan

CREDIT NUMBER 1239 PAK

Punjab Project Agreement

(Irrigation Systems Rehabilitation Project)

between

INTERNATIONAL DEVELOPMENT ASSOCIATION

and

PROVINCE OF PUNJAB

Dated June 3, 1982

On File at USAID/Pakistan

CREDIT NUMBER 1239 PAK

Sind Project Agreement

(Irrigation Systems Rehabilitation Project)

between

INTERNATIONAL DEVELOPMENT ASSOCIATION

and

PROVINCE OF SIND

Dated June 5, 1982

On File at USAID/Pakistan

CREDIT NUMBER 1239 PAK

NWFP Project Agreement

(Irrigation Systems Rehabilitation Project)

between

INTERNATIONAL DEVELOPMENT ASSOCIATION

and

NORTH WEST FRONTIER PROVINCE

Dated June 3, 1982

On File at USAID/P

CREDIT NUMBER 1239 PAK

Baluchistan Project Agreement

(Irrigation Systems Rehabilitation Project)

between

INTERNATIONAL DEVELOPMENT ASSOCIATION

and

PROVINCE OF BALUCHISTAN

Dated June 5, 1982

On File at USAID/Pakistan

Supplemental letter

THE WORLD BANK
ISLAMABAD OFFICE
30 MAR 1982
WES | AA | ANY | AKM | FSMA | UU | PAP | DSA | FHS

ISLAMIC REPUBLIC OF PAKISTAN

International Development Association
1818 H Street, N.W.
Washington, D.C. 20433
United States of America

Credit No. ___-PAK
(Irrigation Systems Rehabilitation Project)
Operation and Maintenance Funding

Dear Sirs:

In connection with Section 2.01(d) of the Project Agreements of even date between the International Development Association and the Provinces of Baluchistan, NWFP, Punjab and Sind, the Borrower and the Provinces confirm that the annual increase in funds available for operation and maintenance for canal, surface drainage and flood protection bunds will exceed the expected rate of annual cost increase. For this purpose, the following amounts (valued in 1981 Rupees) represent a reasonable estimate of recurrent funds required by FY84/85:

Province	Rs M
Baluchistan	36.5
NWFP	80.0
Punjab	535.0
Sind	320.0

The above estimates may be appropriately revised, in agreement with the Association, based upon the Annual O&M Program to be prepared by the Provincial Irrigation Departments following consultation with the Association.

The Borrower and Provinces further confirm that they will make all necessary effort to obtain appropriate legislative approval to reach the above indicated or appropriately revised levels.

Very truly yours,

ISLAMIC REPUBLIC OF PAKISTAN

_____
Authorized Representative

Province of Baluchistan

_____
Authorized Representative

Province of NWFP

_____
Authorized Representative

Province of Punjab

_____
Authorized Representative

Province of Sind

_____
Authorized Representative

CLEMENTS

FOLLOWING RECEIVED TODAY FOR YOU FROM RAHATULLAH KHAN:

QUOTE

KINDLY REFER PARA 3 OF MINUTES OF NEGOTIATIONS FOR THE ABOVE PROJECT. I AM PLEASED TO INFORM YOU THAT THE GOVERNMENT OF PAKISTAN AND THE PROVINCIAL GOVERNMENTS OF PUNJAB, SIND, NWFP AND BALUCHISTAN HAVE APPROVED THE DRAFT NEGOTIATED DOCUMENTS AND THE SUPPLEMENTAL LETTER. QUESTION OF ANTICIPATORY APPROVAL WAS DISCUSSED WITH YOU AND MR. YOON BY THE LEADER OF PAKISTAN DELEGATION.

REG: O+M FUNDING THE FIGURES REPORTED BY THE PROVINCES ARE AS UNDER:

	1980-81 (RS. MILLION)	1981-1982 (RS. MILLION)
PUNJAB	334.200	371.500
SIND	302.960	343.919
BALUCHISTAN	20.000	27.000
NWFP	78.000	84.000

WE WOULD BE GRATEFUL IF FURTHER ACTION IS TAKEN BY YOU TO PROCESS THE CREDIT WITH IDA EXECUTIVE BOARD ON THE SCHEDULED DATE OF 11TH MAY 1982. REGARDS

QUOTE

REGARDS ROWE

PAKISTAN

IRRIGATION SYSTEMS REHABILITATION PROJECT

MINUTES OF NEGOTIATIONS

1. Negotiations for the Irrigation Systems Rehabilitation Project were held in Washington, D.C. from March 15 to March 23, 1982. The Pakistan delegation consisted of Messrs. A. Wahab F. Sheikh, Secretary, Water and Power, Government of Pakistan (Head of Delegation); Salim Abbas Jilani, Additional Chief Secretary, Government of Baluchistan; Khalid Javed, Acting Chairman, Planning and Development Board, Government of Punjab; Mian Tayyab Hassan, Acting Additional Chief Secretary, Government of NWFP; S.M.A. Naqvi, Deputy Secretary, Economic Affairs Division, Government of Pakistan; M.M. Dahar, Secretary, Irrigation, Government of Sind; Abdur Raziq Khan, Secretary, Irrigation, Government of Baluchistan; Saad Haroon Mahmood, Secretary, Irrigation, Government of Punjab; and Ihsanul Haq, Economic Minister, Embassy of Pakistan. The Association was represented by Messrs. Artaza, Fairchild, Mead and Youssef, Ms. Lituma and Miss Gunnarsdottir. Mr. Curtis and Miss Matheson from USAID also attended some of the sessions.

2. These Minutes are not a complete record of the negotiations but are intended to record or clarify understanding reached regarding the following matters pertaining to the proposed Credit and the project.

3. Actions to be completed before Board Presentation. The IDA representatives explained that, to enable the proposed Credit to be presented to the IDA Executive Directors for their consideration on May 11 as scheduled, IDA should receive before April 15 approval by GOP and the Provinces of the documents as negotiated and confirmation that the Minister of Finance has given anticipatory approval to the project's PC-1. Failure to meet this schedule would jeopardize the inclusion of the proposed project in IDA's FY82 lending program.

4. Section 3.01(b) of the Development Credit Agreement (DCA): Agreed Schemes to be Rehabilitated During FY82/83. The Pakistan delegation presented a tentative list of schemes to be rehabilitated during FY82/83 under the project. The estimated quantities and costs are in line with estimates in the Staff Appraisal Report, as specifically detailed in the project PC-1 proforma. The schemes for FY83 were reviewed and tentatively agreed as follows:

A. Baluchistan Province

1. Tore Murgha Canal
2. Loe Viala Canal
3. Nag Canal
4. Pidrak Canal
5. Surma Sang Canal
6. Keshmanda Canal

7. Saliana Canal
8. Suzoo Canal

B. NWFP

1. Warsak Lift Canal (Hill Torrent Zone Reaches)
2. Kabul River Canal
3. Warsak Left Bank Canal System and Catch Water Drain
4. Canals located in Peshawar, Bannu, D.I. Khan, Dir, Swat, Chitral and Hazara Districts
5. Jui Sheikh Canal
6. Masonry Structures, Catch Water Drains and Upper Swat Canal System
7. Pahur Lift Canal System
8. Peshawar District Drainage System

C. Punjab Province

1. Lower Jhelum Canal System
2. Lower Chenab Canal System
3. Muzaffargarh Canal System
4. Depalpur Canal System
5. Faqirian Sillanwab Drainage System

D. Sind Province

1. Rohri Canal System
   a. Almani Branch
   b. Tando Adam Branch
   c. Hyderabad Branch
   d. Nasrat Branch
2. Nara Canal System
   a. Mithrao Canal
   b. Jamroo Canal
   c. West Branch
   d. Khipro Canal
3. Khairpur West Canal System
4. Khairpur East Canal System

5. Section 3.02(b) of the DCA. It was agreed that the supervisory consultants and evaluation/research organization to be employed or caused to be employed by the Borrower will be local consultants/organisation.

6. Sections 3.03(b) of the DCA and 2.03(b) of the Project Agreements. The IDA representatives explained that the "purposes of the project" are those included in the Description of the Project (Schedule 2 to the DCA).

7. Section 3.05(a) of the DCA and Section 2.06 of the Project Agreements: Criteria for Selecting Schemes to be Rehabilitated. It was agreed that all main canals, branches, distributaries and minors, as well as surface drainage systems, could be rehabilitated under the project subject to the following criteria:

(a) Indus Irrigation System: The maximum civil works investment cost per ac of cca (June 1981 prices) for rehabilitating Indus Irrigation System schemes should not exceed Rs 125 in Punjab, Rs 175 in Sind and Baluchistan, and Rs 200 in NWFP. Schemes not within these per ac costs would be rehabilitated only following consultation with IDA, and if an economic analysis by the Provincial Irrigation Department (PID) showed an economic rate of return greater than 15%.

The representatives of Punjab stated that the maximum civil works investment cost per ac of cca laid down for the Punjab part would restrict rehabilitation works. They further stated that the magnitude and nature of works to be carried out in Punjab are similar to those to be carried out in Sind. Therefore the limit for Punjab should be raised to Rs 175 per ac as in Sind. The IDA delegation took note of this statement. In addition, PIDs would exercise care to assure the rehabilitation of complete systems or subsystems during the project period and would use the following guidelines in identifying priority for rehabilitation:

(i) systems or subsystems of canals (consisting of main canals, branches, distributaries, minors and structures requiring repair) that are located in areas of high cropping intensities and higher value crops and need urgent rehabilitation because of high risk of canal breach (for example, canals that are operating with little freeboard, weak banks and dowels, weak or no berms, inadequate road width and outer slope, eroded inner slopes and silted bottoms);

(ii) systems or subsystems of canals that have inequitable deliveries because of large sediment deposits in channels of minors and distributaries;

(iii) systems or subsystems of canals in which farmers, under PID supervision, would donate labor for removing silt from the distributaries and minors; and

(iv) surface drains that are located in highly developed agricultural areas and have lost most of their water carrying capacity through sediment deposition and cannot

remove the excessive water from rainstorm and irrigation effluents at a desired rate.

(b) Systems or Subsystems Outside the Indus Irrigation System:

(i) commanded area would not be less than 250 ac;

(ii) scheme would benefit at least 25 farm families;

(iii) dependable and available storage in supply reservoir should not be less than 2.5 ac/ft per cropped ac; and the minimum flow from supplying streams should provide a minimum of one cusec during the period of critical crop water requirement for each 125 ac cropped; and

(iv) rehabilitation costs for (a) existing commanded area should not exceed Rs 700 per ac; and (b) incremental commanded areas should not exceed Rs 2,000 per ac.

Schemes not meeting the water duty in (iii) above and maximum permissible rehabilitation cost per ac in (iv) above could be included in the project following consultation with IDA, and if an economic analysis by PIDs showed an economic rate of return for the project greater than 15%.

8. Section 3.05(b) of the DCA and Section 2.06(b) of the Project Agreements: The reference to specifications in said paragraphs refer to PIDs specifications in each province which are satisfactory to IDA.

9. Section 3.07 of the DCA and Schedule on Procurement of the Project Agreements. It was agreed that "force account procedures" means "works carried out departmentally."

10. Section 3.08 of the DCA. It was agreed that, for the purpose of meeting the requirements of this Section, the Federal Coordinating Cell would review and consolidate for forwarding to the Association the documents prepared by the Provincial Irrigation Departments such as the Annual Development Program referred to in Section 2.06(c) of the Project Agreements, the Annual O&M Program referred to in Section 2.01(d) of the Project Agreements, the project accounts referred to in Section 3.02(b) of the Project Agreements and quarterly and annual progress reports.

11. Section 3.09 of the DCA. It was agreed that:

(a) the monitoring of the project's progress would be carried out by the PIDs;

(b) the Alluvial Canal Observation Project within the Water and Power Development Authority is a qualified and logical organization to undertake the technical portion of the evaluation program. This organization would supplement as appropriate the monitoring programs to be carried out by the PIDs and provide if necessary technical data to assist in carrying out the financial and economic evaluation of the project; and

(c) the Supervisory Consultants would evaluate the efficiency of equipment usage and maintenance and the quality of construction work.

12. Sections 4.01(c) of the DCA and 3.03 of the Project Agreements. The IDA representatives stated that, for the purpose of meeting the requirements of this Section, the Auditor General or his nominee was acceptable to the Association. However, in the event that the project audits were delayed or found unsatisfactory, the Association might request from the Borrower the employment of other auditors.

13. Section 4.02 of the DCA. The Pakistan delegation noted that the provincial departments and agencies would take the necessary measures indicated in this Section in accordance with appropriate provincial practices.

14. Section 5.01(a) of the DCA: Remedies of the Association. The representatives of the provinces noted that, under Section 6.02 of the General Conditions, IDA could suspend the Credit in whole or in part in order not to affect those provinces that were carrying out the project in a satisfactory manner.

15. Section 2.01(d) of the Project Agreements.

(a) The Pakistan delegation stated that, excluding special federal allocation, a substantial increase in maintenance funding had occurred in FY81-82: these figures will be telexed to the Association by April 15, 1982; and

(b) The Punjab representative indicated that, based upon a recent O&M study prepared by the Provincial Irrigation Department, the O&M estimate of Rs 535 million by FY83 referred to in the Supplemental Letter may be high. It was agreed that such estimates may be appropriately revised in agreement with the Association based upon the Annual O&M program.

16. Section 3.01 of the Project Agreements. It was agreed that, in order to achieve the levels of O&M funding specified in the draft legal documents, it would be desirable to raise water charges at intervals of not

more than two years and that all necessary effort would be made to obtain appropriate legislative approval for such increases.

17. Section 3.01 of the Project Agreements. It was agreed that:

(a) "other appropriate financial arrangements" meant cost recovery measures such as levies, taxes and other forms of revenue from the direct beneficiaries of the irrigation system; and

(b) in exceptional circumstances where such cost recovery from direct beneficiaries was impractical, indirect measures would be appropriate.

18. Schedule on Procurement of the Project Agreements. The IDA representatives stated that present local competitive bidding procedures are satisfactory to the Association. Any change in these procedures would have to be reviewed by IDA. With respect to Paragraph B it was further agreed that (a) contracts for civil works below Rs 300,000 would be disbursed against statement of expenditures. Forms and procedures for statement of expenditures were agreed upon; and (b) contracts for civil works for Rs 300,000 and above would require documentation as indicated in the Project Agreements.

For the Pakistan Delegation

For the International Development Association Delegation

Washington, D.C.
March 23, 1982

IRRIGATION SYSTEMS REHABILITATION PROJECT
PROVINCIAL ADP AND FEDERAL ADP ALLOCATIONS FOR 1982-83

(Figures in Million Rs.)

Province	Provincial ADP	Federal ADP	Total
Punjab	60.60	147.80	208.40
Sind	36.10	88.20	124.30
NWFP	9.38*	27.30	36.68
Baluchistan	9.50	23.40	32.90
TOTAL:	115.58	286.70	402.28

	208.40	124.30	36.68	32.90
Civil Works	105.10	67.50	14.20	10.0
Equipment	72.60	38.30	18.90	18.30
Base Cost	177.70	105.80	33.10	28.30
Price Contin:	30.70	18.50	3.60	4.80
Total	208.40	124.3	36.70	33.10

* Secretary (Irrigation) NWFP says that actual allocation should have been Rs.11.30 million but NWFP Government has allocated only Rs.9.38 million due to financial constraints (telephonic call dated November 18,1982). Therefore the contingency and the total amount has been reduced accordingly for the year 1982-83.

IRRIGATION SYSTEMS REHABILITATION PROJECT

FINANCING OF CIVIL WORKS

(Million Rs.)

A - **Total Cost of Civil Works** = Rs.655.6 million

B - **Contributions**

	US Dollars (Millions)	Share Percentage	Equivalent Pak Rupees (Million)
IDA	28.6	48	314.7
USAID	13.7	23	150.8
GOP & Province	17.3	29	190.4
Total	59.6	100	655.9

C - **Allocations to Provinces**

	Total (Million Rs.)	Contributions (Million Rs.)			Cost of Schemes relating to	
		IDA	USAID	GOP/Provn.	IDA	USAID
Punjab	350.3	168.0	80.4	101.9	237.8	113.5
Sind	225.0	108.0	51.7	65.3	152.2	72.8
N.W.F.P.	47.1	22.6	10.8	13.7	31.9	15.2
Baluchistan	33.5	16.1	7.9	9.5	22.6	10.9
Total	655.9	314.7	150.8	190.4	443.5	212.4

IRRIGATION SYSTEMS REHABILITATION PROJECT
PUNJAB PROVINCE
IDA FUNDED SCHEMES

Number of Scheme	Name of the Scheme	Total Estimated Cost (Million
ISRP-IP-I	Rehabilitation of Muzaffargarh Canal RD 0-147	2.48
ISRP-IP-2	Rehabilitation of Muzaffargarh Canal RD 207-209	2.73
ISRP-IP-3	Berm Formation of Muzaffargarh Canal in Reach RD 330-tail	0.30
ISRP-IP-4	Rehabilitation of Left Bank of Muzaffargarh Canal RD 330-tail	0.84
ISRP-IP-5	Rehabilitation of Lower Maggason Distributary	0.89
ISRP-IP-6	Rehabilitation of Dandewala Distributary	0.35
ISRP-IP-7	Rehabilitation of Kasho Minor	0.12
ISRP-IP-8	Rehabilitation of Maggi Distributary	0.88
ISRP-IP-9	Rehabilitation of Sanawan Distributary	0.41
ISRP-IP-10	Rehabilitation of Dabbi Shah Minor	0.46
ISRP-IP-11	Rehabilitation of Bhanger Sub-minor	0.13
ISRP-IP-12	Rehabilitation of Dinga Minor	0.28
ISRP-IP-13	Rehabilitation of Lower Kot Sultan Distributary Sub-system	1.15
ISRP-IP-14	Rehabilitation of Lower Kishan Wah Distributary Sub-system	0.12

APPENDIX -
Sheet 2 of

ISRP-IP-15	Rehabilitation of Lower Hazara Distributary Sub-system	0.24
ISRP-IP-16	Rehabilitation of Pattle Distributary Sub-system	0.05
ISRP-IP-17	Rehabilitation of Thal Branch RD 48-86	1.75
ISRP-IP-18	Rehabilitation of Munda Distributary	0.20
ISRP-IP-19	Rehabilitation of I-L Kuni Distributary	0.27
ISRP-IP-20	Rehabilitation I-L Dangi Minor	0.14
ISRP-IP-21	Rehabilitation of I-R Pacca Distributary Hassan Minor	0.24
ISRP-IP-22	Rehabilitation of II-R Ghazipur Distributary	9.26
ISRP-IP-23	Rehabilitation of Lower Sardar Wah Distributary Sub-system	0.62
ISRP-IP-24	Rehabilitation of Lower Kot Wah Distributary Sub-System	0.42
ISRP-IP-25	Rehabilitation of Kalu Wah Distributary	0.32
ISRP-IP-26	Rehabilitation of Sanwah Distributary & Wahowal Wah Sub-Minor	0.44
ISRP-IP-27	Rehabilitation of Soni Distributary Sub-System 1. AR Minor RD 0-tail	0.3[illegible]
ISRP-IP-28	Rehabilitation of Demmerwala Distributary RD 0-tail	0.25
ISRP-IP-29	Rehabilitation of Harnam Distributary	0.35
ISRP-IP-30	Rehabilitation of Shujra Distributary	0.30
ISRP-IP-31	Rehabilitation of Shujra Minor	0.03
ISRP-IP-32	Rehabilitation of Alipur Branch RD 0-117	5.25

ISRP-IP-33	Rehabilitation of Kapper Khas Distributary	0.40
ISRP-IP-34	Rehabilitation of Bhakhi Distributary, O-tail	0.32
ISRP-IP-35	Rehabilitation of Qutab Distributary, O-tail	0.11
ISRP-IP-36	Rehabilitation of Chalwan Distributary, O-tail	0.47
ISRP-IP-37	Rehabilitation of Alipur Distributary, O-tail	0.47
ISRP-IP-38	Rehabilitation of Sabiawla Minor, O-tail	0.38
ISRP-IP-39	Rehabilitation of Fatehpur Minor, O-tail	0.37
ISRP-IP-40	Rehabilitation of Suhrab Distributary, O-tail	1.13
ISRP-IP-41	Rehabilitation of Rattan Minor, O-tail	0.28
ISRP-IP-42	Rehabilitation of Moghal Minor, O-tail	0.24
ISRP-IP-43	Rehabilitation of Kaura Khan Distributary, O-tail	0.36
ISRP-IP-44	Rehabilitation of Gulwah Minor, O-tail	0.31
ISRP-IP-45	Rehabilitation of Jatoi Branch Canal cross section O-tail	0.39
ISRP-IP-46	Rehabilitation of Left Bank of Jatoi Branch RD 0-68 and RD 115.140	0.64
ISRP-IP-47	Rehabilitation of Head Regulator of Jatoi Branch	0.24
ISRP-IP-48	Rehabilitation of Soharu Distributary, O-tail	0.26
ISRP-IP-49	Rehabilitation of Yare Wali Minor, MO O-tail	0.13

ISRP-IP-50	Rehabilitation of Mithanwali Minor, O-tail	0.27
ISRP-IP-51	Rehabilitation of Sultanpur Sub-Minor O-tail	0.32
ISRP-IP-52	Rehabilitation of Suleman Distributary, O-tail	0.20
ISRP-IP-53	Rehabilitation of Wahli Minor RD O-tail	0.28
ISRP-IP-54	Rehabilitation of Upper Kot Sultan, O-tail	0.92
ISRP-IP-55	Rehabilitation of Upper Hazara Distributary RD O-tail	0.76
ISRP-IP-56	Rehabilitation of Upper Kishan Minor RD O-tail	0.56
ISRP-IP-57	Rehabilitation of Paharpur Minor RD O-tail	0.27
ISRP-IP-58	Rehabilitation of Kadra Branch RD 0-106	2.90
ISRP-IP-59	Rehabilitation of Mehrwala Distributary RD 0-30	0.38
ISRP-IP-60	Rehabilitation of Talai Distributary, RD 0-102	0.43
ISRP-IP-61	Rehabilitation of Mubarik Distributary, RD 0-70	0.28
ISRP-IP-62	Rehabilitation of Bukhari Distributary, RD 0-33	0.43
ISRP-Ip-63	Rehabilitation of Mailsi Canal RD 138-219 (tail)	2.14
ISRP-IP-64	Rehabilitation of Chit Dain Branch, RD 57-95	0.86
ISRP-IP-65	Rehabilitation of Bahishti Distributary RD 0-154	1.54
ISRP-IP-66	Rehabilitation of Mahmood Distributary RD 0-76	0.64
ISRP-IP-67	Rehabilitation of Shahnal Distributary, RD 0-129	1.50
ISRP-IP-68	Rehabilitation of Karam Branch RD 56-tail	0.62

ISRP-IP-69	Rehabilitation of Jallah Distributary RD O-72	1.10	Annex P Page 21
ISRP-IP-70	Rehabilitation of Chelan Wah Distributary, RD O-93	0.66	
ISRP-IP-71	Rehabilitation of Gopal Distributary, RD O-130	0.87	
ISRP-IP-72	Rehabilitation of Bassi Distributary, RD O-39	0.38	
ISRP-IP-73	Rehabilitation of Gaggan Hatta Distributary, RD O-47	0.19	
ISRP-IP-74	Rehabilitation of Rehmoki Distributary and Bhatti Distributary Sub-System	0.44	
ISRP-IP-75	Rehabilitation of Ferozepur Distributary (RD O-97), Tibbi Distributary (RD O-36), Sub System	0.90	
ISRP-IP-76	Rehabilitation I-L Distributary RD O 82 & 2-L/3 (RD O-27), Sub-System	0.47	
ISRP-IP-77	Rehabilitation of 4-L Distributary RD O-65 Sub-System	0.48	
ISRP-IP-78	Rehabilitation of 2-Al Distributary (RD O-52) & 2-L/1-R Minor (RD O-26)	0.45	
ISRP-IP-79	Rehabilitation of 3-L Distributary RD O-166	0.90	
ISRP-IP-80	Rehabilitation of 2-R/3-L Minor (RD O-15) 4-R/3-L Minor (RD O-22) and 5-L/3-R (RD O-23)	0.44	
ISRP-IP-81	Rehabilitation of 1-R Distributary (RD O-77), 1-L/I-R Minor (RD O-9) and 2-L Distributary (RD O-117)	0.91	
ISRP-IP-82	Rehabilitation of 2-L/TD Minor (RD O-49) 1-L/TD Minor RD O-56	0.43	
ISRP-IP-83	Rehabilitation of Lal Deh Minor (RD O-59) & Kot Saru Minor (RD O-53)	0.67	
ISRP-IP-84	Rehabilitation of 1-R/8-L Minor O-48 & 1-L/8-L Minor RD O-24	0.39	

ISRP-IP-85	Rehabilitation of Bahawal Main Canal RD 152-tail	3.37
ISRP-IP-86	Rehabilitation of Ahmadpur Branch, RD 0-210	7.82
ISRP-IP-87	Rehabilitation of I-R/A-P Branch RD 0-90	0.45
ISRP-IP-88	Rehabilitation of Bahwal Distributary with system	1.13
ISRP-IP-89	Rehabilitation of Sultan Distributary with system	1.79
ISRP-IP-90	Rehabilitation of Uch Distributary with system	1.82
ISRP-IP-91	Rehabilitation of Shahiawala Distributary RD 0-78	1.10
ISRP-IP-92	Rehabilitation of 2-R Mahal Distributary RD 0-97 (tail)	1.33
ISRP-IP-93	Rehabilitation of Bahawalpur Distributary Sub-system	1.41
ISRP-IP-94	Rehabilitation of Hakra Branch RD 149-210 Right	1.95
ISRP-IP-95	Rehabilitation of Hakra Branch RD 254-285 (tail)	0.40
ISRP-IP-96	Rehabilitation of Hakra Right Distributary RD 95-162	0.89
ISRP-IP-97	Rehabilitation of Hakra Right Distributary RD 161-187 with 2-L Hakra Right (RD 9-tail) & 4-L Hakra Right (RD 0-tail)	0.87
ISRP-IP-98	Rehabilitation of I-L/6-R Distributary RD 34-134	1.32
ISRP-IP-99	Rehabilitation of I-R/6-R Distributary (RD 0-tail with 2-L/6-R (RD 0-tail)	0.50
ISRP-IP-100	Rehabilitation of 7-R Distribut ry (RD 99-tail) with 2-L/7-R (RD 0-tail), 2-R/7-P(PD 0-tail), IR/7R, I-L/7R(RD 0-tail)	0.93
ISRP-IP-101	Rehabilitation of 8-R Distributary (RD 0-tail)	0.55

ISRP-IP-102	Rehabilitation of 9-R distributary (RDO-tail) & I-L/I-R(RD 0-tail)	1.77
ISRP-IP-103	Rehabilitation of Abehayat Distributary,RD 0-235 with system	2.90
ISRP-IP-104	Rehabilitation of 4-L Iftikhar Distributary with system	0.70
ISRP-IP-105	Rehabilitation of Sharin Distributary with system	1.70
ISRP-IP-106	Rehabilitation of Gray Distributary with system	1.50
ISRP-IP-107	Rehabilitation of Rukanpur Distributary with system	0.70
ISRP-IP-108	Rehabilitation of banks of S-M-B Link Canal (RD 76-375 RD 374 with Bridges/Lining from RD 0-375	20.10
ISRP-IP-109	Rehabilitation of Banks of Thal Main Line Upper RD 20 - 62	10.30
ISRP-IP-110	Rehabilitation of Mohajir Branch RD 0-tail	1.85
ISRP-IP-111	Rehabilitation of Nurpur Distributary	2.32
ISRP-IP-112	Rehabilitation of Mitha Tiwana Distributary RD 19-24	0.83
ISRP-IP-113	Rehabilitation of Adhi-Kot Distributary RD 7.5-12	0.25
ISRP-IP-114	Rehabilitation of Madali Distributary RD 0-tail	0.96
ISRP-IP-115	Rehabilitation of Thal Main Line Lower RD 0-tail	5.32
ISRP-IP-116	Rehabilitation of Kundian, Piplan, Joya, Sultana Distributaries and related minors	1.55
ISRP-IP-117	Rehabilitation of Jharkal Distributary RD 0-tail & related Minors.	1.00
ISRP-IP-118	Rehabilitation of Dasu Distributary, 0-tail	1.28

ISRP-IP-119	Rehabilitation of Inayat Distributary, O-tail and Berm Cutting	2.08	Annex 7 Page 24
ISRP-Ip-120	Rehabilitation of Karari Minor RD O-tail	1.13	
ISRP-IP-121	Rehabilitation of Rudi System and Berm Cutting	2.23	
ISRP-IP-122	Rehabilitation of Hukam Distributary O-tail and Berm Cutting	1.21	
ISRP-IP-123	Rehabilitation of Rajan Shah Distributary RD 15-80	0.75	
ISRP-IP-124	Rehabilitation of Tarkhani & Meharan Distributary	0.71	
ISRP-IP-125	Rehabilitation of Inayat Distributary RD O-tail	1.21	
ISRP-IP-126	Rehabilitation of Bhagal Distributary RD O-tail	0.86	
ISRP-IP-127	Rehabilitation of Machu Distributary O-tail	0.76	
ISRP-IP-128	Rehabilitation of Bakhat Branch RD O-tail	2.16	
ISRP-IP-129	Rehabilitation of Dala Distributary RD O-tail	0.94	
ISRP-IP-130	Rehabilitation of Dullewala Branch RD O-tail	2.45	
ISRP-IP-131	Rehabilitation of Dullewala Distributary RD O-tail	1.08	
ISRP-IP-132	Rehabilitation of L.C.C. Main Line RD 40-76	0.79	
ISRP-IP-133	Rehabilitation of Mancher Distributary	0.81	
ISRP-IP-134	Rehabilitation of Kot Nikka Branch Sub-System	4.75	
ISRP-IP-135	Rehabilitation of Gajar Gola Distributary	2.21	
ISRP-IP-136	Rehabilitation of Vanike Distributary	1.73	

ISRP-IP-137	Rehabilitation of Channels in Upper Gogeree Branch Sub-System	7.16
ISRP-IP-138	Rehabilitation of Channels in Lower Gogera Branch Sub-System	10.70
ISRP-IP-139	Rehabilitation of Channels in Burala Branch Sub-System	12.66
ISRP-IP-140	Rehabilitation of Channels in Mian Ali Branch Sub-System	1.44
ISRP-IP-141	Rehabilitation of Rakh Branch RD 50-86/L, 61-125/R, 101-114/L and 145-272/ L & R	8.50
ISRP-IP-142	Rehabilitation of Dabora Distributary RD 0-tail	0.57
ISRP-IP-143	Rehabilitation of Jhang Branch Upper	5.15
ISRP-IP-144	Rehabilitation of Masarana Distributary Head to tail	2.67
ISRP-IP-145	Rehabilitation of Chiniot Distributary Head to tail	2.11
ISRP-IP-146	Rehabilitation of Dhaullar Distributary RD 0-tail	4.32
ISRP-IP-147	Rehabilitation of Khewa Distributary RD 0-tail	0.89
ISRP-IP-148	Rehabilitation of Bhawara Branch RD 0-tail	1.30
ISRP-IP-149	Rehabilitation of Sultan Pakhra Distributary RD 0-tail	3.92
	Total Cost of IDA FUNDED Schemes	234.71

IRRIGATION SYSTEMS REHABILITATION PROJECT
PUNJAB PROVINCE
USAID FUNDED SCHEMES

Scheme Number	Name of the Scheme	Total Estimated Cost (Million Rs)
ISRP-UP-1	Rehabilitation of Lahore Branch RD 219- 240	0.38
ISRP-UP-2	Rehabilitation of Main Branch Lower RD 269-431 & RD 446- 459	14.09
ISRP-UP-3	Rehabilitation of Raiwind Distributary & related Minors	0.58
ISRP-UP-4	Rehabilitation of Thaman Distributary & related Minors	1.26
ISRP-UP-5	Rehabilitation of Lower Depalpur Canal RD 0-tail	0.73
ISRP-UP-6	Rehabilitation of Upper Sohag Branch RD 0-tail	0.95
ISRP-UP-7	Rehabilitation of Lower Sohag Branch RD 0-tail	6.29
ISRP-UP-8	Rehabilitation of Haveli Distributary RD 0-tail	1.11
ISRP-UP-9	Rehabilitation of Shahmad Distributary RD 0-tail	1.05
ISRP-UP-10	Rehabilitation of Batta Distributary RD 0-tail	0.76
ISRP-UP-11	Rehabilitation of Musewal Distributary RD 0-tail	0.33
ISRP-UP-12	Rehabilitation of Nizam Distributary RD 0-tail	0.18
ISRP-UP-13	Rehabilitation of Melkahana Distributary RD 0-tail	0.36
ISRP-UP-14	Rehabilitation of Kartarpur Distributary RD 0-tail	0.27
ISRP-UP-15	Rehabilitation of Bajanpur Distributary RD 0-tail	0.58

ISRP-UP-16	Rehabilitation of Jethpur Distributary RD 0-tail	0.48
ISRP-UP-17	Rehabilitation of Dopalpur Distributary RD 80-tail	0.51
ISRP-UP-18	Rehabilitation of Nehranwala Distributary & related Minors	2.93
ISRP-UP-19	Rehabilitation of Chunian Distributary RD 0-tail	0.60
ISRP-UP-20	Rehabilitation of Mangoke Drain RD 11 - 26	8.37
ISRP-UP-21	Rehabilitation of Sheikhupura Drain RD 55 - RD 151	2.81
ISRP-UP-22	Rehabilitation of Hudiara Drain RD 138 - RD 308	5.39
ISRP-UP-23	Rehabilitation of Raiwind Drain RD 0-167	5.28
ISRP-UP-24	Rehabilitation of Buchar-Kana (RD 0-73) & Ramkot (RD 0-9)Drains	1.30
ISRP-UP-25	Rehabilitation of Jamman Drain RD 0-58, Pandoki Drainage System	0.92
ISRP-UP-26	Rehabilitation of Thaman Drainage Sub-System RD 0-24,0-23, 0-10	0.90
ISRP-UP-27	Rehabilitation of Delawar Cheema Drain(RD 0-36) & Pandoki Harkaran Drain(RD 0-60)	1.57
ISRP-UP-28	Rehabilitation of Koth Nullah (RD 0-77)& Malke Drain (RD 0-13)of Nikki Deg Drain	1.37
ISRP-UP-29	Rehabilitation of Nikki Deg Drain RD 0-140	4.43
ISRP-UP-30	Rehabilitation of Right Side Branch Drains of Sukhrawa Drain	1.22
ISRP-UP-31	Rehabilitation of Left Side Branch Drain of Sukhrawa Drain	1.90
ISRP-UP-32	Rehabilitation of Branch Drains out falling into Sukh Beas	2.59

ISRP-UP-33	Rehabilitation of Ghazi Drain (RD 0-65)	1.03
ISRP-UP-34	Rehabilitation of Dugri Drain No.1(RD 0-56) & Dugri Drain No.2 (RD 0-41)	1.10
ISRP-UP-35	Rehabilitation of Rohi Nullah Drain RD 0 - 25	0.79
ISRP-UP-36	Rehabilitation of Plungpur Drain RD 0 - 41	0.64
ISRP-UP-37	Rehabilitation of Wasalpur Drain (RD 0-10) & Aujla Drain RD 0 - 20	0.46
ISRP-UP-38	Rehabilitation of Ghazi Ghat Main Drain RD 0-134	3.06
ISRP-UP-39	Rehabilitation of Ghazi Ghat Branch Drain, O-tail	1.12
ISRP-UP-40	Rehabilitation of Faqirian Sillanwali Drainage System	13.30
ISRP-UP-41	Rehabilitation of Lower Budhi Nallah Drainage System	10.50
ISRP-UP-42	Rehabilitation of Jaranwala Main Drain	5.40
ISRP-UP-43	Rehabilitation of Rasul Nogar Main Drain and related Branch Drains	0.88
ISRP-UP-44	Rehabilitation of Paharang Main Drain RD 0-196	5.87
	Total Cost of USAID Funded Scheme	115.59

IRRIGATION SYSTEMS REHABILITATION PROJECT

SIND PROVINCE

IDA FUNDED SCHEMES

Scheme No.	Name of Scheme	Total Estimated Cost (Rs. Million)
ISRP-IS-1	Rehabilitation of Sehar Wah	3.08
ISRP-IS-2	Rehabilitation of Dahar Wah Upper	3.78
ISRP-IS-3	Rehabilitation of Dubli Branch	3.66
ISRP-IS-4	Rehabilitation of Sarfraz Branch	1.54
ISRP-IS-5	Rehabilitation of Chakar Disty	1.07
ISRP-IS-6	Rehabilitation of Zour Minor	0.61
ISRP-IS-7	Rehabilitation of Miran Khori Minor	0.66
ISRP-IS-8	Rehabilitation of Khesano Minor-II	0.56
ISRP-IS-9	Rehabilitation of Chaaber Minor	0.60
ISRP-IS-10	Rehabilitation of Dasti Minor	N.A.
ISRP-IS-11	Rehabilitation of Khachar Minor	1.31
ISRP-IS-12	Rehabilitation of Talho Minor	0.20
ISRP-IS-13	Rehabilitation of Kalro Minor	0.16
ISRP-IS-14	Rehabilitation of Pharkara Minor	0.12
ISRP-IS-15	Rehabilitation of Hyderabad Branch	5.36
ISRP-IS-16	Rehabilitation of Pano Minor	0.56
ISRP-IS-17	Rehabilitation of Jam Disty	1.83
ISRP-IS-18	Rehabilitation of Said Khan Disty	1.37
ISRP-IS-19	Rehabilitation of Hatri Minor	0.56
ISRP-IS-20	Rehabilitation of Rahuki Disty	2.50
ISRP-IS-21	Rehabilitation of Husri Disty	1.48
ISRP-IS-22	Rehabilitation of Miano Minor	0.68
ISRP-IS-23	Rehabilitation of Amerji Branch	1.86
ISRP-IS-24	Rehabilitation of Abdul Hussain Minor	0.53
ISRP-IS-25	Rehabilitation of Pramabad	0.09
ISRP-IS-26	Rehabilitation of Daur Minor	0.05
ISRP-IS-27	Rehabilitation of Dholu Disty	0.78
ISRP-IS-28	Rehabilitation of James Disty	0.92
ISRP-IS-29	Rehabilitation of Bhambho Minor	0.05
ISRP-IS-30	Rehabilitation of Nawabshah Disty	0.53

ISRP-IS-31	Rehabilitation of Mangsi Minor	0.15
ISRP-IS-32	Rehabilitation of Labji Wai Disty	0.17
ISRP-IS-33	Rehabilitation of Gober Minor	0.05
ISRP-IS-34	Rehabilitation of Dad Branch	1.33
ISRP-IS-35	Rehabilitation of Noorpur Branch	0.22
ISRP-IS-36	Rehabilitation of Mubejani Minor	0.06
ISRP-IS-37	Rehabilitation of Daris Minor	0.39
ISRP-IS-38	Rehabilitation of Daulatpur Disty	0.76
ISRP-IS-39	Rehabilitation of Lundki Disty	0.45
ISRP-IS-40	Rehabilitation of Gacharo Minor	0.42
ISRP-IS-41	Rehabilitation of Thul Branch	1.65
ISRP-IS-42	Rehabilitation of Kakhat Minor	0.16
ISRP-IS-43	Rehabilitation of Talhi Minor	0.17
ISRP-IS-44	Rehabilitation of Motipota Minor	0.08
ISRP-IS-45	Rehabilitation of Malwah Disty	5.43
ISRP-IS-46	Rehabilitation of Mir Rukan Minor	1.13
ISRP-IS-47	Rehabilitation of Qazi Ahmad Minor	0.09
ISRP-IS-48	Rehabilitation of Jado Minor	N.A.
ISRP-IS-49	Rehabilitation of Nabisar Branch	6.10
ISRP-IS-50	Rehabilitation of Sanwary Disty	1.86
ISRP-IS-51	Rehabilitation of Rahmore Disty	0.69
ISRP-IS-52	Rehabilitation of Kunri Disty	0.37
ISRP-IS-53	Rehabilitation of Nabisar Minor	0.51
ISRP-IS-54	Rehabilitation of Bustan Disty	0.74
ISRP-IS-55	Rehabilitation of New Minor	0.91
ISRP-IS-56	Rehabilitation of Tobhan Minor	0.37
ISRP-IS-57	Rehabilitation of Kinjheji Minor	0.18
ISRP-IS-58	Rehabilitation of Gapno Minor	0.46
ISRP-IS-59	Rehabilitation of Bodar Minor	0.21
ISRP-IS-60	Rehabilitation of Ashabo Minor	0.16
ISRP-IS-61	Rehabilitation of Jamrao Branch	8.36
ISRP-IS-62	Rehabilitation of Shahu Brnach	3.25
ISRP-IS-63	Rehabilitation of Duthro Minor	0.75
ISRP-IS-64	Rehabilitation of Mithore Minor	0.40
ISRP-IS-65	Rehabilitation of Kunro Minor	0.33
ISRP-IS-66	Rehabilitation of Sarki Minor	0.54

ISRP-IS-67	Rehabilitation of Liari Minor	0.59
ISRP-IS-68	Rehabilitation of Bijor Minor	0.29
ISRP-IS-69	Rehabilitation of Jhole Minor	0.25
ISRP-IS-70	Rehabilitation of Bhiro Minor	0.31
ISRP-IS-71	Rehabilitation of Thahim Minor	0.43
ISRP-IS-72	Rehabilitation of Tail Minor	0.39
ISRP-IS-73	Rehabilitation of Ex-Jamrao Branch	11.01
ISRP-IS-74	Rehabilitation of Gorchani Minor	0.40
ISRP-IS-75	Rehabilitation of Digri Disty	0.89
ISRP-IS-76	Rehabilitation of Diggi Minor	0.12
ISRP-IS-77	Rehabilitation of Potho Minor	0.27
ISRP-IS-78	Rehabilitation of Murid Disty	0.69
ISRP-IS-79	Rehabilitation of Murid Minor	0.38
ISRP-IS-80	Rehabilitation of Tando Minor	0.17
ISRP-IS-81	Rehabilitation of Khatian Minor	0.40
ISRP-IS-82	Rehabilitation of Khipro Canal	4.46
ISRP-IS-83	Rehabilitation of Samanjo Branch	1.15
ISRP-IS-84	Rehabilitation of Chotiary Disty	1.20
ISRP-IS-85	Rehabilitation of Khori Disty	0.23
ISRP-IS-86	Rehabilitation of Lal Khan Disty	0.92
ISRP-IS-87	Rehabilitation of Sarhal Disty	0.95
ISRP-IS-88	Rehabilitation of Juman Disty	0.85
ISRP-IS-89	Rehabilitation of Nara Canal between Jamrao Head & Makhi Weir.	4.07
ISRP-IS-90	Rehabilitation of Bughdad Minor	0.31
ISRP-IS-91	Rehabilitation of Samathri Minor	0.46
ISRP-IS-92	Rehabilitation of Nuram Disty	0.81
ISRP-IS-93	Rehabilitation of Dakar Disty	1.12
ISRP-IS-94	Rehabilitation of Abdul Wah	2.90
ISRP-IS-95	Rehabilitation of Hamayoon Minor	0.16
ISRP-IS-96	Rehabilitation of Sarchi Minor	0.37
ISRP-IS-97	Rehabilitation of Kamaldero Minor	0.19
ISRP-IS-98	Rehabilitation of Laidi Minor	0.13
ISRP-IS-99	Rehabilitation of Ganger Minor	0.38
ISRP-IS-100	Rehabilitation of Lakha Minor	0.74
ISRP-IS-101	Rehabilitation of Khuhri Minor	0.71
ISRP-IS-102	Rehabilitation of Ghatta Minor	0.21

ISRP-IS-103	Rehabilitation of Ranipur Minor	0.39
ISRP-IS-104	Rehabilitation of Miani Minor	0.21
ISRP-IS-105	Rehabilitation of Darasa Minor	0.23
ISRP-IS-106	Rehabilitation of Ghulam Ali Minor	0.43
ISRP-IS-107	Rehabilitation of Gadeji Minor	0.29
ISRP-IS-108	Rehabilitation of Hyder Minor	0.53
ISRP-IS-109	Rehabilitation of Bodli Minor	0.21
ISRP-IS-110	Rehabilitation of Ahmedpur Minor	0.66
ISRP-IS-111	Rehabilitation of Turi Minor	0.28
ISRP-IS-112	Rehabilitation of Phulpota Minor	0.46
ISRP-IS-113	Rehabilitation of Ujjan Minor	0.73
ISRP-IS-114	Rehabilitation of Sathio Wah RD 0 to 71.8(Tail)	3.68
ISRP-IS-115	Rehabilitation of Ghundera Minor RD 0 to 13.2	0.16
ISRP-IS-116	Rehabilitation of Fais Bux Wah RD 0 to 59.5	2.04
ISRP-IS-117	Rehabilitation of Muhabat Wah RD 0 to 35.9	1.15
ISRP-IS-118	Rehabilitation of Mahar Minor RD 0 to 10.4	0.38
ISRP-IS-119	Rehabilitation of Ganessa Minor RD 0 to 15.13	0.35
ISRP-IS-120	Rehabilitation of Dhedhano Minor RD 0 to 16	0.47
ISRP-IS-121	Rehabilitation of Sanwari Minor RD 0 to 29.7	0.62
ISRP-IS-122	Rehabilitation of Kalra Minor RD 0 to 24.5	0.59
ISRP-IS-123	Rehabilitation of Kanasri Minor RD 0 to 8.5	0.32
ISRP-IS-124	Rehabilitation of Fais Ganj Wah RD 0 to 31.5, 65 to 124 and 161 to 163 (tail)	1.46
ISRP-IS-125	Rehabilitation of Halepota Minor RD 0 to 9.4(Tail)	0.11
ISRP-IS-126	Rehabilitation of Ali Ganj Minor RD 0 to 29.815	0.54
ISRP-IS-127	Rehabilitation of Sangi Minor RD 0 to 14 (Tail)	0.26
ISRP-IS-128	Rehabilitation of Jhajh Minor RD 0 to 14.188(Tail)	0.15
ISRP-IS-129	Rehabilitation of Dilore Minor RD 0 to 10.5	0.09
ISRP-IS-130	Rehabilitation of Umar Minor RD 0 to 16.696 (Tail)	0.12
ISRP-IS-131	Rehabilitation of Warah Branch RD 266 to 368	3.86
ISRP-IS-132	Rehabilitation of Nawab Disty RD 0 to 11	0.41
ISRP-IS-133	Rehabilitation of Puna Disty RD 0 to 10	0.41
ISRP-IS-134	Rehabilitation of Nasir Disty	0.64
ISRP-IS-135	Rehabilitation of Kanwar Disty RD 0 to 35	0.32
ISRP-IS-136	Rehabilitation of Suleman Minor RD 0 to 15	0.37
ISRP-IS-137	Rehabilitation of Wahri Disty, Is-Kirthar	0.15

ISRP-IS-138	Rehabilitation of Patuja Disty, Ex-Qubo Disty	0.10
ISRP-IS-139	Rehabilitation of Shaban Minor Ex-Qubo Disty	0.12
ISRP-IS-140	Rehabilitation of Qubo Disty Ex-Kirthar	0.27
ISRP-IS-141	Rehabilitation of Beer Minor Ex-Kirthar	0.14
ISRP-IS-142	Rehabilitation of Ladho Minor Ex-Kirthar	0.14
ISRP-IS-143	Rehabilitation of Dabo Minor Ex-Kirthar	0.05
ISRP-IS-144	Rehabilitation of Mithri Disty Ex-Kirthar	0.29
ISRP-IS-145	Rehabilitation of Chowki Minor Ex-Noor Pur	0.08
ISRP-IS-146	Rehabilitation of Seer Minor Ex-Noor Pur	0.15
ISRP-IS-147	Rehabilitation of Hadiro Disty Ex-Noor Pur	0.18
ISRP-IS-148	Rehabilitation of Gandakha Ex-Noor Pur	0.56
ISRP-IS-149	Rehabilitation of Noor Pur Disty Ex-Noorpur	0.90
ISRP-IS-150	Rehabilitation of Garhi Minor Ex-Noorpur	0.65
ISRP-IS-151	Rehabilitation of Piral Minor Ex-Noorpur	0.14
ISRP-IS-152	Rehabilitation of Faizabad Disty Ex-Noor Pur	0.20
ISRP-IS-153	Rehabilitation of Sahti Minor Ex-Noorpur	0.10
ISRP-IS-154	Rehabilitation of Khanpur Disty Ex-Noor Pur	0.34
ISRP-IS-155	Rehabilitation of Dumb Minor Ex-Noor Pur	0.35
ISRP-IS-156	Rehabilitation of Shadad Kot Br.RD 0 to 106 Ex.N.W.C.	4.04
ISRP-IS-157	Rehabilitation of Mangat Minor	0.20
ISRP-IS-158	Rehabilitation of Fatehpur Minor	0.15
ISRP-IS-159	Rehabilitation of Dhingano Minor	0.05
ISRP-IS-160	Rehabilitation of Khurbiro Disty	0.60
ISRP-IS-161	Rehabilitation of Khurbiro Feeder	0.10
ISRP-IS-162	Rehabilitation of Suharo Disty	0.70
ISRP-IS-163	Rehabilitation of Tanwari Disty	0.60
ISRP-IS-164	Rehabilitation of Mastoi Disty	0.50
ISRP-IS-165	Rehabilitation of Mohammad Ali Minor	0.10
ISRP-IS-166	Rehabilitation of Kalhoro Minor	0.10
ISRP-IS-167	Rehabilitation of Gul Shah Disty	0.75
ISRP-IS-168	Rehabilitation of Ding Disty	0.25
ISRP-IS-169	Rehabilitation of Ding Feeder	0.05
ISRP-IS-170	Rehabilitation of Maqsooda Minor	0.10
ISRP-IS-171	Rehabilitation of Lighari Disty	0.50
ISRP-IS-172	Rehabilitation of Lighari Feeder	0.10

ISRP-IS-173	Rehabilitation of Sanjar Minor	0.20
ISRP-IS-174	Rehabilitation of Kur Shakh	0.10
ISRP-IS-175	Rehabilitacion of Sijawal Disty	0.60
ISRP-IS-176	Rehabilitation of Sukkur Minor	0.05
ISRP-IS-177	Rehabilitation of Arzi Minor	0.10
ISRP-IS-178	Rehabilitation of Changi Minor	0.10
ISRP-IS-179	Rehabilitation of Bhutta Minor	0.20
ISRP-IS-180	Rehabilitation of Wasirdino Disty	0.40
	TOTAL	152.42

IRRIGATION SYSTEMS REHABILITATION PROJECT

SIND PROVINCE

USAID FUNDED SCHEMES

Scheme No.	Name of the Scheme	Total Estimated Co: (Million Rs.)
ISRP-US-1	Rehabilitation of Ghorabri outfall	3.95
ISRP-US-2	Rehabilitation of Jam Sakro outfall	2.22
ISRP-US-3	Rehabilitation of Navi Sakro	3.04
ISRP-US-4	Rehabilitation of Khui Gharo outfall	3.53
ISRP-US-5	Rehabilitation of Fuleli Guni	4.00
ISRP-US-6	Rehabilitation of T.M.Khan & Matli	3.96
ISRP-US-7	Rehabilitation of Karo Gungro Branch	3.45
ISRP-US-8	Rehabilitation of Karo Gungro Outfall	4.00
ISRP-US-9	Rehabilitation of Nagan Dhoro Outfall	2.05
ISRP-US-10	Rehabilitation of Sujawal Branch	2.16
ISRP-US-11	Rehabilitation of Bathoro Branch	3.44
ISRP-US-12	Rehabilitation of Tando Adam Branch	6.34
ISRP-US-13	Rehabilitation of Jam Branch	5.69
ISRP-US-14	Rehabilitation of Shahdadpur Disty	2.54
ISRP-US-15	Rehabilitation of Qabeyagan Minor	0.60
ISRP-US-16	Rehabilitation of Burriro Minor	0.58
ISRP-US-17	Rehabilitation of Nindra Minor	0.34
ISRP-US-18	Rehabilitation of Bhobhar Minor	0.87
ISRP-US-19	Rehabilitation of Darhs Minor	0.28
ISRP-US-20	Rehabilitation of Berani Distry	1.64
ISRP-US-21	Rehabilitation of Sanhari Minor	0.47
ISRP-US-22	Rehabilitation of Bhadar Minor	0.35
ISRP-US-23	Rehabilitation of Merinai Minor	0.02
ISRP-US-24	Rehabilitation of Hala Branch	2.58
ISRP-US-25	Rehabilitation of Manahi Minor	0.23
ISRP-US-26	Rehabilitation of Dathki Disty	0.24
ISRP-US-27	Rehabilitation of Saidabad Disty	0.40
ISRP-US-28	Rehabilitation of Fatehpur Disty	0.26
ISRP-US-29	Rehabilitation of Tarah Disty	0.41
ISRP-US-30	Rehabilitation of Rano Minor	0.38

APPENDIX-IV
Sheet 2 of 2

Scheme No.	Name of the Scheme	Total Estimated Cost (Million Rs.)
ISRP-US-31	Rehabilitation of Dabhri Minor	0.28
ISRP-US-32	Rehabilitation of Shaikhani Minor	0.58
ISRP-US-33	Rehabilitation of Chher Minor	0.36
ISRP-US-34	Rehabilitation of Lakhisar Minor	0.12
ISRP-US-35	Rehabilitation of Wassan Minor	0.20
ISRP-US-36	Rehabilitation of Sutiari Minor	0.32
ISRP-US-37	Rehabilitation of Murbari Minor	0.32
ISRP-US-38	Rehabilitation of Pai Minor	1.12
ISRP-US-39	Rehabilitation of Gujhri Minor	0.15
ISRP-US-40	Rehabilitation of Meshiakh Moti Disty	1.42
ISRP-US-41	Rehabilitation of New Minor	0.48
ISRP-US-42	Rehabilitation of Jam Jani Minor	0.46
ISRP-US-43	Rehabilitation of Rajperi Minor	0.21
ISRP-US-44	Rehabilitation of Noori Disty	1.28
ISRP-US-45	Rehabilitation of Kehi Minor	0.54
ISRP-US-46	Rehabilitation of Mell Minor	0.93
ISRP-US-47	Rehabilitation of Soomarki Minor	0.73
ISRP-US-48	Rehabilitation of Workshop/Ware-house Buildings	1.20
ISRP-US-49	Rehabilitation of Almani Branch	1.06
		72.58

IRRIGATION SYSTEMS REHABILITATION PROJECT

N.W.F. PROVINCE

IDA FUNDED SCHEMES

Scheme No.	Name of Scheme	Total Estimated Cost (Million Rs.)
ISRP-IN-1	Rehabilitation of Warsak Left bank Canal and Catch Water Drain.	1.00
ISRP-IN-2	Kabul River Canal - Restoration of its Section R.D. 22,000 - 72,000 in reaches	4.00
	UPPER SWAT Canal System	
ISRP-IN-3	Repairs to Damaged Rapid and side pitching of the pitched channel in RD 0-20,000 (IN reaches) Upper Swat Canal	1.18
ISRP-IN-4	Restoration of Canal section, repair to masonary works in various reaches of Machai Branch.	1.34
ISRP-IN-5	Repairs to Rapids on Abazai Branch(16 Works)	0.61
ISRP-IN-6	Restoration of section of Mira Branch RD 92000-130,000 (IN reaches)	0.53
ISRP-IN-7	Rehabilitation of flume RD 250-2200 Jamal Garhi Distributary.	0.86
ISRP-IN-8	Restoration of section of Mado Branch Minor	0.32
ISRP-IN-9	Restoration of Canal Section Mala Minor	0.46
ISRP-IN-10	Restoration to designed section of Ismaila Distributary.	2.10
ISRP-IN-11	Rehabilitation of Kalu Khan Distributary Reach 16,000-25000	1.02
ISRP-IN-12	Restoration of section and side pitching of Nawa Killi Minor	1.09
ISRP-IN-13	Restoration of section and side pitching of Shagi Minor	0.62
ISRP-IN-14	Restoration of section of Swabi Minor	0.68
ISRP-IN-15	Restoration of section Chowky Distributary in reach 0-6,000	0.49
ISRP-IN-16	Silt Clearance of Catch Water Drain along Mira Branch.	0.40

Scheme No.	Name of Scheme	Total Estimated Cost (Million Rs.)
ISRP-IN-17	Pehur Main Canal Lift Irrigation Restoration of section.	5.00
	BANNU District	
ISRP-IN-18	Mama Khel Jadid Canal RD 31,000-44,500	3.00
	D.I.KHAN District	
ISRP-IN-19	Waran Canal RD 0-69000	2.00
	DIR District	
ISRP-IN-20	Darora Jugha Bung Channel	0.13
	SWAT District	
ISRP-IN-21	Fatehpur Channel	0.40
	ABBOTABAD District	
	Sarai Saleh	1.47
	TOTAL IRRIGATION WORKS	28.70
	DRAINAGE SYSTEM	
ISRP-IN-23	Panam Dheri Drain	0.10
ISRP-IN-24	Arbab Drain No. 1 & 2	0.37
ISRP-IN-25	Lakari Drain No.1	0.02
ISRP-IN-26	Ghilji Drain No. 1 & 2	0.02
ISRP-IN-27	Bagicha Drain	0.08
ISRP-IN-28	Catch Water Drain along K.R.C RD 33,000 - 64500	0.04
ISRP-IN-29	Dallas Drain RD 28000 - 42500	0.24
ISRP-IN-30	Kafoor Dheri Drain	0.12
ISRP-IN-31	Surisai Drain	0.423
ISRP-IN-32	Maira Kachori Drain	0.10
ISRP-IN-33	Chamkani Drain-repair to outfall	0.613

Scheme No.	Name of Scheme	Total Estimated Cost (Million Rs.)
ISRP-IN-34	Aza Khel Drainage System	0.20
ISRP-IN-35	Amankot Drainage System	0.09
ISRP-IN-36	Karayana Melogan Drain	0.22
ISRP-IN-37	Kari Khera Drain	0.10
ISRP-IN-38	Providing V.R. Bridges, Water Course Crossings etc.	0.26
	TOTAL DRAINAGE WORKS:-	2.906
	TOTAL IRRIGATION + DRAINAGE WORKS:-	31.606

APPENDIX - VI
Sheet 1 of 1

IRRIGATION SYSTEMS REHABILITATION PROJECT

N.W.F. PROVINCE

USAID FUNDED SCHEME

No.of Scheme	Name of Scheme	Total Estimated Cost (Millions Rs.)
ISRP-UN-1	Rehabilitation of Warsak Lift Canal (Hill torent reach)	4.00
ISRP-UN-2	Repairing Masonary Structures of Warsak land system (i) Syphons (4 Nos) (ii) Aqueduct (3 Nos)	2.60
ISRP-UN-3	Joe Sheikh Canal - Restoration of Section by providing side pitching and strengthening banks. R.D. 80,000 - 120,000	2.50
ISRP-UN-4	Rehabilitation of Sholgarah Canal	0.43
ISRP-UN-5	Rehabilitation of Island Canal	0.60
ISRP-UN-6	Rehabilitation of Doaba Canal	1.60
ISRP-UN-7	Rehabilitation of New Michni Branch	0.50
ISRP-UN-8	Rehabilitation of Ichri Branch	0.20
ISRP-UN-9	Rehabilitation of Samakana Branch	0.20
ISRP-UN-10	Rehabilitation of Subhan Khawar Distributory	0.20
ISRP-UN-11	Rehabilitation of Joe Zardad Canal R.D. 16-26	1.50
ISRP-UN-12	Rehabilitation of Mian Gujar Canal	0.5
ISRP-UN-13	Rehabilitation of Shahi Mahal Minor	0.43
ISRP-UN-14	Rehabilitation of Sangu & Sheikhan Branches	0.40
	TOTAL	15.66

IRRIGATION SYSTEMS REHABILITATION PROJECT

BALUCHISTAN PROVINCE

IDA FUNDED SCHEMES

Scheme No.	Name of Scheme	Total Estimated Cost (Rs. Million)
ISRP - IB/1	Verchoom Irrigation Scheme	0.80
ISRP - IB/2	Poonga Viala	0.40
ISRP - IB/3	Kajoori Irrigation	1.00
ISRP - IB/4	Pir Chatta Channel	2.00
ISRP - IB/5	Mushkaf Channel aoquoduct	0.50
ISRP - IB/6	Main Canal Dhadar	0.30
ISRP - IB/7	Surma Sung	0.90
ISRP - IB/8	Sasool Irrigation Scheme	0.40
ISRP - IB/9	Nag Irrigation Scheme	0.60
ISRP - IB/10	Sidark Irrigation Scheme	0.20
ISRP - IB/11	Barat Khel Irrigation Scheme	1.00
ISRP - IB/12	Kash Manda Irrigation Scheme	0.35
ISRP - IB/13	Saliana Channel Irrigation Scheme	4.00
ISRP - IB/14	Distribution System of Bund Khushdil Khan	2.00
ISRP - IB/15	Tore Murgha Irrigation Scheme	1.00
ISRP - IB/16	Bibi Nani Irrigation Scheme	1.00
ISRP - IB/17	Sukhleji Irrigation Scheme	5.25
ISRP - IB/18	Basima Weir and Channel	0.90
	Total:-	22.60

Annex
Page

IRRIGATION SYSTEMS REHABILITATION PROJECT
BALUCHISTAN PROVINCE

USAID FUNDED SCHEMES

Scheme No.	Name of Scheme	Total Estimated Cost (Rs. Million)
ISRP-UB/1	Loi Viala Shabiau	1.60
ISRP-UB/2	Wam Tangi Irrigation Scheme	1.50
ISRP-UB/3	Sazoo Irrigation Scheme	1.00
ISRP-UB/4	Gachina Irrigation Scheme	0.60
ISRP-UB/5	Gandari Viala Scheme	0.20
ISRP-UB/6	Kaisar Channel Irrigation Scheme	1.00
ISRP-UB/7	Anambar Irrigation Scheme	3.00
ISRP-UB/8	Upper Rehman Manda	1.00
ISRP-UB/9	Lower Rehman Manda	1.00
	Total:-	10.90

ESTIMATED FEDERAL AND PROVINCIAL GOVERNMENT ALLOCATIONS AND EXPENDITURES IN THE WATER SECTOR, PFY 1980/81 - 1986/87 a/

(In Million Rupees)

Administrative Unit/ Activity	Estimated Cost Total	Estimated Cost FX	Estimated Expenditure until 1980/81	Revised ADP Allocation 1981/82	Provision for 1982/83	Foreign Exchange Required for 1982/83 Total	Foreign Exchange Required for 1982/83 GOP	Foreign Exchange Required for 1982/83 Foreign	Estimated Expenditures for 1983/84 to 1986/87
Punjab	753.4	303.8	287.6	49.7	209.4	-	-	-	206.7
Surveys & Investigations	11.7	1.5	0.4	1.2	7.4	-	-	-	2.7
Drainage, Reclamation & Tubewells	524.7	302.3	256.7	29.1	120.9	-	-	-	118.0
Flood Works	0.9	-	-	-	0.9	-	-	-	-
Surface Irrigation/ Open Canals	33.4	-	6.1	6.2	16.5	-	-	-	4.6
Dams	122.2	-	15.7	10.2	28.0	-	-	-	68.3
Others	60.5	-	8.7	3.0	35.7	-	-	-	13.1
Sind	2,109.8	198.4	1,506.4	98.1	103.8	5.0	5.0	-	395.0
Surveys & Investigations	22.2	-	20.9	1.1	2.5	-	-	-	0.5
Drainage, Reclamation & Tubewells	19.9	-	2.5	4.7	4.9	-	-	-	7.9
Flood Works	15.0	-	-	11.8	3.0	-	-	-	9.0
Surface Irrigation/ Open Canals	349.1	-	146.7	42.9	50.7	-	-	-	91.4
Multipurpose Projects	1,688.5	198.4	1,325.3	36.3	41.7	5.0	5.0	-	285.2
Others	14.0	-	11.0	1.0	1.0	-	-	-	1.0

(continued)

Administrative Unit/ Activity	Estimated Cost Total	Estimated Cost FX	Estimated Expenditure until 1980/81	Revised ADP Allocation 1981/82	Provision for 1982/83	Foreign Exchange Required for 1982/83 Total	Foreign Exchange Required for 1982/83 GOP	Foreign Exchange Required for 1982/83 Foreign	Estimated Expenditures for 1983/84 to 1986/87
Baluchistan	425.5	-	216.4	35.3	52.3	-	-	-	71.7
Surveys & Investigations	389.1	-	214.7	31.9	34.4	-	-	-	58.2
Drainage, Reclamation & Tubewells	6.7	-	-	-	6.7	-	-	-	-
Surface Irrigation/ Open Canals	23.6	-	1.7	3.4	8.6	-	-	-	9.1
Dams	6.2	-	-	-	2.6	-	-	-	3.6
NWFP	600.9	207.8	16.4	20.0	119.2	50.0	-	50.0	427.3
Surveys & Investigations	99.7	24.5	16.4	15.4	15.4	3.9	-	3.9	35.8
Drainage, Reclamation & Tubewells	500.7	183.3	(b)	4.3	103.6	46.1	-	46.1	391.5
Flood Works	0.5	-	-	0.3	0.2	-	-	-	-
Federal	NA	NA	NA	3,234.1	3,200.9	861.9	8.2	853.7	NA
Surveys & Investigations	NA	NA	NA	78.5	117.9	39.6	1.0	38.6	NA
Flood Works	NA	NA	NA	269.5	266.6	-	-	-	NA
Meteorological Services	110.8	32.2	43.8	15.0	21.5	3.7	0.4	3.3	30.0
Indus Basin	NA	NA	NA	1,323.8	852.4	494.0	-	494.0	NA
Others	NA	NA	NA	1,547.3	1,942.6	324.6	6.8	317.8	NA

(continued)

Administrative Unit/ Activity	Estimated Cost Total	Estimated Cost FX	Estimated Expenditure until 1980/81	Revised ADP Allocation 1981/82	Provision for 1982/83	Foreign Exchange Required for 1982/83 Total	Foreign Exchange Required for 1982/83 GOP	Foreign Exchange Required for 1982/83 Foreign	Estimated Expenditures for 1983/84 to 1986/87
Total	NA	NA	NA	3,437.2	3,685.6	916.9	13.2	903.7	NA
Surveys & Investigations	NA	NA	NA	128.4	177.5	43.5	1.0	42.5	NA
Drainage, Reclamation & Tubewells	1,052.0	485.6	744.6	38.1	236.1	46.1	-	46.1	517.4
Flood Works	16.4	-	-	281.6	270.7	-	-	-	NA
Surface Irrigation/ Open Canals	406.1	-	154.5	52.5	75.8	-	-	-	105.9
Dams	128.4	-	15.7	10.2	30.6	-	-	-	3.6
Multipurpose Projects	1,688.5	198.4	1,325.3	36.3	41.7	5.0	5.0	-	285.2
Meteorological Services	110.8	32.2	43.8	15.0	21.5	3.7	0.4	3.3	30.0
Indus Basin	NA	NA	NA	1,323.8	852.4	494.0	-	494.0	NA
Others	NA	NA	NA	1,551.3	1,979.3	324.6	6.8	317.8	NA

a/ Excludes allocations for the proposed IBRD and A.I.D. financed canal rehabilitation activities.

b/ Insignificant

Sources: Federal and Provincial 1982/83 Annual Development Programs and USAID/Pakistan estimates.

A.I.D. PROGRAM BY EXPENSE CATEGORY AND FISCAL YEAR: DETAILED BUDGET [a]

(In $ 000 and Rs 000)

Expense Category [b]	FY 1982		FY 1984		FY 1985		FY 1986		Total [c]	
	$	Rs	$	Rs	$	Rs	$	Rs	$	Rs
1. Technical Assistance										
A. [illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B. [illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]	-	-	[illegible]	[illegible]
C. [illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
Subtotal	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Training										
A. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]
B. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C. [illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
Subtotal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3. Commodities										
A. [illegible]	[illegible]	-	-	-	-	-	-	-	[illegible]	-
B. [illegible]	-	-	[illegible]	-	-	-	[illegible]	-	[illegible]	-
C. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-	[illegible]	[illegible]	[illegible]
Subtotal	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4. Other Costs										
A. Civil Works	-	[illegible]	-	[illegible]	-	-	-	-	-	[illegible]
B. [illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
C. [illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
D. [illegible]	-	-	-	-	-	[illegible]	-	[illegible]	-	[illegible]
Subtotal	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Inflation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [d]

a/ Project Costs are defined as anticipated sub-obligations or commitments of funding through, e.g. PIOs, contracts, purchase orders, or work orders for civil works.

b/ Inflation - 10% of FX salaries, 15% of all other FX costs and 20% of local costs, all compounded annually.

c/ Does not include: (i) an estimated $20.0 million (consisting of $20.0 million in FY 1982, $6.0 million in FY 1983 and $6.0 million in FY 1984) of equipment for the ISB project which will be procured with funds under the ACDI Program (386-0080); and, (ii) an additional $25 million for the CSD component of the ISB project, for which the Mission will seek authorization in FY 1984, and for which the following obligation schedule is planned: FY 1985 - $10.0 million; FY 1986 - $2.5 million; and, FY 1987 - $11.5 million.

d/ Equivalent to $20,000,000 at the exchange rate of U.S. $1.00 = Rs 12.02 as of 1/2/82.

A.I.D. FUNDING BY PROJECT COMPONENT, EXPENSE CATEGORY, AND FISCAL YEAR: DETAILED BUDGET [a]

(In $ 000 and Rs 000)

Expense Category [b]	FY 1983		FY 1984		FY 1985		FY 1986		Total	
	$	Rs	$	Rs	$	Rs	$	Rs	$	Rs
1. Rehabilitation Works: a. Commodities [c]	-	-	[illegible]	-	-	-	[illegible]	-	[illegible]	-
[illegible]	-	[illegible]	-	[illegible]	-	-	-	-	-	[illegible]
[illegible]	-	[illegible]	[illegible]	[illegible]	-	-	[illegible]	-	[illegible]	[illegible]
2. [illegible]										
a. [illegible]										
[illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]	-	-	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]	-	-	[illegible]	[illegible]
[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
b. [illegible]										
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
c. [illegible]										
[illegible]	[illegible]	-	-	-	-	-	-	-	[illegible]	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3. Planning, Policy Implementation and Research										
a. Technical Assistance										
i. U.S. Long-Term	[illegible]	[illegible]	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ii. U.S. Short-Term	[illegible]	[illegible]	-	-	[illegible]	[illegible]	-	-	[illegible]	[illegible]
iii. Local Consultants	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
b. Training										
i. U.S. Long-Term	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	[illegible]	[illegible]
ii. U.S. Short-Term	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
iii. In-Country	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
c. Commodities [d]										
i. Planning, Pol. and Sys. Anal.	[illegible]	-	-	-	-	-	-	-	[illegible]	-
ii. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-	[illegible]	[illegible]	[illegible]
d. Other Costs										
i. Civil Research Organizations	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
ii. Research Operating Expenses	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
iii. [illegible] Operating Expenses	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]	-	[illegible]
Sub-Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

a/ Project Costs are defined as anticipated sub-obligations or commitments of funding through, e.g. PIOs, contracts, purchase orders, or work orders for civil works.

b/ Inflation = 10% of FX materials, 15% of all other FX costs and 20% of local costs, all compounded annually.

c/ Does not include: (i) an estimated $30.0 million (consisting of $25.0 million in FY 1982, $5.0 million in FY 1983 and $6.0 million in FY 1984) of equipment for the [illegible] project which will be procured with funds under the ACSE Program (391-0468); and, (ii) an additional $25 million for the CDR component of the [illegible] project, for which the Mission will seek authorization in FY 1986, and for which the following obligation schedule is planned: FY 1986 = $10.0 million; FY 1985 = $3.5 million; and, FY 1986 = $11.5 million.

d/ [illegible] at the exchange rate of U.S. $1.00 = Rs 12.82 as of 1/1/83.

e/ An estimated $32.0 million of the equipment to be procured under the ACSE Program will be in support of the rehabilitation program.

f/ An estimated $ 6.0 million of the equipment to be procured under the ACSE Program will be in support of research activities under this component.