

PD-ABL-106

PROJECT NUMBER
391-0413

ON FARM WATER MANAGEMENT
PROJECT

- FINAL REPORT -

SUBMITTED TO USAID PAKISTAN

BY

SHELADIA ASSOCIATES, INC.

JUNE 30, 1987

BEST AVAILABLE COPY

TABLE OF CONTENTS

- A. BASIC DATA
- B. BACKGROUND
 - 1. Project History
 - 2. Project Progress
- C. PURPOSE OF PROJECT
 - 1. Scope of Work
 - 2. Field Team
 - 3. Contract Modifications
 - 4. Project Progress
- D. STATUS OF COMPLETION OF PROJECT ELEMENTS
 - 1. Reimbursement of Civil Works
 - 2. Institutional Strengthening
 - a. Technical Advisors
 - b. Training
 - c. computer Technology
 - d. Monitoring and Evaluation
 - e. Local Government Pilot Program
 - f. Establishment of Provincial Training Centers
 - 3. Commodities
 - 4. Evaluation of Project

- E. REVIEW OF PROJECT ACCOMPLISHMENTS
- F. END OF PROJECT STATUS
- G. LESSONS LEARNED AND RECOMMENDATIONS

APPENDIX A - COMMODITY PROCUREMENTS

APPENDIX B - END OF TOUR REPORTS - LONG TERM ADVISORS

APPENDIX C - LOGICAL FRAMEWORK MATRIX

APPENDIX D - TECHNICAL ASSISTANCE

**ON FARM WATER MANAGEMENT PROJECT
(391-0413)**

PROJECT ASSISTANCE COMPLETION PROJECT

A. BASIC DATA

1. Country: Pakistan
2. Project Name: On Farm Water Management Project
3. Project Number: 391-0413-C-00-4019-001
 - a. Loan \$ 7,500,000
 - b. Grant \$ 10,917,000
4. Project Dates:
 - a. First Project Agreement - Fy 77
 - b. Final Obligation - Fy 87
 - c. Project Assistance Completion Date: - June 30, 1987
5. Amount Authorized: \$ 18,417,000
6. Project Funding
 - a. Loan: \$ 7.5 million
 - b. Development: \$ 7.5 million
 - Assistance
 - c. ESF Grant: \$ 10.0 million
 - d. GOP: \$ 16.2 million
 - e. Other: Mondale Rupees: Rs. 28.4 mill.
7. Other Donors:

World Bank	OFWM-I	\$ 41 million
	OFWM-II	\$ 34.5 million
IFAD		\$ 12 million
ADB:		\$ 25 million

8. Life of Project: FY 77 to 6-30-1987
9. Project Officer : John Anania
10. Authorized Representative of GOP: Baz M. Khan
11. Name of Implementing Agency : Water Management Wing,
Federal Ministry of
Food Agriculture and
Cooperative.

B. BACKGROUND

1. PROJECT HISTORY:

a. Pilot Project:

In October 1976, A.I.D. initiated the OFWM Pilot Project to establish a capability within government agencies, private contractors, and farmer groups to plan and carry out activities necessary for efficient irrigation water management at the farm level. A.I.D. was to provide a \$ 22.5 million loan and approximately \$ 1.0 million in grant funds over four years to assist the provincial governments improve 1,500 watercourses, precisely level 425,000 acres of land, and train between 60,000 and 100,000 farmers in improved crop and water management practices.

A \$ 7.5 million loan was authorized in FY 1977 for the first three years of the project, and \$917,000 in grant funds was authorized for the project: \$317,000 in FY 1978 and \$ 600,000 FY 1979. The establishment of the institutional base was lower than expected, and a second loan of \$15 million that was to be authorized in FY 1978 was deferred until the next fiscal year. Due to the application of Section 669 of the Foreign Assistance Act, which suspended new development assistance to Pakistan, this second loan was never authorized.

Despite the financial shortfall and several implementation problems, the project is regarded by the GOP and the international community as an innovative and successful program. Its philosophy, procedures, and techniques have been applied by a large number of international development organizations in several countries around the globe.

Because of the success of the program; the GOP was able quickly to attract other donors when additional A.I.D. funds could not be provided. The World Bank (IBRD) and Asian Development Bank (ADB) approved projects in this area, beginning early in 1982. However, neither of these projects provided funds for those activities under the OFWM Program which were short-funded when the second A.I.D. loan was not made. In addition, these projects did not sufficiently address all the critical constraints identified during the implementation of the A.I.D. project.

2. PROJECT PROGRESS

The Pilot Project focused on four major areas:

- a. watercourse improvement;
- b. precision land leveling;
- c. farmer training; and,
- d. institutional development.

a. Watercourse Improvement

Due to the demonstration benefits of watercourse improvement, farmer involvement in the program has been high. The target set for watercourse improvement was 1,500. As of June 30, 1981, 1,319 watercourses had been improved, although reimbursement had been made for only 539 for reasons discussed below.

b. Precision Land Leveling

Although farmer interest in precision land leveling is increasing, this component of the project has not generated the demand envisioned during the design of the original project. The second joint A.I.D./GOP project evaluation, conducted in 1979, recommended de-emphasis of precision land leveling because small farmers were unwilling to sacrifice cropping time while land levelling was carried out, and they were also more interested in watercourse improvement. Subsequently, the GOP curtailed subsidies for this component of the program. Of the 425,000 acres targeted for precision land levelling, only about 75,000 acres were leveled as of June 30, 1981.

c. Farmer Training

Extension has been largely neglected under the OFWM Project. The orientation of the OFWM Directorates has evolved into a focus on civil works in which all field staff, regardless of training or position, are involved in watercourse improvement and precision land leveling. As a result, little progress has been made in achieving the target of training 60,000 to 100,000 farmers in improved crop and water management practices.

d. Institutional Development

More significant than the project's physical successes have been its accomplishments in institutional development. The creation of provincial OFWM organizational entities is a direct result of this project. Through the creation of a Water Management Cell within the Federal Ministry of Food, Agriculture, and Cooperatives, a permanent body of specialists for planning and coordinating water management activities throughout the country has been established. Provincial OFWM Directorates, created within the framework of Provincial Agriculture Departments, function as the implementing agencies for OFWM activities. The demand for the services of the newly created Directorates and GOP's commitment to the program are reflected in the steady growth of both budget and personnel levels. From a total budget of Rs. 4.3 million for OFWM activities in the Punjab, Sind, and NWFP in Pakistan fiscal year 1976/77, the budget grew to nearly Rs. 88 million in Pakistan fiscal year 1980/81. Similarly, the number of field teams has increased from zero in Pakistan fiscal year 1976/77 to over 50 in Pakistan fiscal year 1980/81. The total number of employees in the three Directorates as of June 1981 stood at over 1,000.

Training institutes were established to train program personnel, other government personnel, farmers, bankers, private contractors, and tractor operators. U.S. Soil Conservation Service advisors played a key role in this area by providing in-service training following formal training. By the end of

June 1981, 6,351 persons had participated in specialized training. In sum, the demonstrated effects of OFWM activities have created an enthusiasm from the farm level to the highest levels of Government that assures GOP commitment to the program.

3. PROJECT AMENDMENT:

Because of the continued need for Institution Development, and the apparent success of the established model, it was determined by the USAID to amend the project to provide assistance to those areas not covered by other donors.

In 1982 the Project Paper was amended to provide Technical Assistance, Training, and Institutional Development activities including commodity procurement. A determination was made to provide the Technical assistance under a Grey Amendment set aside. A contract between USAID/Pakistan and the U.S. Small Business Administration (391-0413-C-00-4019-00) dated April 24, 1984 was signed.

C. PURPOSE OF PROJECT

In the project amendment the project goal "to increase agricultural production and improve income for the low income farmer", remains unchanged. The project purpose "to establish public and private sector capabilities to plan and deliver on-farm water management services including improvement of watercourses, precise levelling of farm land and improvement of crop and water management practices, on an economic basis", also remains unchanged.

At the time of the drafting of the OFWM Project Amendment in 1982, the World Bank and Asian Development Bank had commitments in place with the GOP to render "hardware" type assistance such as civil works reimbursements and equipment. USAID's assistance under the OFWM Project Amendment focused therefore on Technical Assistance. Sheladia Associates, Inc. (SAI) was selected as the contractor for this technical assistance in 1984. A contract with USAID was signed in June 1984 to provide these consulting services to the OFWM Project.

1. SCOPE OF WORK

The contract scope of work required SAI to work in the following areas:

- a. Identification and standarization of water management technologies that can be implemented in design, construction, and maintenance of watercourses.
- b. Use of computer technology: The present management systems for watercourse improvements are relatively skill-intensive. Alternatives shall be developed to increase the productivity of the limited number of trained technicians from the OFWM agencies. Computers procured by the contractor will allow talented design engineers to complete a much greater volume of work than is currently possible, thereby allowing a faster pace of watercourse improvement, increased and more effective management control, and increased quality of improved watercourses.

Computers will also be used for computing irrigation water requirements at the farm level in different zones of Pakistan. The Command Water Management and Research Advisors under the Irrigation Systems Management Project will develop procedures and implement such on a pilot basis to determine feasibility of computer usage.
- c. Institutional relationships among the GOP agriculture, irrigation, and water and power authorities: Through seminars, workshops, and joint research, the problem of water management from the dam to the farm will be examined by agencies, including universities, involved in water management. More efficient water management requires close coordination among these separate bodies.
- d. Coordinate OFWM activities with technical advisors from the USAID financed Irrigation System Management (Command Water Management and Research Teams), Tribal Area Development and the Baluchistan Area Development projects. Also, coordinate with other donor agencies (i.e. World Bank, Asia Development Bank) advisors who are also involved in OFWM activities.

e. Training: Assistance shall be provided to the staff of OFWM training centers in such areas as curriculum development, the use of audio-visual aids, and integration of training activities with field work. The contractor shall also be responsible for working with program officials in planning and implementing the participant training activities. Assistance in upgrading training institutions with programs related to OFWM shall also be a major function of this Team.

f. In country Training Programs; Contractor will be required to contract up to 10 in country training programs on various aspects of On Farm Water Management. Each Program shall be of approximately three weeks duration and provide training to approximately 25 participants. Support for all program costs including participant lodging and transportation at the training site shall be provided by the contractor. Program content and organization will be approved by AID and the GOP prior to initiation of each Program.

g. Project evaluation and special studies: Assistance with monitoring and evaluation activities shall be provided particularly with regard to data manipulation and analysis. Special studies will be conducted with the help of the Contractor to analyze policy questions and develop solutions to priority problems.

h. Identify and procure library, extension and training materials, computers, and research equipment and supplies for the OFWM Program.

i. Develop a maintenance manual to be used by the On Farm Water Management Directorates in training farmers how to maintain water courses.

j. Develop criteria and guidelines for the planning, design and construction of Field Drainage Systems.

a/ While the Team will work under the technical direction of AID, this direction is expected to conform substantially to the policies of the FWMW and Ministry of Food and Agriculture and USAID in Islamabad. The individual team members will be stationed as follows: Management and Planning Advisor (Chief of Party) Islamabad, Training Advisor = Hyderabad, Irrigation Engineer = Lahore; and, Agriculturist = Quetta (with the OFWM Directorate in Baluchistan Province). All advisors will be required to travel extensively throughout Pakistan.

2. FIELD TEAM

The first members of the Field Team arrived in country on June 18, 1984. They included:

Eurique Valdivia,	Management Spec./COP.	1984-85
William Bell,	Irrigation Engineer.	1984-86
Steven Kovach,	Irrigation Agronomist.	1984-87
Robert Smail,	Training Specialist.	1984-87
Robert Nothstein	Management Specialist.	1985-87

3. CONTRACT MODIFICATIONS

The contract was modified five times:

a. Modification 001 - 1 July 1984 - to increase the obligated amount, to correctly establish line items in the Budget, and to define the requirement for work orders to be issued under the contract.

b. Modification 002 - 15 January 1985 - To increase the Field Staff Support level of effort by 13 man months and increase the contract cost and budget accordingly.

c. Modification 003 - 3 June 1986 - to implement the contract option and add new procurement in order to (1) increase the level of effort (2) revise the Statement of Work (3) update and make current the contract clauses and (4) provide an equitable adjustment to the contract.

In short the modification provided for:

1. Four new technical assistance positions which were filled during the month of June, 1986:

Education Materials/Equipment Specialist.	- Lawton P. Bourn, Jr
Institutional Development Specialist	- Donald Bostwick
Institutional Development Specialist	- Daniel Bradbury
Irrigation Engineer (Sind)	- Anisa Divine, Sept. 1986

A determination was made by the USAID Project Officer not to fill the vacancy created by William Bell's departure in June 1986, so in essence, Ms. Divine assumed engineering responsibilities for the whole project.

Modification 003 increased the Scope of Work to:

- 1) Provide for the design and installation of up to 8 demonstration plots; after considerable discussion between USAID and the GOP it was decided that four Training Demonstration Farms would be designed and developed.
- 2) Provide up to twenty farmer training field days to be organized and developed through the four training centers.
- 3) Develop training and demonstration materials.
- 4) Continue training of faculty members of the four provincial training centers in teaching techniques curriculum design, program planning and coordination materials preparation, outreach techniques, etc.
- 5) Continue study and development of innovative approaches to maintenance and water saving techniques.
- 6) Provide support to the Federal Cell and Provincial Directorates.

d. Modification 004 further revised the level of effort, changing the demonstration plots to 4 Training Demonstration Farms, and added additional funds for commodity procurement, and training.

e. Modification 005 further revised the budget.

Level of Effort of Technical Assistance.

During the three years of SAI activity in the project the following inputs were provided.

a) Technical assistance.

1. Long Term (U.S.)	169	Person/months
2. Short Term (U.S.)	55	Person/months
3. Short Term (Local)	87.5	Person/months

b) Training:

1. MIS Courses	14	People Trained:	56
2. National Courses:	16	People Trained:	357
3. U.S. Training (Funded directly by USAID)			
Long-Term:	07	Short-Term:	90
4. Farmer Training:	638,100	(GOP Figures)	

4. PROJECT PROGRESS

As noted above, the USAID sponsored project resulted in several additional projects. Two of these were and continue to be funded by the World Bank and by the Asian Development Bank. The outputs indicated below for watercourse improvement and for precision land levelling indicate combined totals for the earlier USAID efforts with those of other donors. The outputs for Training and Institutional Building can be directly attributed to U.S.A.I.D.

a. Watercourse Improvement - as of 6/30/1987

<u>Donor</u>	<u>Field Teams</u>	<u>Watercourses Improved</u>
USAID	56	1,319
World Bank	79	5,033
ADB	19	1,610
<hr/>		
Total	154	7,692

b. Precision Land Levelling - as of 6/30/1987

<u>Donor</u>	<u>Acres Levelled</u>
USAID	74,857
World Bank	66,293
ADB	11,250
	<hr/>
	152,400

c. Tanks Constructed

	<u>Number</u>
World Bank.	181

d. Training

1) USAID records on U.S. Training for for OFWMP under the current project begin with FY 1984. During the three year period at hand, the following training directly sponsored by USAID has occurred.

<u>Type of Training</u>	<u>Number</u>
Long Term (U.S.)	07
Short Term (U.S.)	90

<u>In Country</u>	<u>No. of Courses</u>	<u>No. of Trainees</u>
OFWMP (National & MIS)	26	357
Farmers	10	1,736

2) Province Sponsored Training:

Each Training Center has established targets and begun implementation of their own training programs. The Provinces have done the following training from 1984-87:

<u>Punjab</u>	<u>Courses</u>	<u>No. of Trainees</u>
OFWMP	15	484
CWM	01	31
Others	62	5,898
Farmer Field Days	12	53,700
 <u>Sind</u>		
OFWMP	03	45
Other	-	-
Farmer Field Days:	-	-
 <u>NWFP</u>		
OFWMP	04	173
Other	-	-
Farmer Field Days	04	2,000
 <u>Baluchistan</u>		
OFWMP	01	06
Other	-	-
Farmer Field Days	03	540

e. Institution Building

During the 1984-87 period of the Project, there were several institutional development objectives:

1. To improve the management capability of the Federal Cell and the Provincial Directorates. This was addressed through several means:

- a. Developing and installing a Management Information System to monitor project progress.
- b. Improving the physical setting through modest procurement of equipment and furnishings. Fifteen locations have received computers, air conditioners, and training for managers and operators. 12 locations have received photocopiers. Some upgrading of office space has occurred
- c. Developing the Federal Cell Computer Center as the nerve center of M.I.S. for the O.F.W.P.

2. To develop 4 Training Centers to train Project and related personnel, and farmers.

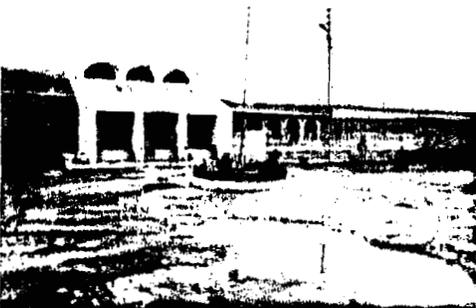
- a. A Training Needs Assessment was prepared in 1984.
- b. PC-1's were developed for 3 of the 4 centers (Punjab Institute had been reasonably well established in earlier years).
- c. Training equipment was procured from U.S. and local sources and is in place (see appendix A)
- d. Center Director and faculty members have been trained in Training of Trainers courses, in OFWM practices, in lesson planning and course design.
- e. Each center has developed a 5 year training program, and has funding requirements established in their PC-1.
- f. Vehicles (two to each center) have been provided by USAID to further the outreach program to farmers.
- g. Library and Teaching materials in support of the programs have been established.

The map on the next page shows locations and a picture of each Training Center.

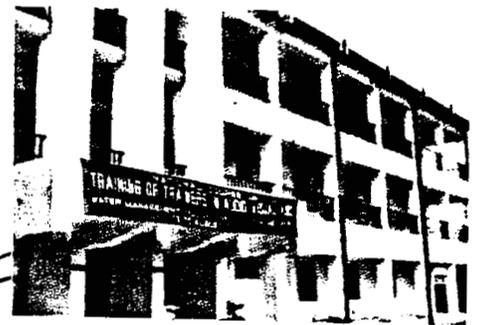


⬆ D.I. KHAN

⬆ QUETTA

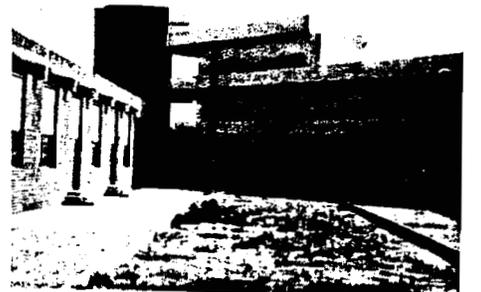


The four provincial training institutes.



⬆ LAHORE

⬆ SAKRAND



3. Establish a Media Center and a Materials Production Center at the Federal Cell.

- a. A modern functioning Media Center has been established, with a graduate engineer in charge. This center has the capability of preparing and editing VCR materials, still photography, plus serving as a project materials resource center.

- b. A Materials Production Center has been established with capability for preparing publications, running off small runs binding and despatching publications.

The Center has produced and published 20 publications. See TABLE 1 following.

TABLE 1

Publications of the OFWMP Materials Production Center.

1. On-Farm Water Management Field Manual Vol: I to V.
2. Irrigation Guide.
3. Water User's Association in Pakistan.
4. Proceeding of the Seminar on Water User's Association for Irrigation Agriculture.
5. Benefits of Cooperatives (Urdu).
6. Better use of Land and Water (Urdu).
7. Watercourse Improvement.
8. Reports on Monitoring and Evaluation of On-Farm Water Management Programme USAID Assisted.
9. Report on Monitoring and Evaluation of On-Farm Water Management Programme IDA/IFAD Assisted.
10. Revised On-Farm Water Management Field Manual Vol: I to V.
11. Report and Proceedings of the National Workshop on Water Management and Control at the Farm Level. (18-22 April, 1982).
12. Water Course Maintenance (Urdu & English).
13. Maintenance Guide Lines for Water Course maintenance (Urdu)
14. Proceedings of the SAARC Regional Seminar(19-24 Oct.86)
15. Planners Diary 1987.
16. Calendars 1987.
17. Water Management Training Guide (for extension workers) Urdu Text(in press).
18. Maintenance Guide Lines for Water Course Maintenance (Sindhi) - (in Press).
19. Cooperative Societies and Water Users Association in in Pakistan and Ordinance from Provinces (in Press).
20. Short History of the Canal and Irrigation System of Pakistan (in Press).

- c. The Federal Cell library and the above centers have been enhanced by updating their professional reference materials and production equipment.
 - d. Operational and acquisition policies and procedures have been developed and disseminated to the clientele of the centers.
4. Establishment of 4 Training Demonstration Farms (TDF). While a farm may be more of a resource to an institution than an institution unto itself, nevertheless institutional development is a must if the farm is to achieve its purpose. To demonstrate to and train farmers in better agronomic practices, it has been necessary to:
- a. Establish a set of purposes for each farm.
 - b. Develop farm plans.
 - c. Install appropriate infrastructure, including:
 - 1. improved sources of water, where necessary.
 - 2. improved water courses.
 - 3. level basin design.
 - 4. procuring necessary farm equipment
 - 5. soils and water quality sampling.
 - 6. precision land levelling.
 - d. Develop a training/outreach plan for each training center utilizing the farm as a resource.

Several of the above points were covered directly in the final Training Course entitled - " The Use of Training Farms to Train Farmers", in Sind Institute, Sakrand, June 3 to 18, 1987.

f. **Technical Assistance:**

As noted above four long term specialists arrived in Pakistan in 1984. All specialists developed individual work plans which were duly approved by USAID and the G.O.P. Their activities are summarized below:

1. Management and Planning Specialist

- a) The primary activity completed in Management and Planning was the development, installation, and training in the use of a Management Information System. Initiated by Doctor Valdivia, the MIS

was considerably altered by his successor, Robert Nothstein, to focus on monitoring of physical progress of water course improvement, financial reporting, WUA participation, personnel and training.

Through a series of Task Orders, a number of studies, training programs and reports were developed. The MIS utilizes IBM PC-XT computers for which special Lotus 123 and dBase III programs were developed by a local Pakistani firm, Pakistan Computing Consultants (PCC). These Programs were taught to OFWM managers and operators. Users Reference and Operations Guides were developed for each of these programs. While initially there was some resistance to the computer by managers, the MIS and the computers are now perceived as being a most useful tool.

b) The secondary activity was the modernization and improvement of the physical settings in the O.F.W.M.P. Directorates. Each was provided one computer, a photocopier, and an air conditioner to preserve the equipment.

c) During the three years, additional short term T.A. was provided in this area in monitoring and evaluation, and in support of the MIS.

d) Coordination with the ADB advisory team has resulted in an enhanced use of the Computer Center for analysis of results of O.F.W.M.P. activities.

e) One result of the Project's activities in M&P has been the creation of a group of 20-25 people who are fully familiar with the operation of computers, and further, the establishment of linkage between them and the computer support institutions in Pakistan. Knowing where to seek assistance and what assistance is needed is as important as knowing how to operate the computers.

2) Irrigation Engineering Specialist

Mr. William Bell, stationed in the Punjab Training Institute in Lahore from 1984 to 1986, developed several computer based applications on improved structures:

- Level Basin Design.
- Broad Crested Weir.

He was instrumental in obtaining the services for the development of an Interactive Computer Assisted Design of Watercourses - (see later section). He performed a number of ad-hoc advisory visits to areas with engineering problems, such as the malfunctioning drill in Mardan Scarp, the irrigation design for the D.I. Khan Airport, and the procurement through the World Bank, of Laser Controlled Land Levelling equipment.

He analyzed and made recommendations about the national curriculum for training engineers and sub engineers in the OFWMP Training Centers.

As the resident specialist in Lahore he provided liaison with the OFWMP institution there, provided logistical support to several National Training Courses, and trained several counterparts on the use of computers.

He accompanied a short term specialist on a national study of Water User's Association and assisted in drafting a report which has become a Federal Cell publication. He drafted two maintenance manuals which have also been published.

3) Agronomy Specialist

Steven Kovach 1984-87. During his first two years Dr. Kovach was assigned in Quetta Baluchistan. His accomplishments were manifold:

- surveyed, planned, installed and trained field personnel in the operation of six widely separated micro irrigation systems in Baluchistan.
- Wrote a field manual for O&M of above systems.
- Wrote "Irrigation Requirements for Fruit and Vegetables in NWFP".
- Developed and managed three National Training Courses:
 - "Trickle/Drip Irrigation"
 - "Soil, Plant Water Relationship"
 - "Crop Irrigation Requirements".
- Taught several 3 to 4 day courses on micro irrigation to local and outside (NWFP) groups.

In the final year Mr. Kovach was shifted to Karachi where he:

- Established a Karachi field office for the Contract.
- Prepared technical specifications for four Training Demonstration Farms.
- Arranged contracts for equipment installation in 4 Training Centers.
- Finalized field manual for Micro Irrigation Demonstration Plots in Baluchistan.
- Conducted training on "fertigation".

4) Training Specialist: (1984-87)

Chief of Party: (1985-87)

During the first 16 months of his contract Dr. Robert W. Smail was stationed in Karachi with primary work assignment in Hyderabad, and with responsibility for national training policies and programs. His accomplishments included:

- Developing a needs assessment for Training in OFWM.
- Writing 3 PC-1s for training centers in Sind, Baluchistan and NWFP.
- Developing equipment and furnishing requirements for four Training Centers and the Federal Cell.
- Conducting in service training of center faculty.
- Initiating Task Orders, organizing, and overseeing National Training Courses.
- Developing U.S. Participant Training Program for FY's 1985-87.
- Selection of sites for Sind and NWFP institutes.

In May 1985 Smail became Chief of Party, while continuing as Training Specialist. During the final two years of the contract he:

- Prepared justification and technical proposal for increasing the scope of work and level of effort of the contract.
- Prepared some 50 Task Orders to implement the program.
- Monitored Project progress and development.
- Prepared five quarterly or semiannual reports of progress.
- Implemented procurement actions for

local procurement for Training Centers, Directorates, and the Federal Cell.

- Visited each Project location periodically.
- Managed contract bank accounts, invoice preparation, and home office correspondence.

As noted above, the contract was amended and extended by one year to double the Field Team size. Following that amendment it was decided not to replace the Irrigation Engineer in Lahore, but to expand the position of the Irrigation Engineer, Sind province to a more national scope.

Thus, four new long term specialists arrived in the summer of 1986. Their contributions to the project have been considerable. The completion of assignment reports of each is attached at appendix B

5) Education Materials and Equipment Specialist:

Lawton P. Bourn, Jr. - Islamabad.

- Mr. Bourn prepared a "Guide for Audio Visual Aids" within two weeks of his arrival which was utilized as a basic text for National Course he supervised two weeks later.
- He established a most functional Media Center.
- Developed Materials Production Center.
- Backstopped a Short Term Specialist who drafted a "Success Story" for O.F.W.M.P. Later Mr. Bourn re-wrote most of the story, prepared copy for publication, advertised for and selected the printer and completed the publication.
- He produced two publications on maintenance of water courses, one for farmers, one for Field Assistants.

- He finalized publication of:

"Field Manual for Baluchistan Demonstration Plots" and several publications prepared by other project personnel.

- He trained a counterpart to manage and operate the media center.

6) Irrigation Engineer (Sind)

Anisa J. Divine--Karachi, September 1986 - June 30, 1987. Ms. Divine was immediately immersed in several activities:

- assisted Mr. Kovach in the design of four Training Demonstration Plots.
- Edited Vol IV of the Field Training Guide.
- Rewrote "Irrigation Requirements for Pakistan".
- Taught segments of National Training Course on "Flow Measurements" in Faisalabad and Hyderabad.
- Provided logistical support to above two courses.
- Worked with each Provincial Training Staff to develop farm plans for T-D-F.
- Wrote and finalized agreement between cooperating farmer and Punjab Province to utilize his land for T-D-F.

7) Institutional Development Specialist -
Sind Province.

Dr. Donald Bostwick

During the one year assignment to support the development of the Sind Institute for On Farm Water Management Training and Research, and the Baluchistan OFWMP Training Center, Dr. Bostwick:

1. Developed long term plans for the centers and the Training Farms.
2. Conducted faculty training sessions in course and lesson planning.
3. Chaired a three day seminar on farm planning for Sind Institute.
4. Provided logistical support for the National Training Courses held in Sind Province.
5. Developed specifications and organized the manufacture of:
 - modifications to the A - V mobile van.
 - ring infiltrometers.
 - fencing around the T-D-F., Sakrand.
 - equipment storage shed for T.D.F. Sakrand
6. Provided oversight to renovations at Sakrand institute, and for tubewell construction.
7. Assisted in developing the farm plan format for all training farms.

8) Institutional Development Specialist -
Lahore and D. I. Khan

Daniel Bradbury -

1. Developed long term plans for centers at D. I. Khan, Lahore and Quetta.
2. Initiated first training courses conducted by centers at D. I. Khan and Quetta.
3. Provided logistical support to three National Training Courses.
4. Implemented local procurement of commodities for centers and for allied project, CWM.
5. Provided local leadership in clearing issues related to obtaining D. I. Khan Center and Training Farm.
6. Assisted in staffing requirement and recruitment at D. I. Khan.
7. Facilitated the Implementation and Applied Training of MIS Systems Operation in Punjab and NWFP.
8. Conducted Training Needs Assessments in NWFP and Punjab.
9. Provided Editorial Assistance in Success Story and other publications.
10. Training Materials Assessment and Coordination with the Training Materials Specialist.
11. Training of Faculty D. I. Khan - Lesson Planning and presentation.

In conducting contract activities a number of Short Term Technical Assistance Specialists were also utilized. Their contributions are noted below in section D-2-a.

D. STATUS OF COMPLETION OF PROJECT ELEMENTS

1. Reimbursement of civil works: Under the USAID portion of the OFWMP, the GOP has been reimbursed by USAID for the improvement of 1,319 watercourses

2. Institutional strengthening
 - a. Technical Assistance

The major accomplishments of the long term technical specialists are covered in the previous section of the report. The basic underlying philosophy of the Contract was that the long term specialists would also be managers of short term inputs and requirements. To implement these inputs the contractor, USAID and the G.O.P. developed Task Orders which identified the problem to be addressed, qualified the resources and time to be applied to the problem, specified scope of work and a budget and provided for signatory approvals of the USAID and G.O.P. Some 50 of these Task Orders were developed and implemented during the contract.

The SAI home office had the responsibility for recruiting, contracting with, fielding and supporting the short term U.S. Technical Assistance Specialists. The Field Office had similar responsibilities for locally implemented Task Orders.

As noted in Appendix "D" attached, there were 169 person/months of Long-Term U.S. T.A.; 55 person/months of Short-Term U.S. T.A.; and 87.5 person/months of local T.A. provided to the project.

These included the following types of services:

- Needs assessment for computer.
- Preparation of specifications for procurement of A-V and scientific equipment for centers.
- Conducting National Training Courses
- Preparation of Project Benefit Monitoring Guide lines.
- Development of National Drainage Policy.
- Development of C.A.D. of water courses.
- Study of Water Users Associations.
- Assistance/Evaluation of M.I.S.
- Supervision of Studies.
- Study of Precision Land Levelling.
- Delivery and inventory of U.S. commodities.
- Writing Project Success Story.
- Study of Sociological Impact of Earth Borrowing for Canal Rehabilitation.
- Canal Roads Feasibility Study.

b. Training -

Training outputs directly attributable to the Consultant came from National Training Courses, short courses at provincial locations, farmer training courses, and incidental on-the-job-training by long term specialists. USAID sponsored overseas training through the Participant Training Program. To aid this effort the Consultants Training Specialist developed a five year Training Program for the Project which is being implemented. USAID has agreed to continue Participant Training in subsequent years through the ISM project

The Tables on the following pages present some details on the training sponsored under the O.F.W.M. Project.

Table 2 summarizes some of the major training outputs of the project.

Table 3 lists the National Training Courses sponsored under the consultants' contract.

Table 4 lists details of the Management Information Systems Courses sponsored under the consultants' contract.

TABLE 2

SUMMARY OF OFWMP TRAINING OUTPUTS 1984-87

<u>TYPE</u>	<u>NO.OF COURSES</u>	<u>NO.OF TRAINED</u>
National - OFWMP	16	357
National - MIS	4	56
MIS - Short	7	75
Provincial - Short	15	75
Farmer Courses	10	1,736
Incidental - OJT	15	73
USAID - Long Term	7	7
USAID - Short Term	12	90
Farmer Observation Tours	2	29
	<hr/>	<hr/>
	88	2,498

TABLE 3

NATIONAL TRAINING COURSES--OFWM PROJECT

S/NO.	TITLE	LOCATION	DATE	NO. TRAINED
1.	Soils, Water, Plant Relationships	Hyderabad	Sept. 84	23
2.	Laser Controlled Land Levelling	Lahore	Jan. 85	25
3.	Improved Agronomic Demonstration	Lahore	April 85	25
4.	Trickle Irrigation I	Quetta	Nov. 85	25
5.	Computers for Water Management Engineering	Lahore	April 85	18
6.	C.A.D. Watercourse Engineering	Quetta Hyderabad Lahore Peshawar	Sept 86 Oct. 86	18 8 12 12
7.	Training of Trainers (Audio/Visual)	Lahore	July 86	18
8.	Improved Water Mngmnt. and Control Structures	Hyderabad	Jan. 87	18
9.	Improved Water Mngmnt. and Control Structures	Faisalabad	Jan. 87	18
10.	Water Users Assoc.	Lahore	Mar. 87	25
11.	Irrigation Requirements	Hyderabad	Mar. 87	18
12.	Training Demonstration Farm: Use/Management	Hyderabad	June 87	18
13.	Computer Operators Course I	Hyderabad	Sep. 85	20
14.	Computer Seminar For Senior Mngmnt.	Lahore	Jan. 86	16
15.	Managment of OFWM HTPM - I	Lahore	March 87	20
16.	Managment of OFWM HTPM - II	Lahore	April 87	20
Sub-Total--National Courses				357

TABLE 4

MANAGEMENT INFORMATION SYSTEMS COURSES--OFWM PROJECT

S/NO.	TITLE	LOCATION	DATE	NO. TRAINED
1.	Computer Operators Course I	Hyderabad	Sep. 85	20
2.	Computer Seminar For Senior Mngmnt.	Lahore	Jan. 86	16
3.	Managment of OFWM HTPM - I	Lahore	March 87	20
4.	Managment of OFWM HTPM - II	Lahore	April 87	20
5.	Computer Course For Senior Mngmt. I	Islamabad	Nov. 86	15
6.	Computer Course For Senior Mngmt. II	Islamabad	Jan. 87	15
7.	Computer Course For Senior Mngmt. III	Islamabad	April 87	15
8.	Computer Course For Middle Mngmnt. I	Lahore	Sep. 86	17
9.	Computer Course For Middle Mngmnt. II	Lahore	Oct. 86	14
10.	Computer Course For Middle Mngmnt. III	Lahore	Jan. 87	18
11.	Middle Mngmt. - MIS	Lahore	Feb. 87	18
12.	Computer Operators MIS I	Lahore	Oct. 86	16
13.	Computer Operators MIS II	Lahore	March 87	18
14.	Computer Operators On-Site Courses	Various Locations	Nov. 86/ May 87	16

c. Computerization of O.F.W.M.P.

A needs assessment was conducted in March 1985. It was determined that to provide computer support to the project each provincial Directorate and the Federal Cell should be provided with IBM-PC-XT computers, with 640 KB, a printer, U.P.S., software, and a photocopier. An air conditioner and a 5 KV generator were provided to each location.

Twelve sets of equipment were provided initially, as follows:

- each Provincial Directorate - one set
- each Provincial Training Center - one set
- Federal Cell - one set
- Project Team - one set plus one
IBM portable, printer
- BCI support/maintenance contract - one set
to be loaned when repairs are needed on
Provincial sets.

Subsequently three more sets were procured and delivered as follows:

Federal Ministry of Planning and Development,
Water Resources Section:

IBM PC-XT with 20 MB hard disk, Printer,
UPS, Photocopier.

Multan Regional Office - 1 set IBM PC-XT.

Lahore Regional Office - 1 set IBM PC-XT.

Federal Cell - One 20 megabyte hard disk.

To implement the three pronged utilization of the computer the following actions were initiated:

- a one month course at Mehran University for operators from the Directorate and Centers.
- initiation of a series of courses at three levels to introduce and implement the Management Information System.

- National Courses for Senior Managers.
- National Courses for Middle Managers.
- National Courses for Operators.
- In-Service Training for Operators.

Development of and training in Computer Assisted Design of Water Courses for Engineers. This interactive program has been published by the contractor, and 150 copies of the program have been distributed.

The CAD, developed by W. Marvin Redditt, permit operators to input data from their field notes, performs the engineering design, and provides schedules and costs of quantities required for the watercourse for bricks, cement, sand, and, labor. It provides a graphic profile of the watercourse indicating locations of turnouts and other structures.

48 engineers received training in the operation of the CAD in a National Course which was held in four locations.

d. Monitoring and Evaluation Program - WAPDA.

In July 1984, the watercourse monitoring and evaluation Directorate of the Planning Division of WAPDA issued their final report on the USAID assisted On Farm Water Management Program. This report covered the years from 1977-81. The result pertained to 36 sample watercourses constructed during that period and a sample of 210 farmer therein. For a number of reasons, including problems with baseline data and the spread of the time in which impact (post improvement) observations were made, much of the potentiality of the Impact Study was lost. Several of the major findings follow:

- The study indicated that waterlosses were minimized by improvements. The overall savings to farms was indicated to be 18% at the field nukka, after improvement, declining to 15% after three years. This indicated the need to maintain watercourses following improvement.

- Farmers overwhelmingly favoured the program.
- PLL had a positive effect on increasing crop yield.

As a project evaluation tool however, the above study was insufficient to provide such measurements as Benefit Cost Ratios, IRR etc. in acceptably definitive terms. However, it paved the way for other studies and Mission programs. As a result of the study it was determined by USAID not to spend further money on trying to re-do the study using data from later years of the Project. Rather it was decided to devote time and attention in another project to train the Evaluation Section of WAPDA in research techniques leading to improved O&M studies.

USAID did however provide support to the Federal Cell to bring an O&M expert to Pakistan to assist in developing an O&M plan for the World Bank supported OFWMP-II.

e. Local Government Pilot Program -

The original P.P. and the Amended P.P. contained an element directed toward the de-centralization of the O.F.W.M.P. to determine whether the movement would be enhanced and strengthened through the involvement of the Ministry of Local Government and Rural Development.

It was felt that this would strengthen the participation of the Water Users Associations in such aspects as organization for maintenance, organization for cooperative actions, etc.

Before the technical assistance contract was negotiated however, a determination was made by USAID not to try to involve another agency in the O.F.W.M.P.

f. Establishment of Provincial Training Centers.

As noted above, the four Provincial Training Centers have been established. Faculty members have been recruited or deputed. However, most of the training centers have

unfilled positions and attention is needed to fill them with qualified personnel. This will require initiative by the Federal Cell as well as the attention of concerned donors such as USAID, The World Bank and the ADB.

Unfortunately, in the Pakistani engineering world, the attainment of a training position is not a first choice. Indeed, field officers lose perquisites such as vehicle allowance and pay status when they become trainers. Therefore trainers often seek to return to the field. The O.F.W.M.P. Training Centers/Institutes developed under this Project are currently blessed with leaders who are dedicated and who are doing a good job of staff motivation and development. Most of the staff members currently assigned to the Centers/Institutes belie the norm. Additional staff members will need to be selected with care.

One recommendation that has been made by the ADB technical representative is to post Field Assistants to the Training Centers on a three month rotating internship basis, This will expand the ability of the F.A. and will provide the Institute/Center with additional help.

g. Research Studies.

Item "c" in the contract's Scope of Work called for the consultants to "research the problem of water management from the dam to the farm..." and to examine the "institutional relationships among the GOP agriculture, irrigation, and water and power authorities."

Under this aspect of the contract research studies were undertaken not only at the on-farm level but at the irrigation systems level as well. The existing work load on existing contractor staff necessitated sub-contracting with local firms for assistance in conducting three of these studies. In order to enable the consultants to fulfill their oversight and management responsibilities on these studies the services of an experienced contracts administrator was engaged to develop and oversee the studies.

Mr. Patrick J. Hopkins was engaged for this purpose from 1 November 1986 until 30 June 1987. The main research studies undertaken were:

a. Canal Roads Feasibility Study.

USAID requested the consultants to advise AID on the technical and economic feasibility up-grading canal inspection paths into full access public roads during the next phase of irrigation canal rehabilitation planned for funding by USAID, the World Bank, and the GOP. A six month study was conducted led by an expatriate roads engineer and agricultural economist assisted by a local consulting firm MAAA. The study showed that many of the inspection paths were suitable for up-grading. As a result, USAID is planning to support this program in the next multi-year AID program.

b. Sociological Study of Earth Borrowing for Canal Rehabilitation.

USAID requested the consultants to undertake research to determine the agro-economic impact on farmers of borrowing earth from farm fields during canal rehabilitation programs. A local firm, SGI, was selected to field a team of experts to study the extent of the problem and to recommend ways to minimize the negative impact of earth borrowing during the next phase of canal rehabilitation.

c. Status of Precision Land Levelling in Pakistan.

Several entities at USAID expressed interest in possibly undertaking a more comprehensive study of the status of Precision Land Levelling in Pakistan than time allowed under the consultant's contract. However, to set the stage for this more comprehensive study an agreement was reached with a Pakistani firm, United Consultants Limited (UCL) to conduct a review of existing literature on the subject and prepare an analytical framework and detailed scope of work for the future comprehensive study of the status of PLL in Pakistan with special emphasis on the role of the private sector in PLL and an examination of some of the reasons that farmers, and particularly small farmers, have not adopted this practice.

d. Surface Drainage of Irrigated Land in Pakistan.

USAID requested the consultants to examine the problem of surface drainage of irrigated land in Pakistan and to develop a detailed Scope of Work for a more comprehensive study of this subject by other parties. To accomplish this Dr. Glenn O. Schwab spent four months in Pakistan. The consultant identified high priority short-term problems and produced a comprehensive Scope of Work and plan of action to improve surface drainage planning and design practices. As a result, USAID plans to fund a major multi-year program in this area in the next phase of the Irrigation Systems Management Project.

e. Water Users Associations in Pakistan.

A two and one half month study of the role of Water Users Associations in the maintenance of improved watercourses was conducted by Robert L. Nothstein during a Short-Term consultancy in 1985. The study addressed some of the organizational issues affecting improved maintenance for W.U.A.s, and developed guidelines to effect more adequate maintenance of watercourses by W.U.A.s.

3. Commodities -

The following commodities have been procured, delivered and are in use at each facility: (for complete description, see Appendix "A") Some of the major items are listed below:

Federal Cell:

3 IBM PC-XTs' with printer, U.P.S., software programs, plus one IBM PCT on loan to Water Ministry of Planning and Development.

One 20 Megabyte hard disk.

3 Photocopiers, plus one on loan to Water Resources Ministry of Planning and Development.

- 1 Toyota Land Cruiser.
- 1 VCR - Camera
- 1 16mm Sound Projector with speakers.
- 1 VCR - monitoring/editing unit.
- 1 35mm camera, with flash, assorted lenses.
- 1 26" color T.V. set.
- 1 20" color monitor.
- 1 VCR deck.
- 1 Overhead projector.
- 1 35mm slide projector.
- 1 35mm film strip projector.
- 4 Radio shack touch tone telephones.
- Books, library supplies, software.
- 1 Binding machine with binders shelving, computer disks, etc.

Training Centers -

The agreement with the World Bank local representative was that USAID funds would be utilized to equip the teaching, library, and

conference areas, while Bank credits would be utilized for hostel space, office space, and field equipment. To a large extent this has been followed. However, some centers have done some switching from area to area. The following represents the areas for which furnishings and equipment were procured. Complete listings, by center appear in the Appendix. Briefly, each center recieved:

Classroom (3)

Chairs, desks, teachers desk, teachers chair, side chair.

Conference Hall

Folding chairs, podium, dishes, flatware, teapots, gas burners, refrigerator.

Soil Lab: - Extractor. shakers, sieves, mixers, water sampling kits, density kits, etc.

Drafting Rooms - drafting tables, stools, design kits, drawing boards, etc.

A - V Room - VCR, 26" monitor, 20" monitor 16mm sound projector, 35mm slide projector, 35mm field strip projector, Overhead projector 35mm camera, with lenses. Tapes, films, sound recorders, 35mm slide sets, filmstrips.

Institutional Equipment.

Levels, Rods, Stakes, Compases, Shovels, Picks, Trowels, Wheelborrows, saws, hammers etc.

Office Equipment

IBM PC-XT, Epson printer, U.P.S., software.
IBM selectric typewriter
2 Manual typewriters.
Computer table.

Vehicles - 2 Toyota HiAce Vans.

Renovation - Through direct USAID contracts renovations were made to the following:

- a. ATI Sakrand - The former king George the fifth Agricultural College main building was renovated, together with two bungalows and some hostel space at an approximate cost of \$75,000.
- b. The training center and hostel at the Agricultural Workshop D.I.Khan was renovated at an approximate cost of \$40,000.

Training Demonstration Farms -

- a. Tubewell - One tubewell each was constructed at Sind and Lahore T-D-Fs.
- b. Field equipment consisting of blades, listers, deep furrow plows, drills, harvesters were procured for each center.
- c. A complete meteorological station was procured and installed at each T-D-F.
- d. Cement, bricks, sand and labor were provided for installing improved watercourses at each T-D-F.
- e. A storage shed for equipment was provided at Sakrand and Lahore institutions T-D-Fs.
- f. A twenty foot raised water tank was constructed at Sakrand, Sind Institute, and a four foot 20x20 tank at Quetta A.T.I.
- g. Credits for the procurement of seeds, P.L.L. and fertilizer for the first years operations were to be made available to each farm. Some farms had not progressed to the point of utilizing these better commodities when the project closed, but are saving them for the Rabi season.

A note must be here on the utilization of World Bank funds for the support of Centers and Training Demonstration Farms. In the World Bank loan for OFWMP-II a line item for training was set aside for each Province. This was to be used to support the Training Centers. The only Province which has lived upto the agreement has been Sind Province, where the PC-1 for the Center contained, in the final version, the funding from the Bank. In the other Provinces this item for training was either deleted by the Planning and Development Department (Punjab) or was not included as direct support to the Training Center (NWFP - Baluchistan). In the NWFP the training line was apparently utilized to support farmer training. It is not apparent how Baluchistan used the line item.

In subsequent years following the USAID support to the Training Farms, support from World Bank resources will be provided through the Federal Cell. A PC-1 has been prepared and forwarded providing for operational support of the Training Farms.

4. Evaluation of Project

The evaluation of a twelve year USAID sponsored activity generally requires external and internal studies which examine objectively verifiable indicators, gather statistical data, design and conduct empirical studies, and emerge with such statements as internal rates of return, benefit cost analyses, etc. Several interim evaluations have been conducted by AID and GOP agencies. Such studies have not however, been a part of the contractual obligation of the consultant.

It follows that the primary evaluation of the Project and the Consultant's work within it must relate back to the logical framework matrix of the amended project paper and to the specific work plan developed by the Consultant in arriving at Project outputs. The logical framework matrix is included at Appendix "C" for reference purposes. The material following summarizes the objectively verifiable indicators from the logical framework and indicates the attainment thereof.

LOGFRAME--ATTAINMENTS: OFWM PROJECT

Objectively Verifiable Indicators and Attainment

Level	Objectively Verifiable Indicator	Attainments
Sector Goal:	Increase domestic production and decrease importation of food grains.	Wheat imports decrease from 1.957 mil. tonnes (1978-79) to .544 mil. tonnes (1984-85)
	Increased agricultural output.	Wheat Production increases from 8.362 mil. tonnes (1978-79) to 13.924 mil. tonnes (1984-85).
	GOP approves management plan of irrigation systems at the farm level.	Comprehensive 5 year OFWM Programme Plan approved by GOP.

End of Project Status

Project Purpose: Provincial Directorates established and delivering Water Management services to farmers.

4 Provincial Directorates established Area Directorates have been established in Multan and Lahore, in Punjab Province. Watercourse (lined) improvements in FY 76-87 by donor as follows:

USAID	(1,319)
World Bank	(5,033)
Asian Development Bank	(1,610)

Total	7,962

19,971 unlined watercourses also improved.

Central OFWM Cell created.

Central Federal Cell created. PC-1 for post-USAID support has been prepared and forwarded to GOP.

Provincial Field Teams effective in assisting farmers improve watercourses and Precision Land Levelling (PLL).

154 Field Teams have been established with the assistance of the following donors: USAID (56), World Bank (79), ADB (19).

152,400 acres of land Precisely Levelled
 ---USAID (74,857), IDA (66,293), ADB (11,250)

Increased evidence of watercourse maintenance.

6,000 Watercourse maintenance guides issued. Annual maintenance program underway during canal closing period (i.e. every January).

Improved quality of design and construction of civil works.

Quality of design has improved as result of national training courses and C.A.D.

Increased level of production technology related to effective water management.

Improved production technology such as drip & trickle irrigation, fertigation, furrow irrigation etc. disseminated.

Project Outputs: Watercourses improved and reimbursement made to GOP.	1,319 watercourses improved under AID funding.
Land precisely levelled.	74,857 acres (USAID funding)
Provincial Directorates Created.	4
Provincial Training Centers Created.	4
Central OPWM Cell Created.	1
Field Manuals Revised--Vol. III, IV, V.	3
OPWM Teams established and trained.	56 (USAID)
Engineers Trained in C.A.D. Watercourse Design.	48
Effective Extension Techniques for OPWM Available.	4 farmer training manuals produced, A-V Center established, staff trained A-V mobile teams/vehicles in place
WUAs effectively maintaining watercourses and drains, trained in water management technology and owning tubewells.	Annual maintenance program in process, multimedia systems in-place alerting WUAs to maintenance responsibilities. WUA members trained in maintenance in U.S.A. National Training held on WUS maintenance responsibilities.
Computers effectively used for Planning Management, Training & field work in OPWMP.	MIS in place and functioning. C.A.D. for watercourse improvement in place.
Training institutes revise curricula and improve training programs.	4 functioning.
Participants trained overseas.	97 trained--2 with Master's Degree. 4 Training-Demonstration-Farms established.

G. LESSONS LEARNED

The following are quoted from the 1982 Project Impact Evaluation Report No.15. Following each section the Consultant has elaborated as indicated, on lessons learned in the 1984-1987 period.

Project Financing

A. FAR Mechanism. The Fixed Amount Reimbursement (FAR) mechanism needs to be re-examined. In irrigation projects such as the OFWM project, which extend beyond public works efforts to increase water supply into extension-based farmer training in water use, a facilitating financial mechanism for the latter element should be incorporated into the project design.

Consultants Remarks - 1984-1987

During the period at hand the funds made available to the consultant were Grant funds. Focused upon Technical Assistance, training, and commodity procurement arrangements have been made for the Federal Cell to assume elements of the FAR support, utilizing World Bank and IDA credits through 1988. This action strengthens the Federal Cell participation in such fields as extension based farmer training through the Provincial Training Centers and Training Demonstration Farms.

B. Farmer Participation. Unit costs of watercourse improvement could have been reduced or the project could have been spread further for the same overall cost if farmers had been required to share in the cost, which they repeatedly indicated willingness to do. A loan mechanism could have been designed to permit farmers to make repayments through land revenues or a water duty spread over a period of several years. Increasing farmers' financial stake could have had the added benefit of improving the quality of work performed, as well as their interest in sustaining improvements through subsequent maintenance.

Consultants' Remarks - 1984-87. Several different mechanisms to increase farmer participation in cost sharing have been proposed. This includes an option of increasing the amount of pukka improvement up to fifty percent of a water course in some areas. The involvement of W.U.A. committee member as an "inspector" during construction (Punjab) helps to ensure that quality standards are being met.

Design Flexibility

The designs for projects -- particularly pilot projects -- which are to be implemented in a variety of physical and cultural settings, need to allow greater flexibility to adapt to local conditions than did the OFWM project. As already noted, permitting flexibility in terms of financial participation would have permitted adaptation to the growing popularity of the OFWM project, once it caught on, permitting better use of funds available. Greater design flexibility would have permitted better adaptation to local needs, such as the need in Sind for more watercourse lining or the need on NWFP for different channel design -- perhaps funded through sliding-scale cost sharing arrangements.

Consultants Remarks: 1984-87 - As noted above increased flexibility in design is being permitted in some areas under the World Bank OFWMP-II. However, some Provinces still allocate an overall Rupee value per Watercourse which tends to constrain design flexibility.

Watercourse Maintenance and Farmer Cooperation

Watercourse maintenance is critical to sustained benefits from watercourse improvement. Such maintenance, particularly in a cultural setting where community cooperation is not the tradition, is highly dependent on building a formal structure for local cooperation and collective labor. However, promotion of voluntary cooperation -- perhaps through extension agents or through media outreach programs to educate farmers as to its benefits -- seems a more promising route than externally imposed legal sanctions to conform, although such cooperation is likely to be more difficult to achieve in villages with pronounced rivalry.

Consultants Remarks: 1984-87. The Federal Cell and the Provincial Directorates have taken cognizance of the problems noted. Training courses and training materials have focused on preparing field teams to improve communications with W.U.A. groups. Recommendations have been made to train agricultural extension agents in water management practice to increase participation in maintenance.

Mobile training vans have been provided to each Training Center to provide outreach capabilities. Programs for farmer training have been developed at each center.

Land Ownership

Land ownership patterns have a profound impact on the benefits of irrigation improvement schemes such as the OFWM project. Where water is controlled by a landlord, the poorest tenants -- precisely those whom such efforts are intended to benefit most -- may see little or no gain from increased water supply. Similarly, size of land holding largely determines the ability, or at least the willingness, or a farmer to take advantage of PLL; participants are often only those with sufficient land to permit a portion to lie fallow after leveling and those with their own implements (to cut the cost and thus the perceived risk). Future projects need to give more thought to ways of reaching the small farmer under such conditions.

Consultants Remarks - 1984-87 - Small holders are encouraged to participate in OFWMP programs. More needs to be done, however, to provide them with improved knowledge of water management.

Implementing Agency Staff

The key to successful implementation of a development project such as this is quality staff in the responsible host country agency. To recruit and train such staff, positions should be regularized rather than temporary as was the case in the OFWM Directorates. The personnel qualifications should fit project needs; for a project emphasizing watercourse reconstruction, more agricultural engineers are needed to maintain technical standards in the work and adjust designs to fit actual conditions than were available in this project. A stronger training program than that found is needed to develop and maintain appropriate skills. Such a training program requires acquisition of better equipment, the recruitment of more engineers are faculty, and better integration of curriculum with research on alternative approaches to on-farm water management than has taken place so far in this project.

Consultants Remarks - 1984-87 Focus during the period has been upon improving the capability of existing staff members and training new staff members. Curricula have been revised, equipment purchased, and training outreach programs strengthened to bring the OFWMP message to the farmers. Care must be taken in recruitment of staff to obtain personnel who are interested in the assigned duties.

Extension

Extension services are essential to the full achievement of on-farm water management, since they deal with efficient water usage and better cropping practices once water supply is improved. However, when the extension function connects with on-farm water management overlapping with an existing extension service is a risky; in these instances, more thought must be given to integration than was the case in this project. Furthermore, training farmers to change age-old cropping and irrigating practices may be much more difficult than reconstructing a watercourse, and require more specialized training than that possessed by most agricultural graduates; much more attention must be paid to the training of extension agents than has so far taken place in Pakistan.

Consultants Remarks 1984-87 - Placing the OFWMP Training Centers on the campuses of A.T.I.'s (in two locations) provides opportunities for cross fertilization between staffs and students in respect to improving extension techniques. More specific attention to this function is needed.

Baseline Data

To the extent that the success and replication of a pilot project relies on the establishment of quantitative data on project impact -- although replication of the OFWM project seems not to have depended on such data -- it is essential that baseline data be collected. Very little attention was paid to the collection of such data in the early stages of the OFWM project, with the result that hard data on yield and income benefits are non-existent. The recently initiated efforts of Pakistan's Water and Power Development Administration needs to be accorded high priority in order to provide better information on the impacts of the expanded follow-on project now underway. It will be helpful to have more post-improvement measurements of water losses in the watercourses.

Consultants Remarks 1984-87 - Attention is being paid to improving research design and data collection through the ISM-Research Project. The WAPDA group is receiving direct training in this function

Institutional Focus

Greater attention should have been paid to develop awareness of, and commitment to, on-farm water management on the part of local government and elected bodies in the implementation of the project. In addition, there should have been more emphasis on encouraging academic institutions to build a larger on-farm water management component into agricultural curricula.

Consultants Remarks 1984-87 - Much attention has been given to increasing institutional linkages within the project. While USAID determined not to make a formal linkage with the Department of Local Government and Rural Development, the linkages are being strengthened through informal W.U.A. relationships.

Relationships have been established between Faisalabad Agricultural University, Sind Agricultural University, Mehran University and the Project. These need further strengthening during subsequent years of the project. Both Faisalabad and Sind University have developed Water Management curricula and Training Programs as formal courses. The project has provided materials and some equipment to facilitate these programs.

Coordinating mechanisms have been established: a Project Coordinating Committee meets quarterly, a Project Publications Committee meets semiannually.

Lessons learned in this category during the past three years:

- Institutional development depends largely upon enlightened leadership, and the provision of sustaining mechanisms (i.e. funding), and a strong doctrine (i.e. goal purpose affiliation). The above mechanisms are in place and operating in the O.F.W.M.P.

APPENDIX A

COMMODITY PROCUREMENTS

EPELADIA DWH PROJECT INVENTORY OF ORDERED ITEMS-

FO # ITEM QUANT

DESCRIPTION SV PO BT NWB FB AIR

TOTAL \$ B/O

FO #	ITEM	QUANT	DESCRIPTION	SV	PO	BT	NWB	FB	AIR	TOTAL \$	B/O
1603	1	5	6BC MANUAL COMBO (MODEL 150XMI)	1	1	1	1	1		5	0
1603	2	200	103 WB STURDY GRAIN - RED					200		200	0
1603	3	200	103 WB STURDY GRAIN - SLATE			200				200	0
1603	4	200	103WB STURDY GRAIN- SKY BLUE					200		200	0
1603	5	200	103WB " - FARCHMENT						200	200	0
1603	6	200	103WB " - WHITE			200				200	0
1603	7	500	CERLOX 19 RG 1/4" BLACK	100	100	100	100	100		500	0
1603	8	500	CERLOX 19 RG 1/2" WHITE	100	100	100	100	100		500	0
1603	9	500	CERLOX 19RG 3/4" RED	100	100	100	100	100		500	0
1603	10	500	CERLOX 19 RG 1" GREEN	100	100	100	100	100		500	0
1604	1	9	PROJECTOR 16MM MODEL 90-25HFR	1	2	2	2	1	1	9	0
1604	2	9	J-14 SPEAKER, 12" FOR ABOVE	1	2	2	2	1	1	9	0
1604	3	9	SLIP COVER	1	2	2	2	1	1	9	0
1604	4	27	EXCITOR LAMP 901377	3	6	6	6	3	3	27	0
1604	5	45	PROJECTOR LAMP 90 BEJL	5	10	10	10	5	5	45	0
1604	6	9	PROJECT-O-STAND 203-56	1	1	1	30/d			3	6
1604	7	9	SPARE 1200FT TAKEUP REEL 020-211	1	2	2	2	1	1	9	0
1604	8	5	OVERHEAD PROJECTOR, AFFOLD 3675	0	1	1	1	1	1	5	0
1604	9	5	DUST COVER CARRYING CASE	0	1	1	1	1	1	5	0
1604	10	20	SPARE LAMPS FOR AFFOLD	0	4	4	4	4	4	20	0
1605	1	4	RESIN, DEMINERALIZER 1LB	0	0	3	0		1	4	0
1605	2	96	BOTTLE W/CAP 1000ML PK/3	24	24	24	24			96	0
1605	3	4	NITRATE TEST KIT N111 0-50	0	1	1	1		1	4	0
1605	4	4	IRON TEST KIT I100 0-10 MG/L	0	1	1	1		1	4	0
1605	5	16	SAFETY GOGGLES	0	4	4	4		4	16	0
1605	6	4	CA + MG SOIL TEST KIT	0	1	1	1		1	4	0
1605	7	4	SOIL EXTRACTION KIT	0	1	1	1		1	4	0
1605	8	16	DEMINERALIZING WASH BOTTLES	0	4	4	4		4	16	0
1605	9	16	FUNNEL 1000ML ANALYTICAL	4	4	4	4			16	0
1605	10	16	GRADUATED CYLINDER 1000ML	4	4	4	4			16	0
1605	11	16	GRADUATED CYLINDER 250ML	4	4	4	4			16	0
1605	12	96	BEAKERS, 1000ML LOW FORM	24	24	24	24			96	0
1605	13	4	SPECTROPHOTOMETER, LAB	1	1	1	1			4	0
1606	1	4	13" MANUAL TYPEWRITER	1	1	1	1			4	0
1606	2	4	18" MANUAL TYPEWRITER	1	1	1	1			4	0
1607	1	4	SOILMOISTURE METER 5710-A	0	1	1	1		1	4	0
1607	2	400	SOIL MOISTURE BLOCKS 3' FT LEADS	0	100	100	100		100	400	0
1607	3	400	SOIL MOISTURE BLOCKS 6' FT LEAD	0	100	100	100		100	400	0
1607	4	0	BATTERY 9v (1607 IN WOOD BOX)	0	2	2	2		2	0	0
1610	1	5	MICRONATIC II SOUND FILM PROJ	1	1	1	1		1 ONE	5	0
1610	2	20	SPARE LAMP FOR ABOVE 0456-170	4	4	4	4		4 FED	20	0
1610	3	5	DUSTCOVER 012839	1	1	1	1		1 SEN	5	0
1610	4	5	REMOTE CORD 0110-1727A	1	1	1	1		1 BY	5	0
1610	6	5	AUXILLARY SPEAKER 0438-300	1	1	1	1		1 HAN	5	0
1611	1	60	SOLAR CALCULATORS	0	10	10	10		14	60	0
1611	2	4	DESK CALCULATORS 105130	1	1	1	1			4	0
1611	3	4	FRANZUS CONVERTORS 220V-110V	0	1	1	1		1	4	0
1612	1	4	STEPDOWN TRANSFORMERS 1000W	1	1	1	1			4	0
1612	2	4	STEPDOWN TRANSFORMERS 750W	1	1	1	1			4	0
1613	1	4	PROJECTOR STANDS	1	1	1	1			4	0
1613	2	24	SKETCH PADS 10X24	6	6	6	6			24	0
1613	3	35	DRAWING BOARDS 30X42"	0	0	0	0		3	35	0
1613	4	30	DRAWING STOOLS	7	7	7	7		2	30	0
1613	5	6	DRAFTING STOOLS W/BACKS	1	1	2	2			6	0
1613	6	120	CLIPBOARDS 9X12	30	30	30	30			120	0

1613	7	24 NEWSPRINT PAPER 18X24"	6	6	6	6			24	0
1613	8	4 PAPER TRIMMER, HEAVY DUTY 15X15	1	1	1	1			4	0
1613	9	20 STAPLES 1/2" BOX 5000	5	5	5	5			20	0
1613	10	20 STAPLES 3/8" BOX 5000	5	5	5	5			20	0
1613	11	20 STAPLES STANDARD	5	5	5	5			20	0
1613	12	8 BLACKBOARD DRAWING SET (WOODEN TOOLS)	2	2	2	2			8	0
1613	13	4 PAPER STAPLER, HEAVY DUTY	1	1	1	1			4	0
1613	14	14 LETTERING SET	3	3	3	3	2		14	0
1613	15	4 CLEAR ACETATE SHEETS	1	1	1	1			4	0
1613	16	100 SLIDE ALBUM PAGES	25	25	25	25			100	0
1613	17	4 INK/PENCIL ERASERS BOX OF 20	1	1	1	1			4	0
1613	18	6 FRENCH CURVE DRAWING SET	1	1	2	1	1		6	0
1613	19	4 FLEXIBLE CURVE	1	1	1	1			4	0
1613	20	4 PROPORTIONAL DIVIDERS 8"	1	1	1	1			4	0
1613	21	12 VISUAL AID PEN SET	3	3	3	3			12	0
1613	22	8 TECHNICAL PEN SET	2	2	2	2			8	0
1613	23	12 HYDRION SOIL PH TESTERS	3	3	3	3			12	0
1613	24	8 HYDRION TEST REFILLS	2	2	2	2			8	0
1613	25	12 COLOR PENS	3	3	3	3			12	0
1613	26	12 EASY MOUNTS	3	3	3	3			12	0
1613	27	35 PARALLEL T-SQUARE	8	9	8	8	2		35	0
1613	28	4 WHITE PRINTING MACHINES	1	1	1	1			4	0
1614	1	80 C TYPE BATTERY	20	20	20	20			80	0
1614	2	120 AA TYPE BATTERY	32	32	32	32			128	0
1614	3	16 POCKET CASSETTE RECORDER	4	4	4	4			16	0
1614	4	20 CAR-70 CASSETTE RECORDER (110V)	5	5	5	5			20	0
1614	5	5 1/4" 900 ADAPTER	1	1	1	1	1		5	0
1614	6	8 PORTABLE POWER HORN	2	2	2	2			8	0
1614	7	5 MONO HEADPHONE	1	1	1	1	1		5	0
1614	8	60 VHS VIDEOTAPES (BLANK)	12	12	12	12	12		60	0
1614	9	140 C-50 BLANK CASSETTE TAPES	35	35	35	35			140	0
1615	1	9 KODAK 20-2076 SLIDE PROJ. EKTAGR	1	2	2	2	1	1	9	0
1615	2	45 SPARE PROJECTOR BULBS 1146558	5	10	10	10	5	5	45	0
1615	3	27 SPARE SLIDE CARROUSELS 1046093	4	6	6	6	3	2	27	0
1617		SEE 1611							0	0
1618	1	5 ACROS PORTABLE DC CAMERA LIGHT 100W	1	1	1	1	1		5	0
1618	2	5 SPARE LAMP (IN CASE)	1	1	1	1	1		5	0
1618	3	5 ACROS NI-CAD BATT RECHARGER (110V)	0	0	0	0	0	HEL	0	5
1619	4	5 ELEVATOR VIDEO TRIFOD	1	1	1	1	1		5	0
1618	5	5 HI-8 FILM TO VIDEO CONVERTOR	NOT DEL IVE RED						0	5
1619	1	4 PORT. AIRCOND. 8000BTU 220V	1	1	1	1			4	0
1619	2	5 10000BTU AIRCOND. 50HZ/110V	1	1	1	1	1		5	0
1619	3	5 1000W TRANSFORMERS 220V-110V	1	1	1	1	1		5	0
1620	1	9 WONDERLITE LENTIC SCREEN 70X70	2	2	2	2	2	1	9	0
1620	2	9 CASES FOR SCREENS/ON BOX	2	2	2	2	2	1	9	0
1622	1	4 Film strip box, metal	0	1	1	1	1	1	4	0
1622	2	4 Weed control transparencies	0	1	1	1	1	1	4	0
1622	3	4 How herbicides work transparency	0	1	1	1	1	1	4	0
1622	4	4 SAFE USE OF PESTICIDES (TRANSPAR)	0	1	1	1	1	1	4	0
1622	5	4 AN EXERCISE IN DIFF. LEVELING	0	1	1	1	1	1	4	0
1622	6	4 USE OF THE LEVEL, SETTING UP	0	1	1	1	1	1	4	0
1622	7	4 USE OF THE LEVEL, READING THE ROD	0	1	1	1	1	1	4	0
1622	8	4 PLANNING IRRIGATION SYSTEM (SLIDES)	0	1	1	1	1	1	4	0
1622	9	4 IRRIGATION PARTS 1 & 2	0	1	1	1	1	1	4	0
1622	10	4 SOIL COLOR	0	1	1	1	1	1	4	0
1622	11	4 TECHNIQUES IN LAND PREPARATION	0	1	1	1	1	1	4	0
1622	12	4 THE FARM MANAGEMENT HANDBOOK	0	1	1	1	1	1	4	0

1622	13	4 IRRIGATION PRINCIPLES AND PRACT	8	1	1	1	1	4	8
1622	14	4 FERTILIZER HANDBOOK	8	1	1	1	1	4	8
1622	15	4 SOIL SCI SIMPLIFIED	1	1	1	1		4	8
1622	16	4 CONCRETE MASONRY WORKS	1	1	1	1		4	8
1623	1	30 DRAWING TABLES	18	18	5	5		38	8
1623	2	9 PENCIL POINTERS	1	2	2	2	1	9	8
1623	3	69 DUSTING BRUSHES	17	17	17	17		68	8
1623	4	19 BEAM COMPASSES	3	4	4	4	3	19	8
1623	5	9 FOLDING PARALLEL RULER	1	2	2	2	1	9	8
1623	6	9 ELLIPSE TEMPLATE SET	1	2	2	2	1	9	8
1623	7	12 PRESENTATION EASEL	3	3	3	3		12	8
1623	8	5 BEPLEZOR LECTERN/LIGHT AND LAMP	1	1	1	1	1	5	8
1624	1	4 ADVANCES IN DRAINAGE	1	1	1	1		4	8
1624	2	4 AGRICULTURAL ECONOMICS	1	1	1	1		4	8
1624	3	4 HYDROLOGIC MODEL OF SMALL WATERSHEDS	1	1	1	1		4	8
1624	4	4 IRRIGATION AND DRAINAGE						8	4
1624	5	4 IRR. CHALLENGES OF THE 80'S	1	1	1	1		4	8
1624	6	4 IRR. POLICY & MANAG. IN SE ASIA						8	4
1624	7	4 IRR. SCHED. FOR WTR & ENERGY	1	1	1	1		4	8
1624	8	4 DESIGN AND OPER OF FARM IRR SYSTEMS						8	4
1624	9	4 HANDBOOK OF HYDRAULICS	1	1	1	1		4	8
1624	10	4 RICE, SOIL, WATER, LAND						8	4
1624	11	4 SOILS AND RICE						8	4
1624	12	4 LAND DRAINAGE	1	1	1	1		4	8
1624	13	4 OPEN CHANNEL HYDRAULICS	1	1	1	1		4	8
1624	14	4 FLOW MEASURING FLUMES FOR OPEN	1	1	1	1		4	8
1624	15	4 SMALL FARM MACH FOR DEV COUNTR.	1	1	1	1		4	8
1624	16	4 IRRIG. PRINCIPLES AND PRACTICES	1	1	1	1		4	8
1624	17	4 SOIL AND WATER ENGINEERING	1	1	1	1		4	8
1624	18	4 SURVEYING	1	1	1	1		4	8
1624	19	4 HYDRO INDEX (FER.)	8/0					8	4
1624	20	4 AGRIBUSINESS (FER.)	8/0					8	4
1624	21	4 SOIL SCIENCE (FER.)	8/0					8	4
1624	22	4 AGRONOMY JOURN. (FER.)	8/0					8	4
1624	23	4 IRRIGATION JOURN. (IRR)	8/0					8	4
1625	1	4 AVCOM PROJ. START KITS	8	1	1	1	1	4	8
1625	2	4 FILEABLE TRANSPARENCY MOUNTS	8	1	1	1	1	4	8
1625	3	4 COLORED ACETATE SHEETS	8	1	1	1	1	4	8
1625	4	12 CLEAR TRANSP. SHEETS	3	3	3	3		12	8
1625	5	4 CRAIG MOVIE SLICER	8	1	1	1	1	4	8
1625	6	4 FILM CEMENT	8	1	1	1	1	4	8
1626	1	24 PLUMB BOB REFL. POINT	6	6	6	6		24	8
1626	2	24 PLUMB BOB REFL. CAP	6	6	6	6		24	8
1626	3	4 OHAUS METRIC SCALE	1	1	1	1		4	8
1626	4	4 OHAUS TRIPLE BEAM SCALE	1	1	1	1		4	8
1626	5	24 SERVICE KIT COMPLETE	8/0					8	24
1626	6	4 10' LEVEL ROD FT/10THS/100	1	1	1	1		4	8
1626	7	70 8' RANGE POLE WITH CASE	18	18	17	17		70	8
1626	8	80 10FT FIBERGLASS POLE	28	28	28	28		88	8
1626	9	4 PORTABLE PH METER		1	1	1	1	4	8
1626	10	4 PH ELECTRODE (CHEMIRIX)	8	1	1	1	1	4	8
1626	11	4 REFL STICK FOR RAIN GAUGE	8/0					8	4
1626	12	34 TAPE W/REEL, 30M	8	8	8	8	2	34	8
1626	13	4 THERMOMETER, CENTI.	8/0					8	4
1626	14	4 SLING PSYCHROMETER	8	1	1	1	1	4	8
1626	15	34 TAPE, CHAIN, 30 M (BARBIT)	8	8	8	8	2	34	8
1626	16	4 GAUGE, RAIN, SNOW STANDARD	8/0					8	4

1626	17	4 SUPPORT TRIPOD EASE	B/O						0	4
1626	18	4 EVAPORATION STATION							4	0
1626	19	26 LEVEL ROD, 3 M		1	1	1	1		4	0
1626	20	8 BINOCULARS, TRITON		7	7	8	8		26	0
1626	21	4 FLOWMETER (GENERAL OCEANIC)		2	2	2	2		8	0
1626	22	4 FLOWMETER READOUT		1	1	1	1		4	0
1626	23	4 36" TENSIONMETER		1	1	1	1		4	0
1626	24	4 48" TENSIONMETER		1	1	1	1		4	0
1626	25	4 60" TENSIONMETER		1	1	1	1		4	0
1626	26	24 BACKPACK STRAWERS, MESTO		6	6	6	6		24	0
1626	27	20 JACOB STAFF (WOOD)		7	7	7	7		28	0
1626	28	4 CONDUCTIVITY METER & DISSOL		0	1	1	1	1	4	0
1626	29	24 100Z FLUMB BOB		6	6	6	6		24	0
1626	30	66 SURVEYOR STEEL ARROWS		16	16	16	16	2	66	0
1626	31	34 TAPE, CHAIN, 100FT (LUFKIN)		8	8	8	8	2	34	0
1626	32	34 REEL, CHAIN TYPE A		8	8	8	8	2	34	0
1626	33	34 REEL, CHAIN TYPE A		8	8	8	8	2	34	0
1626	34	28 TRANSIT WATERPRO	B/O						0	28
1626	35	24 COMPASS, GEOLOGICAL & FOREST	B/O						0	24
1626	36	4 JACOB STAFF ADAPTER		1	1	1	1		4	0
1626	37	4 TUBULAR TRIPOD (BURTON)		1	1	1	1		4	0
1626	38	4 ADAPTER, TRIPOD (IN BOX W/BOB TIPS)		1	1	1	1		4	0
1626	39	22 STOPWATCH, PROF.		5	5	5	5	2	22	0
1626	40	60 TAPE, FIBERGLASS, 50FT (KESSON)		17	17	17	17		60	0
1626	41	34 TAPE, FIBERGLASS, 30H (LUFKIN)		8	8	8	8	2	34	0
1626	42	26 ROD LEVEL (SMALL ORANGE BOX)		7	7	8	8		26	0
1626	43	24 RANGEFINDER, 50-600FT, 3X	B/O						0	24
1626	44	24 CASE FOR MODEL 600 & 620		6	6	6	6		24	0
1626	45	18 ARNEY LEVEL, TOPOGRAPHIC (LEITZ)		4	4	4	4	2	18	0
1626	46	8 PLATHMETER		1	2	2	1	2B/O	6	2
1626	47	28 CLINOMETER (SUUNTO)		7	7	7	7		28	0
1626	48	24 14 INCREMENT BORER SHEATH		6	6	6	6		24	0
1626	49	52 UMBRELLA, 7 FOOT SURVEYOR		13	13	13	13		52	0
1626	50	24 CRANK DUSTER		6	6	6	6		24	0
1627	1	4 HYDRONETER ANALYSIS KIT 220V/50-60HZ		1	1	1	1		4	0
1627		4 HYDRONETER JAR BATH		1	1	1	1		4	0
1627		24 HYDRONETER JAR 1000ML		6	6	6	6		24	0
1627		4 SOIL MIXER 220V/50-60HZ		1	1	1	1		4	0
1627		4 SOIL DISPERSION CUP W/ SCREW		1	1	1	1		4	0
1627		4 MIXING PADDLE		1	1	1	1		4	0
1627	2	4 HYDRONETER ASTM 152H		1	1	1	1		4	0
1627	3	4 HYDRONETER ASTM 152H		1	1	1	1		4	0
1627	4	4 SODIUM HEXA-METAPHOSPHATE		1	1	1	1		4	0
1627	5	4 SIEVE SHAKER 220V/50HZ		1	1	1	1		4	0
1627	6	4 8" BRASS SEIVE #10		1	1	1	1		4	0
1627	7	4 BRASS SEIVE #10		1	1	1	1		4	0
1627	8	4 BRASS SEIVE #35		1	1	1	1		4	0
1627	9	4 BRASS SEIVE #60		1	1	1	1		4	0
1627	10	4 BRASS SEIVE #110		1	1	1	1		4	0
1627	11	4 BRASS SEIVE #270		1	1	1	1		4	0
1627	12	4 BRASS SEIVE #400		1	1	1	1		4	0
1627	13	4 BRASS PAN		1	1	1	1		4	0
1627	14	4 BRASS COVERLESS RING		1	1	1	1		4	0
1627	15	360 TIN SAMPLE BOX		90	90	90	90		360	0
1627	16	4 SPEEDY MOISTURE TESTER		1	1	1	1		4	0
1627	17	4 MOISTURE TESTER REAGENT (IN WOOD BOX)						4	4	0
1627	18	4 GAGE REMOVING TOOL (ALUMINUM)		1	1	1	1		4	0

1627	17	4 GRAVITY CONVECTION OVEN	1	1	1	1	1	0	0
1637		4 1800W 110V-220V TRANSFORMER	1	1	1	1	1	0	0
1627		4 PERMEAMETER FOR OVEN, COMB.	1	1	1	1	1	0	0
1628	1	40 TOPCON AUTO LEVELS (ATF4)	10	10	10	10	10	0	0
1628	2	4 TRANSIT-THEODOLITE TOPCON AS200	1	1	1	1	1	0	0
1628	3	44 TRIPODS FOR ABOVE ITEMS (59030)	11	11	11	11	11	0	0
1629	1	VCR'S NOT ON THIS LIST!!!						0	0
1630	1	1 MANUAL FOR FARMERS IN HILL AREAS				25 COPIES MADE	25	25	-24
1630	2	25 SERIES 02- FARMERS INVOLVEMENT MANUALS					25	25	0
1630	3	4 VIDEOS- FARMER INVOLVEMENT SERIES					4	4	0
1631	1	4 IRRIGATION-PARTS 1 & 2		1	1	1	1	4	0
1631	2	4 USE OF LEVEL SERIES		1	1	1	1	4	0
1631	3	4 AN EXERCISE IN DIFFER. LEVELING		1	1	1	1	4	0
1631	4	4 TECHNIQUES OF LAND PREP. 1 & 2		1	1	1	1	4	0
1631	5	4 SOIL AND AGRIC. ENV.		1	1	1	1	4	0
1631	6	4 PEOPLE AND AGRIC. ENV.		1	1	1	1	4	0
1631	7	4 WATER AND AGRIC. ENV.		1	1	1	1	4	0
1631	8	4 ECOLOGY AND AGRIC. ENV.		1	1	1	1	4	0
1631	9	4 AIR AND THE AGRIC. ENV.		1	1	1	1	4	0
1631	10	4 TECHNIQUES IN BUDDING		1	1	1	1	4	0
1631	11	4 AGRIC. WEED CONTROL		1	1	1	1	4	0
1632	1	4 IRRIGATION WATER FILMSRIP	3 B/O				1	1	3
1632	1	4 SURFACE IRRIG.-LEVEL BORDER/BASIN	2B/O				2	2	2
1632	1	4 SURFACE IRRIG.-FURROW/BORDER	2B/O				2	2	2
1632	1	4 SURFACE IRRIG.-LAND LEVELLING	2B/O				2	2	2
1632	1	4 SIFON IRRIG.	3B/O				1	1	3
1632	1	4 THE TRACTOR	3B/O				1	1	3
1632	1	4 PERIODIC MAINTENANCE: TRACTOR II	3B/O				1	1	3
1632	1	4 PERIODIC MAINTENANCE: TRACTOR III	3B/O				1	1	3
1632	1	4 DAILY MAINTENANCE: THE TRACTOR	3B/O				1	1	3
1632	1	4 THE DISC FLOW	3B/O				1	1	3
1632	1	4 ANIMAL TRACTION	3B/O				1	1	3
?		5 IBM SELECTRIC TYPEWRITERS + RIBBON	1	1	1	1	1	5	0

SUPPLEMENTAL PROCUREMENT REQUEST
BOOKS AND PUBLICATIONS

TITLE	AUTHOR	PUBLISHER	NO.	COST
MEDIA RELATED				
A Plan for Unit & Course Development	Kemp, Jerrold E.	Fearon Publishers/Lear Siegler, Inc.	5	\$150.00
AV Instruction: Materials & Methods	Brown, Richard, Lewis & Harclerod	McGraw-Hill Book Co.	5	\$150.00
Art-Form Size Standard for Proj. Visuals	Kodak Co. Pamphlet #3-12	Eastman Kodak Co.	5	\$25.00
Audiovisual Equipment Self-Instruction Manual	Oates, Stanton C.	Villan C. Brown Book Co.	5	\$125.00
Audiovisual Literature Packet PU-19 Dept. 454	Kodak Co.	Eastman Kodak Co.	5	\$25.00
Audiovisual Materials	Viottich & Schuller	Hapner & Bow, Inc.	5	\$150.00
Audiovisual Planning Equip.	Kodak Co. Pamphlet #3-11	Eastman Kodak Co.	5	\$25.00
Basic Art Techniques for Slide Production	Kodak Company (Slides/Tapes)	Eastman Kodak Co.	5	\$25.00
Concepts & Practices of Management	Hainan & Hilgert	??	5	\$25.00
Concise Encyclopedia of Science & Technology	McGraw-Hill Book Co.	McGraw-Hill Book Co.	5	\$325.00
Creating Visuals for TV	Spear, James	NBA Public. Sales	5	\$175.00
Developing Programmed Instructional Materials	Espeich & Williams	Fearon Publishers/Lear Siegler, Inc.	5	\$150.00
Dictionary of Computers	McGraw-Hill Book Co.	McGraw-Hill Book Co.	5	\$100.00
Dictionary of Scientific & Technical Terms	McGraw-Hill Book Co.	McGraw-Hill Book Co.	5	\$425.00
Drip/Trickle Irrigation in Action	Elsevier Science Publishers	Elsevier Science Publishers	5	\$450.00
Effective Lecture Slides	Kodak Co. Pamphlet #S-22	Eastman Kodak Co.	5	\$25.00
Index to Kodak Technical Information	Kodak Co. Pamphlet #1-5	Eastman Kodak Co.	5	\$25.00
Operating Audiovisual Equipment	Eboch, Sydney C.	Science Research Assoc.	5	\$150.00
Planning & Producing Visual Aids	Kodak Co. Pamphlet #S-13	Eastman Kodak Co.	5	\$25.00
Planning and Producing Audiovisual Materials	Kemp, Jerrold E.	Science Research Assoc	5	\$150.00
Preparation of Inexpensive Teaching Materials	Morlan, John E.	Science Research Assoc	5	\$150.00
Producers Manual	Magnetic Products Div, 3M Co.	3M Co.	5	\$25.00
Producing Slides & Filmstrips	Kodak Co. Pamphlet #S-8	Eastman Kodak Co.	5	\$25.00
Publications & Audiovisual Materials	N.E.A. Publications/Catalogs	National Education Association	5	\$150.00
Self-Instr. AV Equip. Operation (20 titles)	Training Services	Training Services	5	\$150.00
Slides with a Purpose	Kodak Co. Pamphlet	Eastman Kodak Co.	5	\$25.00
Techniques for Producing Visual Inst. Media	Ninor & Frye	McGraw-Hill Book Co.	5	\$150.00
The Handbook of Good English	McGraw-Hill Book Co.	McGraw-Hill Book Co.	5	\$100.00
Trickle Irrigation for Crop Production	Makysana & Bucks	Elsevier Science Publishers	5	\$325.00
		SUBTOTAL		\$3800.00
AGRICULTURALLY RELATED				
can Irrig. Sys. Evaluation, Guide to Mgmt.	Herrina & Keller	Utah State University	5	\$62.50
Canes Irrigation Handbook	McCulloch, Keller, Sheiman et al.	Lockwood Corporation	5	\$60.00
Soil Conservation Manuals, Sect. 15 (full set)	Soil Conservation Service	Soil Conservation Service	5	Free
Irrigation and Drainage Papers (English) #1-10	FAO	FAO	5	\$3200.00
FAO Soils Bulletins #3, 4, 6-13, 15-23, 25-28, 30-42, 44, 45	FAO	FAO	5	\$2640.00
Drainage Manual, 1st Edition	U.S. Bureau of Reclamation	U.S. Govt. Printing Office	5	\$80.00
Irrigation of Agricultural Lands	American Society of Agronomy	American Society of Agronomy	5	\$75.00
Design & Operation of Irrigation Systems	Mensen, Marvin E.	American Society of Agriculture	5	\$225.00
		SUBTOTAL		\$6342.50
			GRAND TOTAL FOR PUBLICATIONS	\$10142.50

SUPPLEMENTAL PROCUREMENT REQUEST

ITEM NAME	BRAND NAME	MODEL NO.	QUANTITY	COST
MEDIA CENTER/PRODUCTION FACILITY				
Camera 35MM	Minolta	X-370	1	\$350.00
Flash attachment for 35MM Camera	Minolta		1	\$75.00
Lens for 35MM Camera 28-135MM Zoom	Minolta		1	\$200.00
Audiovisual Projector/Utility Cart 54"H X 24"W X 30"L Top & Shelf			1	\$150.00
Audiovisual Projector/Utility Cart 31"H X 18"W X 24"L Top & Shelf			1	\$125.00
Microphone, Lavalier Type, w/25' Extension Cord	Sony	BCK-150T	1	\$75.00
Video Head Cleaner Kit (VHS)			2	\$50.00
Spirit/Bubble Level for Tripod			1	\$20.00
Audio Cassette Recorder/Player Deck			1	\$300.00
Audio Cassette Portable Recorder/Player			1	\$250.00
Video Tape Storage Boxes, Plastic, Locking			150	\$300.00
Flood Lights for Video Production			2	\$100.00
Video Recording Tape T-30			50	\$350.00
Video Recording Tape T-60			50	\$400.00
Video Recording Tape T-120			25	\$200.00
Lightweight Stereo Headphones			1	\$25.00
Carrying Case for "Previous Style Projector"	Kodak		1	\$50.00
Plastic Pages for Storing Slides			1	\$35.00
Professional Copy Stand for Photographing Letters, Titles and Flat Copy			1	\$150.00
Video Connectors Adaptor Kit			1	\$95.00
Audio Connectors Adaptor Kit			1	\$15.00
Transparency Film			5 Boxes	\$150.00
Plastic Overhead Transparency Mounts, Reusable			1 Pk. of 50	\$20.00
Transfer Letters, 1/8"H, 1/4"H, 1/2"H Characters, Selected Styles			3 sheets Ea	\$40.00
Computer Diskette Holder, 10-100 Disks			1	\$25.00
Video Cassette Tape Rewinder			1	\$100.00
Video Cassette Tape Bulk Eraser			1	\$100.00
Video Title Making Kit w/Magnetic Letters			1	\$110.00
Video Title Letters			1	\$30.00
Recharger Batteries for Video Recorder, 12V, 2Ah	Panasonic	VV-VB302	2	\$75.00
3 Hole Paper Punch, Heavy Duty, Adjustable			1	\$35.00
Portable Sound System	Lectrosonics	VP18R	1	\$400.00
Case for Presentations, To Hold Pads, Etc.			1	\$125.00
Illuminated Slide Sorter, 2' X 3' Approx.			1	\$50.00
Tractor Feed for Epson LQ-1000	Epson		1	\$125.00
Lettering Set	Vrico		1	\$50.00
X-ACTO Knives, Multi Blade Set	X-ACTO	X-5082	1	\$25.00

51

Large Scissor/Shears, 12" Length		1	\$15.00
Paper Cutter, Heavy Duty, 24"		1	\$75.00
Roto-Tray, Pens/Tools Organizer	Roto-Tray	2	\$60.00
Dust Cover Set for IBM-XT, Monitor, Keyboard & Epson FX-105 Printer		1 Ea.	\$40.00
Copy Holder	Rubbersaid	2	\$42.00
Color Coding Labels, 3/4" RD, Radiant Green, & Radiant Red	Grand Sta Dennison Office Bu	1 Ea.	\$3.10
Orator Typing Element for IBM	IBM	1	\$25.00
Diagraph computer Software Package	Comp. Support Diagraph	1 set	\$395.00
Bulb for Apollo OH Projector	Kalart-Victor 14062	5	\$100.00
ELN Bulb for Ektagraphic Projector	GB	5	\$100.00
Lens Cleaning Kit, Brush, Tissue, Cloth, etc.		2	\$25.00
Slide Mounts, Self Seal "Pic Mounts 1000/Box		1 Box	\$50.00
Projector Lamp for Kalart Victor 16MM Projector	Kalart-Victor	3	\$75.00
Projector Lamp for Dukane Micromatic II	DUKANE	4	\$100.00
Take Up Reel for 16MM Projector, 1600' Capacity	Kalart-Victor	1	\$20.00
Projector Stand	Weidt Safelock 203-56	1	\$150.00
Binoculars, 7 x 35	Swift	1	\$75.00
Newsprint Drawing Paper for Easel, 18" x 24"		6	\$120.00
Jumbo Sketch Pad for Easel, 18" x 24"	Morilla 155	6	\$120.00
Accordian Style Collator, Desk Type		2	\$40.00
Paper Trimmer, Roller Type, 18"		1	\$75.00

			\$6010.10

TO BE LOCALLY PROCURED

Video Recording Tape T-180		25	\$250.00
Audio Cassette Tape C-60		20	\$50.00
Audio Cassette Tape C-90		30	\$90.00
Photocopier	Ricoh 5010	1	\$4500.00
Technical Drawing Pens Set, 8 Pen Point Sizes		1	\$50.00
Drafting Triangle Set, 45 x 45 x 90 Degree, 4, 6, 8, 10 Inch Sizes		1	\$20.00
Drafting Triangle Set, 40 x 60 x 90 Degree 4, 6, 8, 10 Inch Sizes		1	\$20.00
French Curve Set, Selected Sizes & Shapes		1	\$20.00
Overhead Projector Pen Set, 4 Color	VIS-A-VIS	3	\$30.00
Visual Aid Pen Set, 8 Color		3	\$30.00
Drafting T-Square, 48"		1	\$30.00

			TOTAL \$5090.00

GRAND TOTAL FOR MEDIA \$11100.10

ADDITIONAL PROCUREMENT TRAINING CENTERS

ITEM No	ITEM DESCRIPTION	QUANTITY TNG. INST.	TOTAL QUANTITY REQUIRED	TOTAL IN US \$
1	5 Bar Extractor, Cat. No. 1600	1	4	2670
2	Connecting Hose for 5 Bar Extractor, Cat. No. 1293	1	4	67
3	Manifold, Cat. No. 790-23	1	4	3171
4	15 Bar Extractor, Cat. No. 1500	1	4	4205
5	Connecting Hose, Cat. No. 1091	1	4	67
6	Connecting Hose, Cat. No. 710	1	4	167
7	PN Compressor, Cat. No. 50064	1	4	5674
8	1 Bar Pressure Plate cell, Cat. No. 1290	4	16	1201
9	3 Bar Pressure Plate Cell, Cat. No. 1690	4	16	1468
10	5 Bar Pressure Plate Cell, Cat. No. 6758ml	4	16	1602
11	15 Bar Pressure Plate Cell, Cat. No. 1590	1	4	400
12	Soil Sample Retainign Ring, Cat. No. 1093	80	320	282
13	Soil Core Sampler, Cat. No. 200	1	4	1035
14	Soil Retainer Assembly, Cat. No. 210	18	72	1203
15	Cylinder Cap, Cat. No. 209	40	160	88
16	Filter Funnel Stand, Cat. No. 1300	1	4	494
17	Retainer, Cat No. 1300-1	5	20	135
18	500 ML Richards Funnel, Cat. No. 1391	5	20	267
19	4 oz. Bottles & Caps, Cat. No. 1397	5	20	16
20	"Quick Draw", Soil Moisture Probe, 18" sz., Mod. No. 2900L18	4	16	3336
21	Replacement Sensing Tip, Mod. No. 2901-2	4	16	113
22	"O" Ring Tip Seal, Mod. No. B01X008	8	32	45
23	Service Kit for "Quick Draw" Soilmoisture Probe, Mod. No. 2900K1	4	16	862
24	Soilmoisture Tensiometer, 6" size, Mod. No. 2710106	8	32	1135
25	Soilmoisture Tensiometer, 12" sz., Mod. No. 2710L12	8	32	1180
26	Soilmoisture Tensiometer, 18" sz., Mod. No. 2719L18	8	32	1226
27	Soilmoisture Tensiometer, 24" sz., Mod. No. 2710L24	8	32	1271
28	Soilmoisture Tensiometer, 36" sz., Mod. No. 2710L36	8	32	1362
29	"O" Ring Cap Seal, Mod. No. 2025-	8	32	45
30	Screw Cap, Mod. No. 2025	8	32	91
31	Vacuum Dial Gauge, 2" Dial, Mod. No. 2060G2	4	16	340
32	Service Kit, Mod. No. 2710E1	4	16	567
33	Mobile Van Adaptions		4	2000
34	VCR tapes (50-60 minutes)		50	500
35	16mm Films		20	3000
TOTAL				46585

Items 1-32 may be purchased from the following company:

Soilmoisture Equipment Corp.
P.O. Box 30025
Santa Barbara
California 93105
Tel. 805-964-3525
Tlx. No. 65-8424

Large Scissor/Shears, 12" Length		1	\$15.00
Paper Cutter, Heavy Duty, 24"		1	\$75.00
Roto-Tray, Pens/Tools Organizer	Roto-Tray	2	\$50.00
Dust Cover Set for IBM-XT, Monitor, Keyboard & Epson FX-105 Printer		1 Ea.	\$10.00
Copy Holder	Rubbermaid	2	\$12.00
Color Coding Labels, 3/4" RD, Radiant Green, & Radiant Red	Grand Sta Dennison Office Bu	1 Ea.	\$3.10
Orator Typing Element for IBM	IBM	1	\$25.00
Digraph computer Software Package	Comp. Support Diagraph	1 set	\$395.00
Bulb for Apollo 0H Projector	Kalart-Victor #4062	5	\$100.00
ELM Bulb for Ektagraphic Projector	GB	5	\$100.00
Lens Cleaning Kit. Brush, Tissue, Cloth, etc.		2	\$25.00
Slide Mounts, Self Seal "Pic Mounts 1000/Box		1 Box	\$50.00
Projector Lamp for Kalart Victor 16MM Projector	Kalart-Victor	3	\$75.00
Projector Lamp for Dukane Micromatic II	DUKANE	4	\$100.00
Take Up Reel for 16MM Projector, 1600' Capacity	Kalart-Victor	1	\$20.00
Projector Stand	Veldt Safelock 203-56	1	\$150.00
Binoculars, 7 x 35	Swift	1	\$75.00
Newsprint Drawing Paper for Easel, 18" x 24"		6	\$120.00
Junior Sketch Pad for Easel, 18" x 24"	Morilla #55	6	\$120.00
Accordian Style Collator, Desk Type		2	\$40.00
Paper Trimmer, Roller Type, 18"		1	\$75.00

\$6010.10

TO BE LOCALLY PROCURED

Video Recording Tape T-180		25	\$250.00
Audio Cassette Tape C-60		20	\$50.00
Audio Cassette Tape C-90		30	\$90.00
Photocopier	Ricoh 5010	1	\$4500.00
Technical Drawing Pens Set, 8 Pen Point Sizes		1	\$50.00
Drafting Triangle Set, 45 x 45 x 90 Degree, 4, 6, 8, 10 Inch Sizes		1	\$20.00
Drafting Triangle Set, 40 x 60 x 90 Degree, 4, 6, 8, 10 Inch Sizes		1	\$20.00
French Curve Set, Selected Sizes & Shapes		1	\$20.00
Overhead Projector Pen Set, 4 Color	VIS-A-VIS	3	\$30.00
Visual Aid Pen Set, 8 Color		3	\$30.00
Drafting T-Square, 48"		1	\$30.00

TOTAL \$5090.00

GRAND TOTAL FOR HBIDA \$11100.10

LOCAL PROCUREMENT - SIND INSTITUTE (IN RUPEES).

ITEM No	COMMODITY DESCRIPTION	TOTAL COST
3	Ring Infiltrometer (set of 3) 4 Nos.	5000
4	Steel Backs 4 Nos.	6000
7	Flumes 10 Nos.	6000
TOTAL		

HAJISONS

ITEMS FOR D.I. KHAN

<u>CATEGORY - 7</u>	<u>NO.</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
46. Driving plate	2	Rs.270	Rs. 540
47. Driving hammer	2	630	1,260
49. Augers	4	770	3,080
53. Plumber bobs	5	15	75
56. Cube test block forms	3	1,400	4,200
57. Spade	10	47	470
59. Iron pans	20	43	860
60. Sieves	5	700	3,500
61. Sieves	5	700	3,500
64. Shovels	10	57	570
65. Ma son's spirit level	10	95	950
67. Brushes	10	37	370
68. Ma son's float (wooden handle)	10	44	440
69. Ma son's float(steel plate, wooden handle)	10	57	570
71. Buckets (galvanized)	8	43	344
72. Buckets (plastic)	10	37	370
73. Sand Screen	5	970	4,850
74. Gorea aggrevated screen	5	700	3,500
75. Tampers	10	900	9,000
76. Troughs	1	1,300	1,300
77. Measuring box	2	1,300	2,600
84a. Hammers	9	15	135
84b. Saws	9	37	333
84d. Screw drivers	15	23	345
84f. Hoes	15	13	195

Sub Total Rs.43,357.00 C/F

62

HAJISONS

<u>CATEGORY - 7</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>B/F</u>	<u>AMOUNT</u>
84g. Brush cutters	15	Rs.140		Rs.43,357 Rs.2,100
84h Line chalk	5	37		185
84i Wire cutters	15	45		675
84j Tin snips	15	40		600
85a Soldering irons	10	70		700
85b Blow torch	2	179		358
85e Pipe threader	2	900		1,800
85f Wrench pipe	2	269		538
85h Hacksaw	2	35		70
85i Vice grips	2	89		178
85j Hammers	2	44		88
85k Crescent wrench	2	89		178
85l Tool boxes	2	350		700
85m Pipe vise	2	470		940
85n Branch vise	1	389		389
86a Screw drivers	2	189		378
86b Pliers needle nose	4	35		140

Grand Total Rs.53,374.00

63

HAJISONS

ITEMS FOR SIND, SAKHRAND

<u>CATEGORY</u> /	<u>NO.</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
46. Driving plate	2	Rs.270	Rs. 540
47. Driving hammer	2	630	1,260
49. Augers	4	770	3,080
53. Plumber bobs	5	15	75
56. Cube test block forms	3	1,400	4,200
57. Spade	10	47	470
59. Iron pans	20	43	860
60. Sieves	5	700	3,500
61. Sieves	5	700	3,500
64. Shovels	10	57	570
65. Mason's spirit level	10	95	950
67. Brushes	10	37	370
68. Mason's float (wooden handle)	10	44	440
69. Mason's float(steel plate, wooden handle)	10	57	570
71. Buckets (galvanized)	8	43	344
72. Buckets (plastic)	10	37	370
73. Sand Screen	5	970	4,850
74. Gorea aggravated screen	5	700	3,500
75. Tampers	10	900	9,000
76. Troughs	1	1,300	1,300
77. Measuring box	2	1,300	2,600
84a. Hammers	9	15	135
84b. Saws	9	37	333
84d. Screw drivers	15	23	345
84f. Hoes	15	13	195

Sub Total Rs.43,357.00 C/F

HAJISONS

<u>CATEGORY - 7</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>B/F</u>	<u>AMOUNT</u>
84g. Brush cutters	15	Rs.140		Rs.43,357 Rs.2,100
84h Line chalk	5	37		185
84i Wire cutters	15	45		675
84j Tin snips	15	40		600
85a Soldering irons	10	70		700
85b Blow torch	2	179		358
85e Pipe threader	2	900		1,800
85f Wrench pipe	2	269		538
85h Hacksaw	2	35		70
85i Vice grips	2	89		178
85j Hammers	2	44		88
85k Crescent wrench	2	89		178
85l Tool boxes	2	350		700
85m Pipe vise	2	470		940
85n Branch vise	1	389		389
86a Screw drivers	2	189		378
86b Pliers needle nose	4	35		140

Grand Total Rs.53,374.00

65

HAJISONS

ITEMS FOR LAHORE

<u>CATEGORY - 7</u>	<u>NO.</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
46. Driving plate	2	Rs.270	Rs. 540
47. Driving hammer	2	630	1,260
49. Augers	4	770	3,080
53. Plumber bobs	5	15	75
56. Cube test block forms	3	1,400	4,200
57. Spade	10	47	470
59. Iron pans	20	43	860
60. Sieves	5	700	3,500
61. Sieves	5	700	3,500
64. Shovels	10	57	570
65. Ma: son's spirit level	10	95	950
67. Brushes	10	37	370
68. Ma: son's float (wooden handle)	10	44	440
69. Ma: son's float(steel plate, wooden handle)	10	57	570
71. Buckets (galvanized)	8	43	344
72. Buckets (plastic)	10	37	370
73. Sand Screen	5	970	4,850
74. Gorea aggrevated screen	5	700	3,500
75. Tampers	10	900	9,000
76. Troughs	1	1,300	1,300
77. Measuring box	2	1,300	2,600
84a. Hammers	9	15	135
84b. Saws	9	37	333
84d. Screw drivers	15	23	345
84f. Hoes	15	13	195

Sub Total Rs.43,357.00 C/F

HAJISONS

<u>CATEGORY - 7</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>B/F</u>	<u>AMOUNT</u>
84g. Brush cutters	15	Rs.140		Rs.43,357 Rs.2,100
84h Line chalk	5	37		185
84i Wire cutters	15	45		675
84j Tin snips	15	40		600
85a Soldering irons	10	70		700
85b Blow torch	2	179		358
85e Pipe threader	2	900		1,800
85f Wrench pipe	2	269		538
85h Hacksaw	2	35		70
85i Vice grips	2	89		178
85j Hammers	2	44		88
85k Crescent wrench	2	89		178
85l Tool boxes	2	350		700
85m Pipe vise	2	470		940
85n Branch vise	1	389		389
86a Screw drivers	2	189		378
86b Pliers needle nose	4	35		140

Grand Total Rs.53,374.00

HAJISONS

ITEMS FOR QUETTA

<u>CATEGORY - 7</u>	<u>NO.</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
46. Driving plate	2	Rs.270	Rs. 540
47. Driving hammer	2	630	1,260
49. Augers	4	770	3,080
53. Plumber bobs	5	15	75
56. Cube test block forms	3	1,400	4,200
57. Spade	10	47	470
59. Iron pans	20	43	860
60. Sieves	5	700	3,500
61. Sieves	5	700	3,500
64. Shovels	10	57	570
65. Mason's spirit level	10	95	950
67. Brushes	10	37	370
68. Mason's float (wooden handle)	10	44	440
69. Manson's float(steel plate, wooden handle)	10	57	570
71. Buckets (galvanized)	8	43	344
72. Buckets (plastic)	10	37	370
73. Sand Screen	5	970	4,850
74. Gorea aggravated screen	5	700	3,500
75. Tampers	10	900	9,000
76. Troughs	1	1,300	1,300
77. Measuring box	2	1,300	2,600
84a. Hammers	9	15	135
84b. Saws	9	37	333
84d. Screw drivers	15	23	345
84f. Hoes	15	13	195

Sub Total Rs.43,357.00 C/F

HAJISONS

<u>CATEGORY - 7</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>B/F</u>	<u>AMOUNT</u>
84g. Brush cutters	15	Rs.140		Rs.43,357
84h Line chalk	5	37		Rs.2,100
84i Wire cutters	15	45		185
84j Tin snips	15	40		675
85a Soldering irons	10	70		600
85b Blow torch	2	179		700
85e Pipe threader	2	900		358
85f Wrench pipe	2	269		1,800
85h Hacksaw	2	35		538
85i Vice grips	2	89		70
85j Hammers	2	44		178
85k Crescent wrench	2	89		88
85l Tool boxes	2	350		178
85m Pipe vise	2	470		700
85n Branch vise	1	389		940
86a Screw drivers	2	189		389
86b Pliers needle nose	4	35		378

Grand Total Rs.53,374.00

PIRZADA ABDUL QAYYUM & SONSITEMS FOR LAHORE

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
15. Chairs	150	Rs. 500	Rs.75,000.00
16a Tables calssroom	20	1,350	27,000.00
16b Tables classroom	10	1,200	12,000.00
17 Chairs classroom	30	350	10,500.00
40 Tea carts	2	800	1,600.00
 <u>CATEGORY - 2</u>			
1a Map set	1	150	150.00
1b Map set	1	150	150.00
1c Map set	1	50	50.00
 <u>CATEGORY - 4</u>			
7 & 30 Storage cabinets	10	3,200	32,000.00
10 Filing cabinets	6	1,500	9,000.00
12 Stand projector	2	1,000	2,000.00
 <u>CATEGORY - 5</u>			
34b Refrigerator	2	14,000	28,000.00
35 Cooking stove	1	550	550.00
			Sub Total Rs.198,000.00

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR LAHORE

<u>CATEGORY - 6</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>	
		Brought forward	Rs. 198,000.00	
37	Cups/saucers	60	Rs. 260 per dozen	1,299.60
38	Teas spoons	120	70 per dozen	699.60
39	Tea kettles	4	500	2,000.00
41	Tea pots	15	220	3,300.00
42	Sugar bowls	15	-	-
43	Thermos jugs	5	180	900.00

CATEGORY - 7

58	Picks	10	75	750.00
62	Trovels	20	30	600.00
63	Wheel barrow	4	475	1,950.00
82	Trolleys	2	475	950.00
83	Hand compactors	30	150	4,500.00
84c	Pulers	15	175	2,625.00
84e	Pakes	15	55	825.00
87	Extension cord	5	150	750.00
88	Extension cord	6	440	2,640.00

Grand Total Rs. 223,088.80

PIRZADA ABDUL QAYYUM & BROS

ADDITIONAL ITEMS
FOR LAHORE INSTITUTE

<u>CATEGORY - 1</u>	<u>NO</u>	<u>RATE PER UNIT</u>	<u>TOTAL</u>
<u>ITEM</u>			
15 Chairs, folding	100	Rs.500.00	Rs.50,000
16a Tables, classroom	20	Rs.1,350.00	Rs.27,000
17 Chairs, classroom	30	Rs.350.00	Rs.10,500
 <u>CATEGORY - 4</u>			
7 & 30 Storage cabinets	10	Rs.3,200.00	Rs.32,000
10 Filing cabinets	2	Rs.1,500.00	Rs. 3,000
 <u>CATEGORY - 5</u>			
34-a Water heaters		Rs.1,600.00	Rs. 6,400
 <u>CATEGORY - 6</u>			
37 Cups/saucers	40	Rs.20.00	Rs. 800
43 Dinner service sets	40	Rs.300.00	Rs.12,000
 TOTAL			 Rs.141,700 =====

BEST AVAILABLE COPY

72

PIRZADA ABDUL QAYYUM & SONSITEMS FOR QUETTA

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
15. Chairs	150	Rs.500	Rs.75,000.00
16a Tables classroom	40	1,350	54,000.00
16b Tables classroom	15	1,200	18,000.00
17. Chairs classroom	60	350	21,000.00
40. Tea carts	2	800	1,600.00
 <u>CATEGORY - 2</u>			
1a Map sets	1	150	150.00
1b Map sets	1	150	150.00
1c Map set	1	50	50.00
 <u>CATEGORY - 4</u>			
7 & 30 Storage cabinets	14	3,200	44,800.00
10. Filing cabinets	8	1,500	12,000.00
12. Stand Projector	2	1,000	2,000.00
 <u>CATEGORY - 5</u>			
34a. Water heater	4	1,600	6,400.00
34b Refrigerator	2	14,000	28,000.00
35. Cooking stove	1	550	550.00
			<hr/>
Sub Total			Rs.263,700.00

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR QUETTA

<u>CATEGORY - 6</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
		Brought forward	Rs.263,700.00
37. Cups/saucers	20	Rs.260 per dozen	433.20
38. Teaspoons	100	70 per dozen	583.20
39. Tea kettles	4	500	2,000.00
41. Tea ports	10	220	2,200.00
42. Sugar bowls	10	-	-
43. Thermos jugs	5	180	900.00
 <u>CATEGORY - 7</u>			
58. Picks	10	75	750.00
62. Trovels	20	30	600.00
63. Wheel barrow	4	475	1,900.00
82. Trolleys	2	475	950.00
83. Hand compactors	30	150	4,500.00
84c Rulers	15	175	2,625.00
84e Rakes	15	55	825.00
87. Extension cord	5	150	750.00
88. Extension cord	6	440	2,640.00
		Grand Total	Rs.285,356.20

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR FEDERAL CELL, ISLAMABAD

<u>CATEGORY - 4</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
7 & 30 Storage cabinets	2	Rs.3,200	Rs. 6,400.00
10 Filing cabinet	2	1,500	3,000.00
12 Stand projector	1	1,000	1,000.00

<u>CATEGORY - 6</u>			
38 Tea spoons	20	70 per dozen	116.60
41 Tea pots	5	220	1,100.00
42 Sugar bowls	5	-	-

Total Rs.11,616.60

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR SIND INSTITUTE, SAKHRAND

<u>CATEGORY - 9</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
24. Divenport	1	Rs.3,500	Rs.3,500.00
25. Easy chairs	3	1,000	3,000.00
26. Coffee tables	2	700	1,400.00
27. Side tables	2	800	1,600.00
			Total Rs. 9,500.00

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR SIND INSTITUTE, SAKHRAND

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
15. Chairs	150	Rs. 500	Rs.75,000.00
16a Tables classroom	40	1,350	54,000.00
16b Tables classroom	15	1,200	18,000.00
17. Chairs, classroom	60	350	21,000.00
40. Tea carts	2	800	1,600.00
 <u>CATEGORY - 2</u>			
1a. Map sets	1	150	150.00
1b. Map sets	1	150	150.00
1c. Map sets	1	50	50.00
 <u>CATEGORY - 4</u>			
7 & 30 Storage cabinets	24	3,200	76,800.00
10. Filing cabinets	8	1,500	12,000.00
12. Stand, Projector	2	1,000	2,000.00
 <u>CATEGORY - 5</u>			
34a. Water heater	4	1,600	6,400.00
34b. Refrigerator	2	14,000	28,000.00
35 Cooking stove	1	550	550.00
Sub Total			Rs.295,700.00

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR SIND INSTITUTE, SAKHRAND

<u>CATEGORY - 6</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
		Brought Forward	Rs.295,700.00
37. Cups/saucers	80	Rs.260 per dozen	1,732.80
38. Teaspoons	120	Rs.70.00 per dozen	699.60
39. Tea kettles	4	500	2,000.00
41. Tea pots	15	220	3,300.00
42. Sugar bowls	15	-	-
43. Thermos jugs	5	180	900.00
44. Dinner service sets	30	1,800 (per six)	9,000.00

CATEGORY - 7

58. Picks	10	Rs.75	750.00
62. Trovels	20	30	600.00
63. Wheel barrow	4	475	1,900.00
82. Trolleys	2	475	950.00
83. Hand compactors	30	150	4,500.00
84c. Rulers	15	175	2,625.00
84e. Files	15	55	825.00
87. Extension cord	5	150	750.00
88. Extension cord	6	440	2,640.00

CATEGORY - 8

13. Ceiling fans	5	650	3,250.00
------------------	---	-----	----------

Grand Total Rs. 332,122..00

18

PIRZADA ABDUL QAYYUM & SONS
ITEMS FOR SIND INSTITUTE, SAKHRAND

<u>CATEGORY - 9</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
24. Davenport	1	Rs.3,500	Rs.3,500.00
25. Easy chairs	3	1,000	3,000.00
26. Coffee tables	2	700	1,400.00
27. Side tables	2	800	1,600.00
			Total Rs. 9,500.00

FIRZADA ABDUL QAYYUM & SONS
ITEMS FOR PESHAWAR AND D. I. KHAN

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
15. Chairs	150 D.I.Khan	Rs. 500	Rs.75,000.00
16a Tables classroom	25 D.I.Khan	1,350	38,250.00
16b Tables classroom	15 D.I.Khan	1,200	18,000.00
17. Chairs classroom	50 D.I.Khan	350	17,500.00
40. Tea carts	2 D.I.Khan	800	1,600.00
 <u>CATEGORY - 2</u>			
1a Map sets	1 D.I.Khan	150	150.00
	1 Peshawar	150	150.00
1b Map sets	1 D.I.Khan	150	150.00
	1 Peshawar	150	150.00
1c. Map set	1 D.I.Khan	50	50.00
	1 Peshawar	50	50.00
 <u>CATEGORY - 4</u>			
7 & 30 Storage cabinets	24 D.I.Khan	3,200	76,800.00
10. Filing cabinets	8 D.I.Khan	1,500	12,000.00
12. Stand Projector	2 D.I.Khan	1,000	2,000.00
 <u>CATEGORY - 5</u>			
34a Water heater	8 D.I.Khan	1,600	12,800.00
34b Refrigerator	2 D.I.Khan	14,000	28,000.00
35. Cooking stove	1 D.I. Khan	550	550.00
Sub Total			Rs.283,050.00

PIRZADA ABDUL QAYYUM & SONSITEMS FOR D. I. KHAN

<u>CATEGORY - 6</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
		Brought forward	Rs. 283,050.00
37. Cups/saucers	80 D.I.Khan	Rs. 260 per dozen	1,732.80
38. Teaspoons	120 D.I.Khan	70 per per dozen	699.60
39. Tea kettles	4 D.I.Khan	500	2,000.00
41. Tea pots	15 D.I.Khan	220	3,300.00
42. Sugar bowls	15 D.I.Khan	-	-
43. Thermos jugs	5 D.I.Khan	180	900.00
44. Dinner service sets	30 D.I.Khan	1,800	9,000.00
<u>CATEGORY - 7</u>			
58. Ticks	10 D.I.Khan	75	750.00
62. Trowels	20 D.I.Khan	30	600.00
63. Wheel barrow	4 D.I.Khan	475	1,900.00
82. Trolleys	2 D.I.Khan	475	950.00
83. Hand compactors	30 D.I.Khan	150	4,500.00
87. Extension cord	5 D.I.Khan	150	750.00
88. Extension cord	6 D.I. Khan	440	2,640.00
<u>CATEGORY - 8</u>			
13. Ceiling fans	5 D.I.Khan	650	3,250.00
		Grand Total	Rs. 316,022.40

PIRZADA ABDUL QAYYUM & SONS

ITEMS FOR D. I. KHAN

<u>CATEGORY - 9</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
24. Davenport	1	Rs.3,500	Rs. 3,500.00
25. Easy chairs	3	1,000	3,000.00
26. Coffee tables	2	700	1,400.00
27. Side tables	2	800	1,600.00

Total Rs. 9,500.00

BEST AVAILABLE COPY

82

AZIZ & COMPANY

ITEMS FOR FEDERAL CELL, ISLAMABAD

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
3. Table, computer	3	Rs.3,000	Rs.9,000
11. Table typing	2	1,200	2,400
			<hr/>
			Total Rs.11,400

BEST AVAILABLE COPY

87

AZIZ & COMPANY

ITEMS FOR LAHORE, MULTAN

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
3. Table computer	3 Lahore) 1 Multan)	Rs.3,000	Rs.12,000
4. Instructors desks	3 Lahore	2,500	7,500
8. Office chairs	3 Lahore	1,500	4,500
11. Table typing	2 Lahore	1,200	2,400
<u>CATEGORY - 3</u>			
6. Bulletin boards	6 Lahore	2,500	15,000
<u>CATEGORY - 8</u>			
14. Desk lamps	10 Lahore	125	1,250
28. Lamp reading, table top	5 Lahore	100	500
Total:			Rs.43,150

BEST AVAILABLE COPY

84

AZIZ AND COMPANY

ADDITIONAL ITEMS
FOR LAHORE INSTITUTE

<u>CATEGORY 1</u>	<u>NO.</u>	<u>RATE PER UNIT</u>	<u>TOTAL</u>
ITEM			
4. Instructors desks	3	Rs.2,500	Rs.7,500.00
8. Office chairs	3	Rs.1,500	Rs.4,500.00
9. Side chairs	6	Rs.2,200	Rs.13,200.00
11. Typing tables	2	Rs.1,200	Rs.2,400.00

CATEGORY - 3

ITEM			
3. Chalk boards	1	Rs.2,500	Rs.2,500.00

CATEGORY 8

ITEM			
14. Desk lamps	15	Rs.125	Rs.1,875.00
20. Transformer	1	Rs.10,000	Rs.10,000.00
Heating colling system gas wall heaters	3	Rs.1,500	Rs.4,500.00
		
			Rs.46,475.00
			=====

AZIZ AND SONS
ITEMS FOR QUETTA

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
3. Computer tables	2	Rs. 3,000	Rs. 6,000.00
4. Instructors' desks	4	2,500	10,000.00
8. Office chairs	4	1,500	6,000.00
11. Table typing	2	1,200	2,400.00
 <u>CATEGORY - 3</u>			
6. Bulletin boards	6	2,500	15,000.00
14. Desk lamps	10	125	1,250.00
20. Transformers	2	10,000	20,000.00
28. Lamps, reading, table top	5	100	500.00
			<hr/>
Total			61,150.00

BEST AVAILABLE COPY

86

AZIZ AND SONS

ITEMS FOR PESHAWAR AND D.I. KHAN

<u>CATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
3. Table computer	1 Peshawar) 1 D.I. Khan)	Rs.3,000.00	Rs. 6,000.00
4. Instructors desks	7 D.I. Khan	2,500.00	17,500.00
8. Office chairs	7 D.I. Khan	1,500.00	10,500.00
9. Side chairs	5 D.I.Khan	2,200.00	11,000.00
11. Table typing	2 D.I. Khan) 1 Peshawar)	1,200.00	3,600.00
<u>CATEGORY - 3</u>			
5. Chalk boards	6 D.I.Khan	2,500.00	15,000.00
6. Buleetin boards	6 D.I. Khan	2,500.00	15,000.00
<u>CATEGORY - 8</u>			
14. Desk lamps	10 D.I. Khan	125	1,250.00
18. Lighting fixtures	20 D. I. Khan	125	2,500.00
19. Spare bulbs	10 D.I. Khan	40 40	400.00
20 Transformer	1 D.I. Khan	10,000.00	10,000.00
28.Lamp reading	5 D. I. Khan	100	500.00
			<hr/> Rs.93,250.00

AZIZ AND SONS

ITEMS FOR SIND INSTITUTE, SAKRAND

<u>GATEGORY - 1</u>	<u>NO</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
3. Computer tables	2	Rs.3,000.00	Rs.6,000.00
4. Instructors desks	8	2,500.00	20,000.00
8. Office chairs	8	1,500.00	12,000.00
9. Side chairs	6	2,200.00	13,200.00
11. Table typing	2	1,200.00	2,400.00

CATEGORY - 2

5. Chalk boards	6	2,500.00	15,000.00
6. Bulletin boards	6	2,500.00	15,000.00

CATEGORY - 8

14. Desk lamps	10	650.00	6,500.00
18. Lighting fixtures (Wall mounted, not hanging)	20	125.00	2,500.00
20. Transformers	- Will provide detailed spces at later time		
28. Lamp reading	5	100.00	500.00

TOTAL: Rs.96,350.00

88

EQUIPMENT FOR TRAINING AND DEMONSTRATION FARM

The following are the major pieces of equipment being distributed to the Training and Demonstration Farms in the Provinces of Sind, Baluchistan, Punjab, NWFP:

Type of Equipment

Disc Harrow

Rotavator 60"

Ridger

Seed-cum-Fertilizer Drill

Planter (Kharif)

Sprayer (Power)

Reaper Binder

Bar Harrow

Cultivator (13 Tines)

Rotary Ditcher

Chiesel Plough (3 Tines)

Sub-Soiler

Border Disk

ga

COMPUTER DISTRIBUTION TO CENTERS

Hyderabad	02
Quetta	02
Lahore	03
Multan	01
D. I. Khan	01
Peshawar	01
Islamabad	05

PHOTOCOPIERS DISTRIBUTION TO CENTERS

OFWM Federal Cell	02
OFWM Directorate for Punjab, Lahore	01
OFWM Punjab Training Institute, Lahore	01
OFWM Directorate, Hyderabad, Sind	01
OFWM Training Institute, Sind Agricultural University, Tando Jam.	02
OFWM Directorate, Quetta	01
OFWM Training Center, A.T.I., Quetta	02
OFWM Training Center for D.I. Khan	02

MONTHLY STATUS REPORT ON PROCUREMENT

PURCHASE ORDER NO.	DATE OF PURCHASE ORDER	SUPPLIER	ITEM CATEGORY	PURCHASE ORDER EX-FACTORY VALUE	ESTIMATED SHIPPING DATE TO WAREHOUSE	ARRIVAL WAREHOUSE
0728	6/26/86	Capitol Electric Motor Repair	Generators	61,000.38	11/1/86	12/12/86 1/5/87
0731	5/29/86	Minolta Corporation	Camera	237.09		8/5/86-M
0735	6/13/86	Business Computing International Inc.	Computer hardware and software	18,582.40		
0690	6/3/86	General Binding Corporation	Bindings	1,006.60		8/5/86-M
0734	6/11/86	MAP, Inc.	Caps	3,689.00		8/5/86-M
0739	7/23/86	National Information Center for Educational Media	Film/video catalogue	305.00	11/30/86	2/11/87-
350-00	8/29/86	NASCO	Audio visual aids	1,126.30		
350-01	9/18/86	General Binding Corporation	Bindings	231.52		

MONTHLY STATUS REPORT ON PROCUREMENT

PURCHASE ORDER NO.	DATE OF PURCHASE ORDER	SUPPLIER	ITEM CATEGORY	PURCHASE ORDER EX-FACTORY VALUE	ESTIMATED SHIPPING DATE TO WAREHOUSE	ARRIVAL AT WAREHOUSE
350-02	11/7/86	Maryland Book Exchange	Books-SPR	1,054.00		11/17/86
350-03	11/19/86	American Overseas Book Co.	Book-SPR	71.80		12/21/86
350-04	11/21/86	Soiltest, Inc.	Transit	235.00		12/9/86
350-05	11/23/86	University Microfilms In'l	Book reproduction-SPR	100.25		12/11/86
350-06	11/86	AI Mentor Inc.	Software	104.50		
350-07	12/2/86	Am.Ov.Book Co.	Book-Anisa	55.41		12/23/86
350-08	12/11/86	Utah State U	Video tapes	4,890.00		12/86
350-09	12/23/86	Eastman Kodak	Data Shows	4,765.00	2/20/87	3/4/87
350-10	1/12/87	Am.Ov.Book Co.	Books-Library	393.45	2/26/87	3/4/87
350-11	1/30/87	Individual Software, Inc.	Software Proj.Man.	73.45	2/27/87	2/26/87
350-12	2/9/87	ANR Publications	Books/Irrigation Brochures	778.50	3/6/87	3/87

93

MONTHLY STATUS REPORT ON PROCUREMENT

PURCHASE ORDER NO.	DATE OF PURCHASE ORDER	SUPPLIER	ITEM CATEGORY	PURCHASE ORDER EX-FACTORY VALUE	ESTIMATED SHIPPING DATE TO WAREHOUSE	ARRIVAL AT WAREHOUSE
IFB-391-0413-02	1/8/87	Scientific Instruments Inc.	Water Current Measuring Equip.	27,603.75	4/14/87	4/20/87
IFB-391-0413-02	1/8/87	Horizon Trading Co.	Agronomic Equipment	103,980.00	4/30/87	4/3/87 4/13/87 (partial)
350-13	2/26/87	World of Computers	Computer Accessories	128.95	4/17/87	
350-14	2/27/87	Prince Georges Office Supply	Office Supplies	474.95		3/87
350-15	3/4/87	International Film Bureau	16 MM Films Soil	1,875.00		3/31/87
350-16	3/7/87	Computer Support Corp.	Diagraph Software	395.00		3/87
350-17	3/10/87	Lake Company	Irrigation System Parts	1,829.76 (CIF)		
350-18	3/24/87	Minolta Corp.	Camera, lens flash	530.11	4/30/87	4/3/87 4/14/87
350-19	4/2/87	American Overseas Book Co.	Periodicals	Unfinalized	5/30/87	

94

SHELADIA ASSOCIATES, INC.

Page 5
Date: April

MONTHLY STATUS REPORT ON PROCUREMENT

PURCHASE ORDER NO.	DATE OF PURCHASE ORDER	SUPPLIER	ITEM CATEGORY	PURCHASE ORDER EX-FACTORY VALUE	ESTIMATED SHIPPING DATE TO WAREHOUSE	ARRIVAL AT WAREHOUSE
350-20	4/7/87	Horizon Trading Co.	Office/Drafting/Survey Equip.	12,722.00	5/25/87	
350-21	4/13/87	Metropolitan Audio Visual	Media Equipment	3,019.00	5/25/87	
350-22	4/14/87	American Concrete Inst.	Book	74.25		
350-23	4/24/87	Esterline Angus Instrument Co.	Chart Recorders	52,937.55	6/15/87	
350-24	4/27/87	College Park Boat & RV Center	Boats/Equip.	4,691.11	5/29/87	
350-25	4/27/87	Appropriate Technology Project	Books	191.91		5/87
350-26	4/30/87	Rubbermaid Com. Products	Copyholder	33.00		5/15/87

PROCUREMENTS FOR OTHER PROJECTS

FOOD SECURITY MANAGEMENT PROJECT

U.S. Procurement:	<u>Quantity</u>
IBM-PC-AT Xomputer with accessories	15

COMMAND WATER MANAGEMENT PROJECT

Enhanced IBM-PC/AT Model 339 with	01
Toshiba 360K DsDD Drive B	01
INTEL 80287-8 Math Compressor	01
INTEL above board at FS installed with 4MB of 256-120 chips	01
Paradise Auto Switch EGA Card	01
NEC Multisync 14 Inches Monitor	01
Elgar 1000 Watt UPS	01
Toshiba T1100 Plus Laptop Computer	05
External 5.25 inches 360KB DSDD Disk Drive (TOSHIBA)	08
HEWLETT Packard Laser Jett 11 Printer	01
EPSON LQ 2500 Dot Matrix Printers with Cable	01
HEWLETT Packard Thinkjet Portable battery operated Printers and appropriate interfaces and cables for the TOSHIBA T1100 Portable LAP Computer	03
Elgar 1000 Watt UPS	01

<u>Field Equipment</u>	CWMP Cont....
Chest waders	02
Soil Auger	28
Soil Probe	28
Tensiometer	28
Bulk Density Sand Cone Meas.Kit (Except Scales)	28
Volumeter	28
Infiltrometer kit	28
Soil Moisture Tester	28
Gypsum Blocks	28
FH Meter	28
Vane tester	28
Soil Color set	28
Soil Sieve set	08
Pan Evaporation set	08
Rain Guage	08
Ammonia Printing Machine	01
Drafting machine	01
Landau Jon Boat	05
LOadrite Trailor	03
Anchor	03
Anchor line	05
DAR Locks	05
DARS	10
Truck Rack	02
Life vest	05
Current meter set	08
Mini Current meter	08
Wading Rod 1	04
Wading Rod 2	04
Stop Watch	08
Thermometer	08
Sounding Reel	05
Scale in Bulk Density Meas. Kit	
Pocket Penetrometer	
Telescope Alidade.	

Locally Procured Equipment

Pantographs	04
Binoculars	02
Binoculars	01
Binoculars	01
Planimeter	01
Planimeters	03
Survey Compass	02

OFWMP SUPPLEMENTARY PURCHASES

Tensiometer 6 inches	32
Tensiometer 12 inches	32
Tensiometer 18 inches	32
Tensiometer 24 inches	32
Tensiometer 36 inches	32
Set of Replacement cap + seals	16
Soil moisture probe. with Replacement	16
TIP, 2 Replacement seals and service kits.	

A

A P P E N D I X B

END OF TOUR REPORTS - LONG TERM ADVISORS



END OF TOUR REPORT
TRAINING SPECIALIST (CHIEF OF PARTY)
ROBERT W. SMAIL

1. Specialist arrived in Pakistan on June 18, 1984, and was domiciled in Karachi, with duty station Hyderabad until May 9, 1985. At that time assumed additional responsibility as Chief of Party, and commuted between Karachi and Islamabad on weekly basis. Moved to Islamabad November 1985, and remained in Islamabad until departure from Pakistan on July 1, 1987.

2. Responsibilities and accomplishments - Training Specialist:

a. During the first week on duty performed a study of percentage of field nominations for U.S. Training which successfully made it through the system to point of departure. Discovered several problems:

-Provincial Agriculture and P&D Departments

(a) frequently substituted non-OFWMP candidates for those nominated from field.

(b) frequently did not forward nominations in time to meet course deadlines.

Solutions: - USAID provided special training opportunities for non OFWMP personnel

- Sending announcements directly to field shortened the GOP processing time.

b. Prepared needs assessment for In Country Training of OFWMP personnel. This resulted in identifying the need for Provincial O.F.W.M.P. Training Centers, Institutes.

c. Wrote PC-1's for three Training Centers/Institutes in Baluchistan, NWFP and Sind Provinces.

Negotiated with World Bank Agricultural Expert on coordinated USAID/WB support to the Centers/Institutes.

d. Selected and negotiated sites for Centers/Institutes in Sind and N.W.F.P.

19

- e. Prepared equipment, furnishing lists for 4 Centers/Institutes and Federal Cell. Backstopped Short Term Expert who wrote specifications for equipment.
 - f. Prepared Task Orders and provided logistical support for 12 National Training Courses in O.F.W.M.P. subjects, and supported 4 National M.I.S. Training Courses, plus local and regional training.
 - g. Developed 5 year National Training Plan for O.F.W.M.P.
 - h. Developed specifications for and procured locally equipment and furnishings for 4 Training Centers and the Federal Cell.
 - i. Conducted in-service Training Program for staff members at Sind Institute, ATI Quetta, Punjab Institute, and minimally, N.W.F.P.
 - j. Prepared annual program announcements for FY 1985, 86, 87 and 88 U.S. Participant Training Program, based on 5 year plan.
3. Accomplishments as Chief of Party - 1985-1987.
- a. Reorganized office/reporting procedures.
 - b. Prepared some 50 Task Orders for short term T.A., both U.S. and local.
 - c. Prepared procurement R.F.P., reviewed bids, and let contracts for local procurement of equipment and furnishings, CWM procurement, M.I.S. procurement, Training Demonstration Farm Procurement, supervised and signed sub-contracts for three studies: Canal Roads, Sociological Impact, Status of Precision Land Levelling.
 - d. Prepared technical proposal leading to doubling level of effort of SAI contract; prepared PC-1 for Federal Cell to implement final year of contract.
 - e. Initiated proposals leading to:
 - (1) Quarterly coordinating meetings of Project Officials/Donors.
 - (2) Publications policy coordinating committee.

- f. Provided program coordination and guidance to seven long term technical assistance personnel.
- g. Represented the Consultant at National and Institutional meetings such as S.A.A.R.C. conference, Farmer Field Days, etc.

LESSONS LEARNED

1. Institutional development in a Project which is emerging into a regular governmental department requires leadership, a doctrine which is reasonable and acceptable to both enabling and sustaining entities, a program which serves the clientele, and resources which enable the institution to continue to function. Shortly after the Training Specialist became Chief of Party, the leadership of the O.F.W.M.P. changed. New initiatives changed programs and policies. Relationships between the Federal Cell and the Provinces were greatly strengthened through several actions: Releasing of seven million Dollars to the Provinces to strengthen their field activities; frequent coordinating meetings between Federal Cell and Provincial Directorates, improved service in respect to Training, Publications and Federal support of Provincial activities such as requests for engineering services, farmer field days, inauguration of new water courses all served to strengthen the institutionality of the project.

Recent efforts to reach and train Water Users Association Chairman have had a secondary effect of publicizing the work of the project and, incidentally, of improving the projects' image with the sustaining agencies of the National Assembly and Provincial Assemblies - many of the W.U.A. Chairmen receiving training being members of the above bodies. In the final analysis, at least 50% of the success of the project is the result of enlightened leadership from both the GOP and USAID.

2. In line agencies in Pakistan, field personnel receive such perquisites as housing allowance, transportation etc. It is difficult for field personnel to accept willingly appointments in Training Centers/Institutes, where such perquisites are not available. Consequently, efforts by the Federal and the Provincial Directorates are necessary to increase the desirability of training positions within the O.F.W.M.P. Sind Institute has taken some steps in this direction by establishing the senior training positions at the Deputy Director level - GS-18. As a result, the faculty in that institute is now the strongest in the country.

3. A third lesson learned is that in a situation where the Project is 12,000 miles away from the Consultants home office, the field team chief must have sufficient trust and authority to make decisions, enter agreements, and implement actions. In this contract such a situation prevailed, eventually. The overall accomplishments were somewhat diminished during a period when both home office and field office signatures were required on Task Orders. The elapsed time between drafting the T.O., obtaining home office signature and GOP/USAID clearance more than doubled during that period.

4. A complete severing of official relationships between a project and the donor agency is unwise, regardless of the degree of institutional development that has been obtained. There are many sustaining linkages that have been developed over the years that require some continued support. In this instance USAID's decision to provide, through another project, some continued assistance to mutual problems of both projects is far-sighted. The decision to provide training, support of the M.I.S. and of the Training Centers through the C.W.M. project is a commendable one.

5. Technical Assistance - Sheladia Associates Incorporated identified, recruited, fielded, and supported nine long term personnel and 30 short term personnel during the life of the Contract. While a few personnel problems were encountered, the success of the consultancy is largely due to the quality of people recruited, and their dedication to the Project. Quarterly field team meetings with the USAID Project reinforced that dedication. Willingness to travel almost constantly and to give up week ends and holidays in order to do the work was a paramount attribute of each technician. Cheerfulness and optimism in addressing problems pervaded the field team. One should look for a similar mixture of characteristics in subsequent field consultancies.

One of the more important aspects of building morale in a team is the home office support. The support provided by SAI has been superb. One of the field team members is quoted as saying it is the best he had encountered in twenty five years of overseas experience.

ON FARM WATER MANAGEMENT PROJECT
END-OF-TOUR-REPORT

LAWTON P. BOURN, JR.

Educational Equipment & Materials Specialist

The position of the Educational Equipment & Materials Specialist (EEMS) was developed to assist the Federal Cell and the Provincial Training Institutes in the development of Media Centers for audio visual materials and equipment and Print Production Facilities for producing publications and other resource training materials. The purpose of the position was to assist and support the training activities and related information requirements of the Federal Cell, as well as the Provincial Training Centers, in the production of both hard copies and electronic (audio-visual) training materials for the instruction of farmers and technicians in the subject of Farm Water Management.

The primary function of the EEMS was to work with each of the On Farm Water Management Training Institutes and the Federal Cell to help them become fully functional and self-operating following the project termination date of June 30, 1987. Activities focused on tasks designed to offer means and methods by which the Provincial Training Center technicians and Federal Cell personnel would be able to provide advice, in-service training and specialized courses to other Training Center members following completion of the OFWM Project. Areas of assistance and tasks to be accomplished involved seven major areas:

- I. Instructional programs and in-service training and specialized courses.

- II. Materials Development and Equipment Utilization for Provincial Training Institutes.
- III. Video Cassette Recorder (VCR) production and editing techniques.
- IV. Publishing a summation document describing the development and success of the OFWM Project.
- V. Identification, planning, and implementation of up to 15 National Training Courses.
- VI. Specifications of locally manufactured equipment and furnishings.
- VII. Additional tasks as indicated by the Workplan and/or requested by the project Chief of Party.

AREA I. Instructional Programs and In-service Training & Specialised Courses - TASKS ACCOMPLISHED:

- A. Developed and participated in a Training of Trainers Course (TOT) in Audio-Visual Equipment and Teaching Aids held at the OFWM Training Institute, Lahore. The three-week program gave hands-on experiences in nearly all forms of AV practices and equipment, ranging from the common blackboard and easel to new and modern video editing equipment.
- B. In conjunction with the TOT course, a fifty-page manual entitled TYPES OF AUDIO-VISUAL EQUIPMENT & HOW TO USE A-V EQUIPMENT PROPERLY AND EFFECTIVELY was developed and distributed to the course participants for use at their respective training facilities.

- C. Pakistani counterparts were trained in the use of AV equipment, including general repairs and maintenance (e.g. changing bulbs, cleaning, and adjusting) and also shown strategies for directing and managing the Media Center and Print Production Facility in the Federal Cell to realize maximum output and efficiency.

AREA II. Materials Development and Equipment Utilization for
Provincial Training Institutes - TASKS ACCOMPLISHED:

- A. The design and establishment of an Audio-Visual Facility (Media Center) at the Federal Water Management Cell. The Center houses both video and conventional A-V equipment, manuals and spares. The Center contains video equipment sophisticated enough to produce and edit high quality video tapes as well as editing tapes produced by the provincial training centers for distribution to the other centers.
- B. The design establishment of a Materials Production Center at the Federal Water Management Cell. Designed to enhance the development of print materials by providing adequate work space and storage in a clean and well-lighted area, the Center houses a large work table and extensive wall shelving, a computer and word-processing facility plus a versatile Hewlett-Packard plotter for computer-generated graphics, a high capacity photocopy machine, binding facilities, drafting/drawing materials and equipment, and a large light table.
- C. Visits to the provincial Training Institutes to assist in the development of curriculum materials and audio-visual facilities. This activity included the publication of those training materials and the training of faculty in the

development of audio-visual materials in addition to the storage and maintenance techniques for A-V equipment.

- D. The development and publication of a **MANUAL ON WATERCOURSE MAINTENANCE** for farmers participating in Water Users' Associations. Available in both Urdu and English editions, the manual contains both 4-color photographs and black-and-white illustrations to enhance the text. The reading level is designed to accommodate those readers with limited reading ability. 13,000 copies were printed and distributed.
- E. The publication of a companion **MANUAL ON WATERCOURSE MAINTENANCE** for OFWM Field Teams assisting farmers and Water Users' Associations. This publication is also available in both URDU and English. Similar to the Farmer's edition, the manual also contains 4-color photographs and black-and-white illustrations to enhance the text. In addition, the reading level is slightly higher in keeping with the literary skills of the field team personnel. 2,000 copies were printed and distributed.
- F. The publication of a **MANUAL ON WATERCOURSE MAINTENANCE** designed as a workbook for OFWM Field Teams who are assisting farmers and Water Users' Associations in the maintenance of watercourses. The booklet is a field manual or workbook providing detailed information for field teams. Available in URDU and Sindhi languages, the booklet was written by a Pakistani professor at the Lahore Training Institute. 3,600 Urdu and 5,000 Sindhi copies were printed and distributed.
- G. The publication of the English Edition of the Water Users' Association Watercourse Maintenance publication. This is the Institutional Edition, for the OFWM field teams. This

publication outlines the strategies necessary for developing WUA's among the farmer groups and is considered an essential document for explaining and convincing the field teams and others about the importance of WUA's and ways to convince farmers to develop the associations. 150 copies were printed and distributed.

- H. Continued with the procurement of appropriate publications and additional selected print materials to enlarge and enhance the libraries of the Federal and Provincial Training Institute. In addition to reviewing out-of-country sources, this task also included reviewing and selecting available materials from the Asian Foundation in Islamabad.

- I. Edited and coordinated the publication of the OFWMP MANAGEMENT MANUAL FOR FURROW/TRICKLE DEMONSTRATION PLOTS BALUCHISTAN PROVINCE Manual developed by Steve Kovach for primary use by the field teams at the ATI, Quetta. Although designed for one province, the style and format may be used for the other provinces by substituting the appropriate data for irrigation and fertilization. Over 60 pages long, the manual contains procedures and data for irrigating and fertilizing several types of crops in Baluchistan. 125 copies were printed and distributed.

- J. Edited and coordinated the publication of the WATERCOURSE DESIGN PROGRAM OPERATING MANUAL developed by Marvin Redditt. Intended to aid field teams in designing watercourses for specific areas and with specified features, the computer-aid design (CAD) program comes with two disks, instructions on how to use it, and sample forms for the user to follow. 125 copies were printed and distributed.

- K. Edited and coordinated the publication of THE IRRIGATION GUIDE FOR PAKISTAN which was revised by fellow SAI team

member Anisa Devine. 3,500 copies were printed and distributed.

AREA III. Video Cassette Recorder (VCR) production and editing techniques - TASKS ACCOMPLISHED:

- A. Provided video and photographic coverage of the week-long, first SAARC Convention on Water Usage held in Pakistan. Provided media and A-V assistance (such as slide projector, overhead projector, screen and video facilities) for meetings and speaker presentations at convention site.
- B. Assisted with the editing of the master film and recording of the audio track on a Watercourse Maintenance videotape developed by other consultants for the Federal Cell. This procedure involved assembly editing and generating title frames from a camera-mounted title generator.
- C. Provided video coverage of several Federal Cell conferences and meetings to develop a raw-footage library for insertion and future use with other video programs.
- D. Duplicated several video programs for distribution to the provincial training centers using the editing/duplicating equipment specially order for the media center.
- F. Assisted with the installation and setup of video equipment for meetings and conferences requiring VCR facilities.

AREA IV. Publishing a summation document describing the development and success of the OFWM Project - TASKS ACCOMPLISHED:

- A. Provided professional and logistical support for TDY person selected to develop original draft of OFWMP Success Story. Developed and scheduled country-wide itinerary and arranged appointments for interviews and picture-taking sessions.
- B. Interviewed both Pakistani and American personnel involved with OFWMP program for past 20 years and took photographs of places and persons of importance and prominence in the history of the program.
- C. Conducted a lengthy review of Pakistan printers and their facilities following an advertisement for bids to print the SUCCESS STORY. This review included trips to other cities to observe firms and their working conditions, review their facilities and meet with their personnel.
- D. Edited original document, made necessary revisions to text, selected photographs, wrote captions and worked closely with printer for final version. Coordinated all publishing efforts with Federal Cell, USAID and Sheladia, Associates, Incorporated. 6000 copies were printed and distributed.
- E. Coordinated a large-scale mailing effort required for distributing Success Story throughout Pakistan. This effort was made jointly with the United States Information Service (USIS), using their mailing listings and experiences. Over 3500 copies were distributed to Pakistani personnel in this mailing.
- F. Arranged to have national coverage of the OFWMP by getting a newsstory and two sidebars (short anecdotal stories) on the

OFWMP printed in the monthly publication Khabar Wo Nazar produced by the United States Information Service (USIS). The publication contained the OFWM stories as the centerfold articles and was printed in the March and April editions.

This two-month publication was selected because: a. there was enough material to print, and; b. it was felt by USIS that the material was of suitable human interest to warrant the extended coverage. Over 5000 copies were printed and distributed each month by USIS.

AREA V. Identification, planning, and implementation of up to 15 National Training Courses - TASKS ACCOMPLISHED:

- A. Assisted the training advisor and course personnel in technical aspects of implementing two national training courses on the subject of On Farm Water Management. Also assisted in the implementation of a national training course on the subject of Improved Demonstrations.
- B. Assisted the training advisor and course personnel in technical aspects of planning and implementing national training courses in the areas of Improved Maintenance, Control Structures and Water Measuring Devices.
- C. Assisted the training advisor and course personnel in technical aspects of planning and implementing national training courses in the area of Water Users' Associations.

AREA VI. Specifications of locally manufactured equipment and furnishings - TASKS ACCOMPLISHED:

- A. Developed a listing of vendors who carry textbooks and other publications pertinent to the Federal Cell activities and those of the Training Institutes. This task also included listing the selection of available printed materials from the Asian Foundation in Islamabad.
- B. Reviewed publishers' facilities around Pakistan and developed a listing of progressive and up-to-date firms which should be considered for future use by the Federal Cell to produce documents.

AREA VII. Additional tasks as Indicated by the Workplan and/or requested by the project Chief of Party - TASKS ACCOMPLISHED:

- A. Advised and provided input as requested on the OFWMP 1987 Diary.
- B. Advised and provided input as requested on the OFWMP 1987 Calendar.
- C. Designed and developed a prototype sign to be used at the entrances of the Demonstrations Farms in each province. The sign states that the farm is a training facility under the joint auspices of the Federal Water Management Cell and USAID.

END OF TOUR REPORT

Name: Patrick J. Hopkins
Title: Contracts Specialist
Duty Station: Islamabad
Duration of Assignment: 1 November 1986 to 30 June 1987
Project: On-Farm Water Management Project
Contract No. USAID/SAI/391-0413 C-00-4019-00

1. INITIAL ASSIGNMENT

My initial assignment was to oversee the sub-contracting and management of Task Orders related to the research component of USAID's On-Farm Water Management Project. These Task Orders were for:

1. Canal Roads Feasibility Study.
2. Sociological Study to Determine the Agro-economic Impact of Earth-borrowing for Canal Rehabilitation.
3. Computerized Mapping of Pakistan's Irrigation System.
4. Status of Precision Land Levelling in Pakistan (assigned in April 1987)

To facilitate the management and administration of these tasks a small SAI "sub-office" was established in Islamabad and an Administrative Officer employed to lend administrative support for this office.

Of the studies, the major emphasis was on the Canal Roads Feasibility Study which would require the services of two expatriate experts and five local experts plus related technical and administrative support staff for a six month period. AID asked for a preliminary report in February outlining in broad terms the technical and economical feasibility of upgrading canal inspection paths into full access public roads during the next phase of the Irrigation Systems Management Project.

The Sociological Study requiring the services of a multi-disciplinary team of local experts was next in importance. The Computerized Mapping Program received lesser emphasis since only one expatriate expert was involved who would report primarily to the USAID Project Officer with the SAI "Sub-Office" providing logistical and administrative support. Shortly after initiating work on these activities, AID decided to cancel the Task Order for the services of the computerized irrigation mapping expert. AID handled this assignment with internal experts.

Towards the end of my assignment I was asked to examine what might still be accomplished in studying the status of precision land levelling in Pakistan and to assist the Chief of Party administratively in closing out the OFWM Project.

2. SHORT-LISTING OF FIRMS.

In order to identify local consulting firms which might be capable of assisting SAI in the execution of these studies, we decided to advertise in the local press. Advertisements describing the services required, were prominently displayed in "Dawn"; Pakistan's leading, and nationally circulated newspaper. The advertisement for the sociological study appeared in the 9 November issue of the paper and the advertisement for the canal roads study appeared in the 16 November issue.

A parallel, more direct, approach was simultaneously employed to locate potential sub-contractors. This approach entailed directly contacting selected firms with the known capability of conducting the studies. To identify these firms we reviewed the existing pre-qualification literature on local engineering and consulting firms available from other AID projects and also drew on more than four years of previous experience in Pakistan.

3. REQUEST FOR PROPOSALS

Based on the above responses to our advertisements and a review of existing literature, a short listing of firms was made and formal Request For Proposals were sent out to six firms for the Canal Roads Study and five firms for the Sociological Study. The RFPs were sent out in late November and early December respectively. The proposal of M. Ayoob, Abidi & Associates (MAAA) for the Canal Roads Study was evaluated number one and the proposal of Associated Consulting Engineers (ACE) was evaluated number one for the Sociological Study. Negotiations with both firms proved successful and formal permission was sought from AID to enter into sub-contracts with MAAA in December and with ACE in January.

It was at this point that a serious "bottleneck" occurred within the USAID internal bureaucracy. Despite an earlier internal AID interpretation that the SAI/USAID master contract allowed sub-contracting, after discussion between O/ARD and the Contracting Office it was decided by AID that the USAID/Sheladia master contract would have to be amended to clearly authorize these type of studies and allow SAI to sub-contract for this type of work. Our proposed sub-contracts with MAAA and ACE could not be approved until the master contract was amended.

4. CANAL ROADS STUDY.

To avoid delaying work on the Canal Roads Study it was agreed that we could provide administrative, technical and local professional support staff to our expatriate advisors under Task Order 38 funding and work began on this study in late December 1986 with the arrival of Mr. Lee Broderick, rural roads engineer, and Dr. Robert Reeser, agricultural economist. An SAI Canal Roads Study Office was established in Lahore on 3 January 1987 and work began in earnest on the study. The preliminary feasibility report requested by AID was submitted at the end of February and indicate that the project was feasible and justifiable both from the economic and technical viewpoints. The preliminary report was well received both by AID and the Provincial Irrigation Departments. AID asked us to continue our study and agreed to our request to increase the level of effort of the economic aspect of the study. At about the same time AID approved of the proposed SAI/MAAA sub-contract to support the expansion of this study. The sub-contract was signed on 1 March 1987 and allowed us to expand the study considerably.

At the end of April the first draft of our final Canal Roads Feasibility Study was shared with AID. At this stage it was decided that the possible scope of the project should be scaled back somewhat as a result of the economic analysis that indicated that it was not justifiable on strict economic grounds to upgrade the canal inspection paths on all of the irrigation systems studied. It was also determined that a scaling back of this aspect of the project from the neighborhood of perhaps \$100,000,000 to \$40,000,000 was perhaps advisable from the project management point of view as well since this was not the only, or even the main focus of the Irrigation Systems Management Project.

Additional economic and engineering work was then done to assist in determining which of the irrigation systems had highest priority within the reduced scope of road work to be undertaken. Several minor adjustments to the scope of work of the study were also made at this time. The final Canal Roads Feasibility Study was submitted to AID on 11 June 1987.

5. SOCIOLOGICAL STUDY.

After the SAI/USAID master contract was amended in late February 1987 USAID gave SAI permission to enter into a sub-contract with a local firm to conduct the Sociological Study to Determine the Agro-economic Impact of Earth-borrowing for Canal Rehabilitation. However, AID mandated a reduction in the overhead rate of the firm (ACE) whose proposal was evaluated number one for this study. Since ACE refused to reduce their overhead rate SAI entered into negotiations with the number two ranked firm and requested AID's concurrence to entering into a sub-contract with Specialists Group, Inc. (SGI) to conduct this study.

After a considerable delay, the proposed sub-contract was approved and the sub-contract was signed on 6 April 1987. Work commenced immediately. The team of experts assembled for this study included:

- Sociologist (Chief of Party)
- Irrigation Engineer
- Irrigation Lawyer
- Agricultural Economists (2)
- Research Assistants (2)

Midway through the study it was decided that the random sampling survey technique originally agreed to should be supplemented with several more in-depth case studies to add balance to the findings. Our analysis of the subject indicated that indeed earth-borrowing for canal rehabilitation does have a significant negative effect on agricultural production in areas used for borrow material, and particularly for small farmers who lack the resources to re-level their fields after earth-borrowing. However, the relevant section of the Canal and Drainage Act and the Provincial Irrigation Department's own standard operating procedures are adequate to handle the problem. The rules do not have to be changed. However, there is a need to ensure that the rules guaranteeing farmers adequate compensation for earth-borrowing are better enforced in practice as well as in theory. The final report of this study was submitted to USAID in June 1987.

6. PRECISION LAND LEVELLING STUDY.

SAI, the GOP and USAID had originally intended to bring out an expatriate agricultural engineer with a strong social science background to lead a team of Pakistani experts in a study of the current status of Precision Land Levelling in Pakistan with a special emphasis on the role of the private sector in this field and the reasons why PLL has not proved as popular as envisaged by experts and policy makers.

Towards the end of the SAI contract, it became apparent that the time remaining on our contract did not permit us to undertake a full study on this subject. I was asked to investigate what might still be possible given our time and manpower constraints. After a review of the capabilities of local consulting firms in this area and our time constraints we recommended that our study on this subject should be limited to laying out the analytical framework and research instruments for a follow-up more comprehensive study by another contractor with more time and greater resources. We could also conduct a review and collect existing literature on the subject which would save a great deal of time for a follow-up study team.

Since an AID centrally funded project was also interested in undertaking a study of this same subject it was decided that SAI would undertake just this type of study which would lay the groundwork for the potential follow-on study. This limited study of the status of Precision Land Levelling in Pakistan was given to United Consulting Limited (UCL) for execution. UCL's team of experts for this study included an agricultural engineer, two agricultural economists, and a market analyst assisted by field assistants. The final report outlining the analytical framework and research instruments for the follow-up study and the collection of relevant literature was submitted to USAID in June 1987.

USAID/SHELADIA ASSOCIATES
OFWM PROJECT IRRIGATION AGRONOMIST
END-OF-TOUR REPORT (JULY 1984-JUNE 1987)

by

Steve Kovach

I. Identification and standardization of water management technologies related to design, construction, and maintenance of watercourses:

Not applicable.

II. Use of computer technology:

A. Assisted with the assessment of computer needs for the OFWMP.

B. Assisted the OFWMP (Baluchistan Province) with setting up their IBM XT computers and printers.

C. Developed Lotus 1-2-3 spreadsheets for use in calculating seed, fertilizer, herbicide, and insecticide quantities and costs.

D. Assisted with the development of Lotus 1-2-3 spreadsheets used to calculate crop and irrigation water requirements.

III. Institutional relationship among GOP agriculture irrigation and water and power authorities:

Assisted with the Irrigation/Horticulture Study Tour to Australia sponsored by USAID/ISM/OFWM for participants from the Agriculture (OFWM, Ag. Ext., and Research Departments), the Irrigation and Power Departments of the Baluchistan Province, and the Agricultural Development Bank of Pakistan. By individuals going from several departments, there were occasions during the study tour where each department could see how they are dependent on each other and how each can benefit through cooperation with other departments.

IV. Coordination of OFWM activities with technical advisors from other USAID projects (ISM, CWM, ISM Research, TADP, BALAD) and other donor agencies (World Bank and ADB):

A. Site visits were made in Quetta District (Baluchistan Province) with University of Idaho staff working on the USAID ISM Research Project.

B. Assisted the Gadoon Amazai Project with determining the crop water requirements for the fruits, vegetables, and agronomic crops to be grown in the project area. The project area was assessed in regards to the potential use of irrigation systems (trickle and sprinkler) with higher water application efficiencies than the conventional surface systems presently being used to irrigate crops. Also, a trickle irrigation system design was made for a one half acre demonstration site with fruit trees.

C. In conjunction with the USAID Tribal Areas Development Project staff in the NWFP, site visits were made to assess the potential of utilizing other methods of irrigation (trickle and sprinkler) for irrigating area crops. A recommendation was made on how to more efficiently utilize the available groundwater resource. Presently, traditional surface methods of irrigation are being employed. The area has a limited groundwater resource and the goal is to utilize the water in the most efficient manner and to maximize the acreage of the crops grown.

V. Promotion of improved or new forms of OFWM technology:

A. Assisted with the coordination of visits within Pakistan of U.S. and Pakistani based irrigation companies interested in developing more efficient irrigation systems such as sprinkler and trickle irrigation.

B. Assisted the Baluchistan Province Agriculture Department in the development of their PC-1 entitled "Trickle Irrigation in the Baluchistan Province".

C. Assisted the NWFP OFWM Project Directorate in the development of their five year PC-1 on trickle/sprinkler irrigation.

D. Made visits with staff from the NWFP and Baluchistan Province Directorates to sites planned for trickle irrigation demonstration systems.

VI. Training:

A. Training Center Development

1. Assisted ATI, Quetta with the coordination and conducting of a one day seminar on trickle/sprinkler irrigation for 18 participants from the following organizations:

<u>Number of Participants</u>	<u>Organization</u>
1	Agriculture Department
5	OFWM Project
6	Agricultural Training Inst. (ATI)
6	GOB/FAD Fruit Dev. Proj.

2. Assisted ATI, Quetta with the coordination and conducting of the "Workshop on Sprinkler/Trickle Irrigation" for FATA--DC and OFWMP personnel from the NWFP. The four day workshop was attended by 19 participants from FATA--DC, OFWMP (Baluchistan and NWFP Provinces), and staff from ATI Quetta. The participants received instruction in trickle and sprinkler irrigation technology. The course consisted of two days of classroom instruction and two days of site visits to trickle and sprinkler installations located in the Baluchistan Province.

3. Coordinated the activity of consultants hired to install and train staff for the soil/water laboratories to be attached to each of the four provincial OFWMP Training Institutes.

B. Incidental On-the-Job Training

1. Assisted with the selection of the six sites for the OFWMP Furrow/Trickle Demonstration Plots. Coordinated and conducted OJT sessions for the coordinators, managers, and supervisors of the six OFWMP Furrow/Trickle Demonstration Plots located in the Baluchistan Province. A total of 9 individuals from the OFWM Project and Agricultural Department (Baluchistan Province) received training in the procedures of installation of the Demonstration Plots. Four training sessions were conducted to train personnel in the use of the "OFWMP Management Manual for the Furrow/Trickle Demonstration Plots". The sessions were related to irrigation, fertilization, chlorination, system maintenance and start-up and shut-down procedures as follows:

<u>Date</u>	<u>Course Duration</u>	<u>No. of Participants</u>
June, 1986	2 days	9
Dec., 1986	5 days	7
May, 1987	2 days	6
June, 1987	2 days	4

Assisted and trained the OFWMP coordinator of the six Furrow/Trickle Demonstration Plots in the procedures of inventory control, establishment of an equipment supply base and central storage unit for the Demonstration Plots.

2. Assisted with the conducting of three-one day training sessions on irrigation scheduling, crop water requirements and methods of measuring flow from tubewells. A total of 13 participants from the OFWMP and the Agriculture Department (Baluchistan Province) received training.

C. Overseas Training

Assisted with the organizing of the USAID/ISM/OFWM sponsored Irrigation and Horticulture Study Tour to Australia. Also served as the USAID/Sheladia Assoc. escort for the Study Tour. There were a total of 9 participants from the Agriculture

and Irrigation Departments of Baluchistan and the Agricultural Bank of Pakistan.

E. Demonstration Plots/Farms

1. Assisted with the planning and selection of eight training demonstration plots (2 per province) for use by the OFWM Training Institutes. The training demonstration plots were not developed due to a change in project emphasis in favor of training demonstration farms.

2. Assisted with the planning, site selection, selection of irrigation systems and design, and the development of four Training Demonstration Farms (one per province) attached to each of the OFWM Training Institutes.

3. Assisted with coordinating the installation of weather stations on each of the four Training Demonstration Farms. Also, assisted with the development of data recording forms and training of staff to manage the weather stations.

VII. National Training Courses

Assisted with the planning, coordination and teaching of the following National Training Courses:

A. "Improved Agronomic Demonstration and Water Management Practices". A total of 25 participants from all four provinces and the Federal Cell were trained at the OFWM Training Institute in Lahore.

B. "Trickle Irrigation and Agronomic Water Management Practices". The course was held at AII, Quetta with a total of 24 participants from the OFWM Project in all four provinces and the Federal Cell receiving training in the engineering and agronomic principles of trickle irrigation technology.

C. "Crop and Irrigation Water Requirements". The course was offered by the OFWM Training Institute, Hyderabad and conducted at the Faculty of Agriculture Engineering, Sind Agricultural University, Tando Jam. A total of 13 participants from OFWM Project (Sind Province and the Federal Cell), from the Drainage Reclamation Institute of Pakistan and the Sind Agricultural University received training.

VIII. Project evaluation and special studies:

A. Monitoring and evaluation

Not applicable.

B. Special studies which have helped analyze policy question and develop solutions to priority problems:

Not applicable.

IX. Identify and procure library, extension, and training materials, computers, and research equipment and supplies for the OFWM Program.

A. Assisted with the preparation of the agronomy/soils equipment procurement list for the OFWM Project Training Institutes.

B. Developed a supplemental equipment and supply list for the OFWM Project Furrow/Trickle Demonstration Plots in the Baluchistan Province.

X. Developed a maintenance manual to be used by the OFWMP directorates in training farmers to maintain watercourses.

Not applicable.

XI. Developed criteria and guidelines for the planning design and construction of Field Drainage Systems.

Not applicable.

XII. Publications:

A. Assisted with the revision of the On-Farm Water Management Field Manual Volume IV Irrigation Water Management.

B. Developed the OFWMP Management Manual For Furrow/Trickle Demonstration Plots Baluchistan Province.

XIII. General Recommendations:

A. Promotion of improved or new forms of OFWM technology, specifically trickle and sprinkler irrigation:

1. A joint effort should be made among the OFWMP, commercial irrigation companies, participating farmers, and donor or funding agencies to assist with the installation of trickle and sprinkler irrigation systems on progressive growers' land.

2. In the purchase agreement with the commercial irrigation company providing the irrigation equipment, it should be stated that they will be responsible for providing all of the on-the-job training and make at least two visits to the irrigation sites each year for two years for follow-up training and system evaluation.

3. A sufficient supply base needs to be maintained at the site or with the irrigation company in Pakistan so the irrigation systems can be properly maintained and repaired.

4. The participating farmer, if he will not be managing the irrigation system himself, should appoint members of his staff to manage the system. At least one of the individuals chosen should be able to read and write.

B. Training:

1. National training courses:

a. Classroom training sessions should be followed by "on-hands" laboratory or field exercises.

b. The courses should be followed by periodic visits to the training participants sites to determine if they are actually putting into practice what was taught in the course. If further on-the-job training is required, it should be given at this time.

c. Courses should be conducted where the instructors go to the participants' work locations. This makes it possible to have more one-on-one instruction in the participant's own working environment. The group should be as small as possible and preferably not more than four participants per location.

d. The course content should be limited to training in the most important principles.

C. OFWMP Furrow/Trickle Demonstration Plots

1. A full-time coordinator position for the Furrow/Trickle Demonstration Plots should be created. The present coordinator (Mr. Javid Kausar, OFWMP, Quetta) should be appointed for this position and relieved of his other job responsibilities.

2. A vehicle needs to be assigned to the coordinator on a full-time basis so he can make weekly visits to each of the six sites for collection of water usage data, routine maintenance, and conducting on-the-job training for the managers of each demonstration site.

3. Each site requires two levels of management. One person is needed to carry out the daily activities of irrigation and routine maintenance. Another person, who can read and write, is needed to oversee the first person and collect the site data (pan evaporation data, water meter readings and hours of irrigation), inject fertilizers, and chlorinate the irrigation system.

4. If demonstration irrigation systems are installed on private farmer(s) land, the farmer should sign an agreement that he will provide staff to manage the system in conjunction with the OFWMP Site Coordinator and is willing to pay a minimum of 25% of the system cost and installation. By the farmer making partial payment for the system, he is apt to take more interest in maintaining the system and seeing that the new technology is a success.

D. Demonstration Plots/Farms:

1. This should be a joint effort between the OFWMP, other government organizations (agricultural research & extension), and commercial companies (irrigation, chemical, and distributors of farm machinery).

2. As part of the purchase agreement between the commercial companies and the OFWMP, technical backup needs to be provided for the maintenance, servicing, and on-the-job training to the staff (government or private farmer) who will be utilizing the equipment on the demonstration plot or farm.

3. The organizational and management setup must be established so that each individual involved with the management of the demonstration plots/farms knows his job responsibilities. If the sites are located on private farmers' land, they should sign an agreement that they will provide sufficient managerial help to maintain and operate the demonstration plots/farms. At least one of the managers should be able to read and write and capable of collecting data on the site (water flow measurements, and calculation of fertilizer and pesticide rates).

4. A sufficient budget must be provided to operate and maintain the demonstration plots/farms. Also, sufficient transportation must be available to the staff so they can carry out the required maintenance and supervision necessary to make the activity a success.

5. Participating farmers should provide at least 25 % of the equipment and operating costs for the demonstration plots and farms. This should have a twofold effect, in that the farmer(s) will realize he has an investment in the activity and it should eliminate the participation of farmers not interested in promoting improved methods of on-farm water management technology.

**ON-FARM WATER MANAGEMENT
END OF PROJECT REPORT**

Daniel M. Bradbury
Training Institution Development Advisor

PROJECT GOAL

To increase agricultural production and improve income for low income farmers in Pakistan.

PROJECT PURPOSE

To assist in strengthening the On-Farm Water Management (OFWM) Directorates in the implementation of an effective on-farm water management program utilizing the latest appropriate technology.

AREAS OF ASSISTANCE

To work with the On-Farm Water Management Training Centers/Institutes in the NWFP and Punjab so they will be fully functional by the project termination date of June 30, 1987. To formulate a five year institutional development program that will carry on after project termination and serve the training needs of OFWM Professionals, Sub-Engineers, Field Assistants, Extension Workers, Water User Associations and individual farmers in these provinces. Tasks to be accomplished during the project include: Training Center development, institution policy and procedure development, faculty and curricula development, training materials development, program presentation, end of project report and any other duties, yet unspecified, that may be requested.

ACCOMPLISHMENTS

1. TRAINING CENTER DEVELOPMENT:

- a. A training director and two faculty members have been appointed to the Training Center in D.I. Khan.
- b. The current training programs for each province have been reviewed with the OFWMP Directors and Training Center Directors. These programs have been compared with current and anticipated future training needs. Strategies have been developed to meet these future needs.

c. Additional staffing needs at D.I. Khan have been assessed and recommendations made to obtain additional faculty.

d. The Agricultural Engineering buildings in D.I. Khan have been remodeled into the On Farm Water Management Training Institute and classes began in the new facilities in June of 1987.

e. Equipment for the training centers has been procured locally as well as from the United States. Each center is now equipped to provide quality training to project team members.

f. Training Demonstration Farm sites have been identified in the Punjab, Baluchistan and North West Frontier Provinces. Farm plans have been developed, watercourse improvements have been initiated, land leveling has been contracted for, and equipment has been procured to run these farms. Training has been imparted to key OFWM personnel in each province in the management of these farms.

g. A Task Order was prepared for the installation of laboratory equipment at the four training centers. This task was accomplished during the month of June 1987.

2. INSTITUTION POLICY AND PROCEDURE DEVELOPMENT:

a. Long range development desires and requirements have been identified in the Punjab, Baluchistan and North West Frontier Provinces. Strategies to meet these needs have been implemented.

b. Inventory control and equipment usage procedures have been developed at each of the three training centers.

c. A computerized Management Information System has been implemented country-wide. Comprehensive training has been provided for computer operators, middle managers and the senior management of each province.

d. Computer rooms have been developed in the training centers and provincial directorates and guidelines for operation and maintenance of these centers have been implemented.

e. Remodeling was done at the Directorate offices in the NWFP providing adequate office space for project administration.

3. FACULTY AND CURRICULA DEVELOPMENT:

a. The National Curriculum Guidelines have been reviewed with the Training Directors and key faculty members at the OFWM Training Institutions in the Punjab and NWFP.

b. Curricula for the training of Sub-engineers, Water Management Officers and Field Assistants have been developed based on the assessed needs of each province and on the requirements of the National Curriculum Guidelines.

c. Training schedules for the OFWM Training Centers in D.I. Khan and Quetta have been developed. Input has been provided to Lahore training center concerning their scheduling.

e. Training has been provided to the faculty at the OFWM Training Center in D.I. Khan in unit and lesson planning. Unit and lesson plans have been drafted at this institution.

f. A curriculum outline for training of Sub-engineers in Quetta has been developed. A training schedule and lesson plans have been formulated.

g. Curricula for farmer training sessions in the NWFP have been developed.

4. TRAINING MATERIALS DEVELOPMENT:

a. Training material needs have been assessed and recommendations for additional material have been reported to the SAI Training Materials and Equipment Advisor.

b. The Punjab OFWM Training Institute's slide presentation "Introduction to On-Farm Water Management" has been reviewed and additions made to scope and content.

c. The libraries at the OFWM Training Centers in the Punjab and NWFP have been reviewed and recommendations have been made as to the subject areas that need to be expanded. These needs have been reported and some additional books procured. Requests for additional publications from ATI Quetta have been forwarded to USAID and the Federal Cell.

16

d. Editorial and logistical assistance has been provided to the Training Materials and Equipment Specialist on the following publications:

1. Watercourse Maintenance Manuals.
2. Trickle Irrigation Guidelines for Baluchistan.
3. Computer Assisted Design for Watercourse Rehabilitation.

5. PROGRAM PRESENTATION:

a. Organization and logistical support have been provided for the following National Training Courses:

1. Training of Trainers in Audio/Visual Aids.
2. Computer Assisted Design for Watercourse Rehabilitation.
3. Water User Associations/Organization, Maintenance & Communications.
4. Flow Measuring Devices and Control Structures.

b. Farmer training sessions have been presented at D.I. Khan, Peshawar, Mardan, and Swat in the NWFP. Farmer training days have also been presented in the Punjab. Farmer training in the form of national farmer tours have been accomplished in Baluchistan.

c. Training of Sub-engineers in Baluchistan has been accomplished.

d. Training programs for Water Management Officers, Sub-engineers and Field Assistants have been presented in the NWFP and Punjab.

6. OTHER DUTIES AS ASSIGNED:

a. A briefing for USAID Mission personnel on the history of the OFWMP and its activities in the NWFP was presented.

b. Co-authored an article on OFWMP for the Sheladia in-house publication.

c. Logistical support was provided for the SAARC conference held in the Punjab and NWFP.

d. Logistical support was provided for the ADB Field Day held in Multan, Punjab.

e. Editorial and logistical assistance was provided to the Educational Materials and Equipment specialist in the production of the On Farm Water Management Success Story publication and in other USAID and USIS publications dealing with the project.

THOUGHTS AND RECOMMENDATIONS

1. WATER MANAGEMENT TRAINING INSTITUTE, PUNJAB.

This training institute has by far the most experience in presenting the On Farm Water Management training. It is well managed by the director of Training, Mr. Gill. Mr. Awan, the Chief Agronomist and Dean of Faculty, is a very capable administrator as well as an excellent instructor. This institute should be utilized as a source for the other training centers. Mr. Gill is very willing to help the other centers develop and is quite willing to share experiences and ideas with these other institutions.

2. ON FARM WATER MANAGEMENT TRAINING CENTER, D.I. KHAN.

Now that the physical facility has been completed and training has begun, the work is just ready to begin at this center. The administration and faculty are new with limited experience. Mr. Hidayatullah has the makings of a very effective training director but input from more experienced people would greatly facilitate the growth and strengthening of this institution. The faculty has done well in the training they have conducted but, again, they could use more training in the techniques of choosing, developing and presenting the material.

3. ON FARM WATER MANAGEMENT/ATI, BALUCHISTAN.

Baluchistan stands apart from the other training centers in that On Farm Water Management does not have control of the training that needs to be done. At the time of development of this project in Baluchistan it was decided that the Agricultural Training Institute (ATI) would be responsible for the OFWMP training in the province. It appeared to have adequate faculty and facilities to perform the job. Since that time it has become evident that serious problems exist which are preventing the establishment of on-going training programs.

The Principal of ATI and the Director of On Farm Water Management are at equal level under the Director General of Water Management in Baluchistan. Each of these men have separate areas of interest. While the

Director of OFWM is concerned with the training of project personnel, the Principal of ATI is primarily concerned with the expansion of ATI into the Agricultural College of Baluchistan. To further complicate the situation, no formal agreement exists as to the training to be provided by ATI to OFWMP.

There currently is no position for an instructor of On Farm Water Management at either ATI or in OFWMP and there is no money in the provincial budget to fund a position. There will be no position nor funds until 1989. Whether this position will be placed with ATI or OFWMP remains to be seen.

It will take considerable effort on the part of someone to overcome these problems. It will take the attention of the Federal Cell to resolve this problem quickly. It appears the primary need is for a detailed agreement to be worked out between OFWMP and ATI that delineates the amount and type of training to be imparted and defines the duties and responsibilities of each in achieving the training goals. Positions for instructors in On Farm Water Management must be created and funded immediately. It would best serve the project if the instructors fell under the direction of the OFWM Project Director and not ATI. If these instructors worked for ATI, then the OFWMP training would be of secondary importance to them and less than a full commitment would be made to the project at a time that a full commitment is vital.

4. NATIONAL COORDINATION OF THE TRAINING CENTERS.

The future of these training institutions now depends less upon inputs from the outside than on the enthusiasm generated from within. To this end it is recommended that the Training Directors meet at least quarterly to share problems and experiences. These sessions should rotate between training centers which will allow each director to observe the operation of the other centers. It is hoped that these meetings will provide the forum for the generation of new ideas and finding solutions to mutual problems. The training coordinator at the Federal Cell should play an active role in establishing these meetings and should attend each one in that they will keep him abreast of the training situation nationally.

A P P E N D I X C

L O G I S T I C A L F R A M E W O R K M A T R I X

PROJECT DESIGN SUMMARY
REVISED LOGICAL FRAMEWORK MATRIX

Life of Project: From FY 1977 to FY 1983
Total U.S. Funding: \$18,417,000
Date Prepared: 3/7/83

Project Title & Number: ON-FARM WATER MANAGEMENT (191-0412)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes: To increase agricultural production and improve income for low income farmers in Pakistan.</p> <p>Sub-Goal: On-Farm Water Management concept is fully appreciated and taken account of by the GOP in agricultural planning, and the project is replicated.</p>	<p>Measures of Goal Achievement:</p> <ul style="list-style-type: none"> - Increased domestic production and decreased importation of food grains. - Increased agricultural output, especially by small farmers - GOP develops and approves a plan for management of the irrigation system at the farm level throughout the country. 	<ul style="list-style-type: none"> - GOP financial and planning records. - Household budget survey data. - Agricultural production data. - Project is replicated. 	<p>Assumptions for achieving goal targets:</p> <ul style="list-style-type: none"> - GOP policy encourages agricultural production and increases income opportunities for small farmers. - On-Farm Water Management will increase water availability and the water saved will be productively utilized. - Watercourses improvements and precision land leveling will be competitive with alternative public and private investments in other sectors of the economy. - Experience gained in the pilot program is replicable nation-wide.
<p>Project Purpose: To establish public and private sector capabilities to plan and deliver on-farm water management services including improvement of irrigation watercourses, precise leveling of farm land, and improvement of crop and water management practices, on an economic basis.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ul style="list-style-type: none"> - Provincial OFWM Directorates created within Provincial Agricultural Departments and effectively delivering water management services to farmers. - Central OFWM Cell created within Federal Ministry of Food, Agriculture, and Cooperatives and effectively coordinating all OFWM activities in the country. (Cont'd on pg. 2) 	<ul style="list-style-type: none"> - GOP financial and planning records. - Participant training records. - Records of the federal OFWM Cell and the provincial directorates. - Extension records. 	<p>Assumptions for achieving purpose:</p> <ul style="list-style-type: none"> - GOP continues to assign high priority to the OFWM Program as evidenced by adequate budgetary support. - Adequate numbers of qualified personnel are available to staff the OFWM program. - Trained participants return to Pakistan to work in the OFWM program.
<p>Outputs:</p> <ul style="list-style-type: none"> - Watercourses improved and reimbursement made to the GOP - Land precisely leveled - Provincial OFWM Directorates created within Provincial Agriculture Departments and effectively delivering water management services to farmers. - Central OFWM Cell created within Federal Ministry of Food, Agriculture, and Cooperatives and effectively coordinating all OFWM activities in the country (Cont'd on pg. 2) 	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> - 1,399 - 75,000 acres - 4 - 1 	<ul style="list-style-type: none"> - Site visits, personnel records, consultant reports. - Quarterly project reports. - Project evaluations. - Special publications and reports. - Provincial and federal GOP records and planning documents. - GOP training center records. 	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> - Qualified participants are selected for training. - Provinces are receptive to having their OFWM programs coordinated at the national level. - Inspection and reimbursement procedures are efficiently implemented. - The Ministry of Local Government and Rural Development prepares and has approved a PC-1 for OFWM activities. (Cont'd on pg. 2)
<p>Inputs: 1. <u>A.I.D.</u></p> <ol style="list-style-type: none"> Reimbursement for civil works. Short-term and long-term technical assistance. Short-term and long-term participant training. In-country training. <p>2. <u>GOP</u></p> <ol style="list-style-type: none"> Personnel salaries and allowances. Operating expenses and facilities rental and maintenance. <p>3. <u>Commodities including vehicles, computers, library, training and extension materials, and research equipment and supplies.</u></p>	<p>Implementation Target (Type and Quantity) See financial, commodity, technical assistance, and training plans and implementation schedule in the project paper Amendment.</p>	<p>A.I.D. and GOP project records and financial documents.</p>	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> - A.I.D. and GOP proposed funding levels are approved by their respective governments and disbursements are made on a timely basis. - Appropriate consultants can be recruited to provide the required technical assistance. - Appropriate and relevant training courses can be identified. - Required commodities are available on a timely basis and from eligible sources.

BEST AVAILABLE COPY

BEST AVAILABLE COPY

PROJECT DESIGN SUMMARY
REVISED LOGICAL FRAMEWORK MATRIX

OM-FARM WATER MANAGEMENT (391-0413)
Project Title & Number:

Title of Project: _____
From FY: _____
Total U.S. Funding: _____
Date Prepared: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective is _____ with this project contributes: _____</p> <p>Project Purpose: _____</p> <p>Duration: _____</p> <ul style="list-style-type: none"> - Volume III of OVM Field Manual revised - OVM teams established and provided with on-the-job training - District engineers trained in watercourse improvement and PFI - District rural development staff trained in water management extension - Improvement developed - Provide-specific models for watercourse improvement studies of local councils as implementing mechanism for OVM activities completed - Effective extension techniques for OVM available 	<p>Measures of Goal Achievement: _____</p> <p>Conditions that will indicate purpose has been achieved: End of project teams will be effective in assisting farmers improve watercourses and precisely level farm land.</p> <ul style="list-style-type: none"> - Increased incidence of watercourse maintenance. - Improved quality of design and construction of civil works by OVM Districts. - Increased level of production technology related to effective water management. 	<p>Assumptions for achieving purpose: _____</p>	<p>Assumptions for achieving outputs: _____</p> <ul style="list-style-type: none"> - The Ministry of Food, Agriculture and Cooperatives prepares and has approved a PC-1 for OVM activities.
<p>Program or Sector Goal: _____ with this project contributes: _____</p> <p>Project Purpose: _____</p> <p>Duration: _____</p> <ul style="list-style-type: none"> - District rural development staff trained in water management extension - Improvement developed - Provide-specific models for watercourse improvement studies of local councils as implementing mechanism for OVM activities completed - Effective extension techniques for OVM available 	<p>Measures of Goal Achievement: _____</p> <p>Conditions that will indicate purpose has been achieved: _____</p>	<p>Assumptions for achieving purpose: _____</p>	<p>Assumptions for achieving outputs: _____</p>
<p>Program or Sector Goal: _____ with this project contributes: _____</p> <p>Project Purpose: _____</p> <p>Duration: _____</p> <ul style="list-style-type: none"> - District rural development staff trained in water management extension - Improvement developed - Provide-specific models for watercourse improvement studies of local councils as implementing mechanism for OVM activities completed - Effective extension techniques for OVM available 	<p>Measures of Goal Achievement: _____</p> <p>Conditions that will indicate purpose has been achieved: _____</p>	<p>Assumptions for achieving purpose: _____</p>	<p>Assumptions for achieving outputs: _____</p>
<p>Program or Sector Goal: _____ with this project contributes: _____</p> <p>Project Purpose: _____</p> <p>Duration: _____</p> <ul style="list-style-type: none"> - District rural development staff trained in water management extension - Improvement developed - Provide-specific models for watercourse improvement studies of local councils as implementing mechanism for OVM activities completed - Effective extension techniques for OVM available 	<p>Measures of Goal Achievement: _____</p> <p>Conditions that will indicate purpose has been achieved: _____</p>	<p>Assumptions for achieving purpose: _____</p>	<p>Assumptions for achieving outputs: _____</p>
<p>Program or Sector Goal: _____ with this project contributes: _____</p> <p>Project Purpose: _____</p> <p>Duration: _____</p> <ul style="list-style-type: none"> - District rural development staff trained in water management extension - Improvement developed - Provide-specific models for watercourse improvement studies of local councils as implementing mechanism for OVM activities completed - Effective extension techniques for OVM available 	<p>Measures of Goal Achievement: _____</p> <p>Conditions that will indicate purpose has been achieved: _____</p>	<p>Assumptions for achieving purpose: _____</p>	<p>Assumptions for achieving outputs: _____</p>

OUTPUTS:
- Participants trained overseas in management, irrigation engineering, computer science, and extension - 75 (including 10 with formal degrees)

BEST AVAILABLE COPY

BEST AVAILABLE COPY

A P P E N D I X D

T E C H N I C A L A S S I S T A N C E

ANNEX D

SAI TECHNICAL ASSISTANCE----OFWM PROJECT

A. LONG-TERM CONSULTANTS (U.S.)

S/NO.	CONSULTANT	ASSIGNMENT	LOCATION	DATES	PERSON/MONTHS
1.	Valdivia	Chief of Party (Management & Planning)	Islamabad	July 84--June 85	12
2.	Smail	Training Specialist Chief of Party	Karachi/ Islamabad	June 84--July 87 May 85--July 87	36
3.	Kovach	Agronomy Specialist	Quetta Karachi	July 84--June 85 June 86--June 87	36
4.	Bell	Irrigation Engineer	Lahore	July 84--June 86	24
5.	Nothstein	Management & Planning Specialist	Islamabad	Nov. 85--Jan. 87	15
6.	Bradbury	Institutional Development Specialist	Peshawar	June 86--June 87	12
7.	Bostwick	Institutional Development Specialist	Hyderabad	June 86--June 87	12
8.	Devine	Irrigation Engineer	Karachi	Sept 86--June 87	10
9.	Bourne	Educational Materials & Equipment Specialist	Islamabad	June 86--June 87	12
Total Long-Term Consultants					169

B. SHORT-TERM CONSULTANTS (U.S.)

S/NO.	CONSULTANT	ASSIGNMENT	LOCATION	DATE	PERSON/MONTHS
1.	Hogan	Laser Controlled Land Levelling	Lahore	Jan. 85	0.75
2.	Tinsley	Improved Agronomic	Lahore	April 85	1.75
3.	Redgrave	Demonstration			1.75
4.	Pravatt	Trickle Irrigation I	Quetta	Nov. 85	1.25
5.	Stanley				1.25
6.	Boswell				0.75
7.	Redditt	Computers for Water Management Engineering	Lahore	April 85	4
8.	Redditt	C.A.D. Watercourse Engineering	Quetta Hyderabad Lahore Peshawar	Sept 86 Oct. 86	1.5
9.	Hilleman	Training of Trainers (Audio/Visual)	Lahore	July 86	1
10.	Oad	Improved Water Mngmnt. and Control Structures	Hyderabad	Jan. 87	1.5
10.	Oad	Improved Water Mngmnt. and Control Structures	Faisalabad	Jan. 87	
11.	Hodgkins	Water Users Assoc.	Lahore	Mar. 87	1
12.	Zazueta	Irrigation Requirements	Hyderabad	Mar. 87	1
13.	Stanley				1
14.	Hodgkins	Training Demonstration	Hyderabad	June 87	1
15.	Oad	Farm: Use/Management			1

BEST AVAILABLE COPY

135

S/NO.	CONSULTANT	ASSIGNMENT	LOCATION	DATE	PERSON/MONTHS
16.	Morgan	Computer Procurement	Islamabad	March 85	0.75
17.	Wesselman	Procurement Specs.	Islamabad	March 85	3
18.	Schwab	Drainage	Islamabad	Nov. 85	5
19.	Shaner	Proj. Moitoring & Eval.	Islamabad	Sep. 85	0.75
20.	Redgrave	Proj. Moitoring & Eval.	Islamabad	Sep. 85	0.5
21.	Larsen	Success Story	Islamabad	Nov. 86	1.5
22.	Gilpin	Computer MIS	Islamabad	Aug. 86	1
23.	Holt	D.I. Khan Specs.	Islamabad	Feb. 86	0.5
24.	Nothstein	W.U.A. Guide	Islamabad	Aug. 85	2
25.	Bradbury	Delivery of Equipment	Islamabad	Feb. 86	2
26.	Hopkins	Research Studies/Admin.	Islamabad	Nov. 86	8
27.	Reeser	Canal Roads Study	Lahore	Dec. 86	1.5
28.	Broderick	Canal Roads Study	Lahore	Dec. 86	5.5
29.	Reeser	Canal Roads Study	Lahore	April 87	1.5
30.	Morrison	Training Demonstration Farm: Use/Management	Hyderabad	June 87	1
Total Short-Term Consultants					55

C. LOCAL CONSULTANTS----SAI OFWM PROJECT

S/NO.	ASSIGNMENT	LOCATION	DATE	SOURCE OF T.A.	PERSON/MONTHS
1.	Project Benefit Monitoring and Evaluation		April 86	Gill/Memon	3
2.	Flow Measurements		Dec. 86	Ali	1
3.	Computer Operators Course I	Hyderabad	Sep. 85 Sep. 85	BCI Mehran Univ.	2.5 2
4.	Computer Seminar For Senior Mngmt.	Lahore	Jan. 86	PCC	2
5.	Systems Analysis for MIS	Lahore	April 86	PCC	6
6.	MIS Study, Seminar Sample Applications	Lahore	June 86	PCC	3
7.	Overview & Management Senior Management Training	Lahore	July 86	PCC	4.5
8.	Middle Management Training	Lahore	Sept 86	PCC	6.5
9.	Computer Operators On-Site Courses	Various Locations	Nov. 86/ May 87	PCC	6
10.	Operational Staff Training and Dev. of MIS Applications	Various Locations	Aug. 86/ May 87	PCC	25
11.	Accountancy Support	Various Locations		PCC	7
12.	Computer Management Support	Various Locations		PCC	7
13.	Management of OFWM HTPM - I, II	Lahore	March 87/ April 87	PCC	2
14.	WUA National Course	Lahore			2
15.	Overview & Management Senior Management Training	Lahore	May 87	PCC	1.5
16.	Middle Management Training	Lahore	April 87	PCC	1.5
17.	Installation of Weather Stat.	T-D-F	April 87	Local Universities	1 1
18.	Installation of Soil Labs	T-D-F	April 87	Local Universities	2
19.	T-D-F Course	T-D-F	May 87		1
Total Short-Term Local Consultants					87.5