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PROJECT COMPLETION REPORT

ON-FARM WATER MANAGEMENT PROJECT

391-0413

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

MISSION TO PAKISTAN

ISLAMABAD PAKISTAN, JULY 19, 1987

PROJECT ASSISTANCE COMPLETION REPORT  
ON-FARM WATER MANAGEMENT PROJECT  
(391-0413)

A. BASIC DATA

1. Country : Pakistan
2. Project Name : On-Farm Water Management
3. Project Number : 391-0413
  - a. Loan : 391-T-172
  - b. Grant
4. Project Dates
  - a. First Project Agreement : October 27, 1976
  - b. Final Obligation : April 07, 1983
  - c. Project Assistance Completion Date : June 30, 1987
5. Amount Authorized : \$ 18,417,000
6. Project Funding :  
  
A.I.D. Bilateral Funding
  - DA Loan : \$ 7,500,000
  - DA Grant : \$ 917,000
  - ESF Grant : \$ 10,000,000
  - Other: Mondale Rupees : Rs. 28,400,000
  - GOP : \$ 16,200,000
7. Other Donors
  - World Bank OFWM-I : \$ 41,000,000
  - OFWM-II : \$ 34,500,000
  - IFAD : \$ 12,000,000
  - ADB : \$ 25,000,000
8. Life of the Project : 10 years 8 months
9. Project Officer : John R. Anania
10. Authorized Representative of GOP : Baz Mohammad Khan  
Director General  
Water Management Wing  
Ministry of Food and  
Agriculture
11. Name of Implementing Agency : Ministry of Food and  
Agriculture

## B. BACKGROUND

### 1. Project History

In 1973, Water and Power Development Authority (WAPDA) undertook a water management research project at Mona Reclamation Experimental Station. The project was funded by USAID with technical assistance provided by the Colorado State University (CSU). The research determined that watercourse conveyance loss rate ranged between 31-57%. The potentials for controlling water losses at watercourse level led to the design and subsequent implementation of the On-Farm Water Management (OFWM) Pilot Project.

#### 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 million in grant funds over four years to assist the provincial governments to improve 1,500 watercourses, precisely level 425,000 acres of land, and train between 60,000 to 100,000 farmers in improved crop and water management practices. The project received only \$7.5 million in loan and \$917,000 million in grant funds when the development assistance to Pakistan was severed by the application of Section 669 of the Foreign Assistance Act in 1979.

Despite the slow start, financial shortfall and several implementation problems, the pilot project was 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.

#### b. Pilot Project Achievements:

The Pilot Project focused on the following four major areas:

Watercourse Improvement: Due to the demonstrated benefits of watercourse improvement, farmer involvement in the program was high. The target set for watercourse improvement was 1,500. As of June 30, 1981, 1,319 watercourses had been improved.

Precision Land Leveling: Although farmer interest in precision land leveling is increasing, this component of the pilot project failed to generate 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 leveling 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 leveling, only about 75,000 acres were leveled as of June 30, 1981.

Farmer Training: Little progress was made in achieving the target of training 60,000 to 100,000 farmers in improved crop and water management practices. This neglect of extension services was largely attributable to the greater emphasis placed on watercourse improvement by the provincial OFWM Directorates.

Institutional Development: The most significant accomplishment of the pilot project was in the area of institutional development. The creation of the 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. The 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 (PFY) 1976/77, the budget grew to nearly Rs. 88 million in PFY 1980/81. Similarly, the number of field teams increased from zero in PFY 1976/77 to 50 in PFY 1980/81. The total number of employees in the three Directorates as of June 1981 stood at over 1,000.

The U.S. Department of Agriculture/Soil Conservation Service (USDA/SCS) developed five volumes of technical manuals to assist trainers, technical support personnel and field workers in carrying out on-farm water management activities. The manuals - Reference, Precision Land Leveling, Watercourse Improvement, Irrigation Water Management and National Standards for Practices, Materials and Structures are being used by all provinces and donor agencies.

Training institutes were established to train program personnel, other government personnel, farmers, bankers, private contractors, and tractor operators. USDA/SCS 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 summary, the demonstrated effects of OFWM activities created an enthusiasm from the farm level to the highest levels of government that assures GOP commitment to the program.

#### C. PROJECT AMENDMENT

In spite of the suspension of assistance by A.I.D. in 1979, the provinces continued to carry out the planned civil works under the OFWM

Program. In August 1981 USG-GOP negotiations, the GOP requested reimbursement for the completed civil works. In order to reimburse the GOP for the completed watercourse improvements which were eligible for A.I.D. financing under the original project and to overcome institutional deficiencies and to correct implementation problems which were identified during the course of the pilot project, A.I.D. decided to extend the original project for three years to provide needed assistance. The decision was not only consistent with A.I.D.'s policy emphasis on institution-building and management training, but was to ensure the long-term development impact and sustainability of the original project.

In 1982, the Project Paper was amended to provide technical assistance, training, and institutional development activities including commodity procurement. The project amendment contained three major components: reimbursement for civil works already completed under the pilot project; training and technical assistance to further strengthen the capability of local institutions to implement Pakistan's OFWM Program; and a local government pilot program to examine the feasibility of local councils to deliver water management services as a means to identify an institutional mechanism to accelerate the implementation of the OFWM Program. All the proposed activities were consistent with the original project purpose and reflected the lessons learned during the pilot project.

#### 1. Project Progress

The project continued to build on the accomplishments of the pilot project and resulted in several additional projects. Two of these were funded by the World Bank and by the Asian Development Bank. The project outputs, watercourse improvement and precision land leveling indicate combined totals for the earlier A.I.D. efforts with those of other donors. The outputs for training and institutional building are the direct result of A.I.D.-funded project.

##### a. Watercourse Improvement

The total number of improved watercourses completed by the provinces as of June 30, 1987 stood at 7,692. Of this total, A.I.D. financed the improvement of 1,319 watercourses, World Bank 5,033 and Asian Development Bank 1,610.

##### b. Precision Land Leveling

As of June 30, 1987, the total number of acres precisely leveled under the various OFWM projects stood at 152,400 --- 74,857 acres under A.I.D. project, 66,293 acres under World Bank, and 11,250 acres under Asian Development Bank.

##### c. Training

Training activities under the project focused not only on the provision of in-country and overseas training of the project personnel but also on the strengthening of OFWM training centers.

Capabilities were developed in each of the four provincial OFWM training centers to plan, design, and conduct required training courses. The following training took place under the project.

Overseas Training

<u>Type of Training</u>	<u># Participants</u>
Long-Term (U.S.)	7
Short-Term (U.S.)	90
Farmer study tours	29
GOP officials study tour	30

In-Country Training

<u>Type of Training</u>	<u># Courses</u>	<u># Trainees</u>
OFWM Project (Technical and Management)	42	563
Farmer Training	10	1,736
On-the-job Training	15	73

Province Sponsored Training

Each Training Center established targets and implemented their own training programs. The provinces undertook the following training under the project.

<u>Punjab</u>	<u>Courses</u>	<u>No. of Trainees</u>
OFWM Project	15	484
CWM Project	1	31
Others	62	5,898
Farmer Field Days	12	53,700
<u>Sind</u>		
OFWM Personnel	3	45
Farmer Field Days	5	2,500
<u>NWFP</u>		
OFWM Personnel	4	173
Farmer Field Days	4	2,000
<u>Baluchistan</u>		
OFWM Personnel	1	6
Farmer Field Days	3	540

d. Institution Building

The pilot project led to the creation of permanent entities both at federal and provincial levels to implement the OFWM project. The acceptance and adoption of the improved OFWM technology both by the GOP and the farming community necessitated the expansion and strengthening of the Federal OFWM Cell and Provincial OFWM Directorates. These entities grew enormously both in magnitude and in its ability to shoulder greater OFWM program implementation responsibilities during the last three year of the project (1984-87). During this period the following institutional development activities took place:

Improved Management Capabilities: The management capabilities of the federal cell and the provincial directorates were enhanced through the development and installation of a management information system to monitor project progress and improved the physical setting through modest procurement of equipment and furnishings. Fifteen locations received computers, air conditioners, and training for managers and operators. Twelve locations received photocopiers.

Strengthening of Training Centers: To adequately meet the growing training needs of the OFWM personnel and the farmers, four OFWM training centers (one in each province) were established/strengthened. Training equipment was provided and training staff trained in training of trainers courses, in OFWM practices, in lesson planning and course design. Vehicles were provided to these centers to enable them to further the outreach program to farmers.

Establishment of Media and Materials Production Center: A modern functioning Media Center with the capability to prepare and edit VCR materials, still photography, and to serve as a project materials resource center was established at the federal cell. Similarly, a Materials Production Center with the capability for preparing publications, running off small runs, binding and despatching publications was also established. The center during the past three years produced twenty publications covering OFWM related disciplines.

Establishment of Training Demonstration Farms: Four training demonstration farms (one in each province) were set up to demonstrate improved OFWM water management practices and to train OFWM field staff and farmers in better agronomic practices.

## 2. Project Purpose

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

#### D. STATUS OF COMPLETION OF PROJECT ELEMENTS

Reimbursement to GOP for the civil works improvements and institution strengthening and provision for commodities were the major elements of the amended project. The amended project emphasis was shifted from watercourse improvements to institution development to ensure the sustainability of the OFWM program. Status of each of the project element are as follows:

##### 1. Reimbursement for Civil Works

A.I.D reimbursed the GOP for the improvement of 1,319 watercourses under the project.

##### 2. Institution Development

The institution strengthening element of the project registered remarkable growth during the last three years of the project. Involvement of the World Bank and the Asian Development Bank in OFWM activities assured adequate financial support to the watercourse improvement program. Therefore, AID focussed on the "software" aspects of the project - to establish a public and private sector capability to plan and deliver on-farm water management services on an economic basis. The activities carried out as part of institution strengthening effort of the program are summarized below.

##### a. Technical Assistance

The objectives of the technical assistance team was to improve the management capability of the federal cell and the provincial directorates by developing and installing a management information system to monitor project progress, develop provincial capability for training of field staff, extension workers and farmers and to establish a media center and materials production unit within the federal cell. Sheladia Associates Inc. (SAI), a minority firm provided 169 person months of long term technical assistance, 55 person months of short term consultants and 87.5 person months of local advisory services to carry out the project activities.

The accomplishments of the Sheladia water management team were as follows:

A functional management information system in each provincial directorate and training center and at the federal cell;

Surveyed, planned, installed, and trained field personnel in the operation of six widely separated micro irrigation systems in Baluchistan;

Developed four provincial OFWM training centers to train project and related personnel and farmers. This included the development

of a 5 year training program, renovation/remodeling of existing facilities, procurement of training aids, equipment and vehicles, training of teaching staff and upgrading of library facilities;

Established a training demonstration farm in each province to demonstrate improved water management practices and provide on the job training for field staff, extension workers and farmers; and

Established a Media Center and a Materials Production Center at the federal cell. The media center has the capability of preparing and editing VCR materials, still photography, plus serving as a project materials resource center. The production center has the capability of preparing publications, running off small runs binding and dispatching publications. The center produced and published 20 publications.

b. Training

The shift in the emphasis of the program from civil construction and actual watercourse improvements to institutional development necessitated the development of training capabilities within the provincial OFWM Directorates. A total of 36 person months of long term technical assistance was provided to the provincial training institutes to plan, organize, and conduct training courses for field staff, extension workers and farmers.

c. Computerization

Based on the computer needs assessment conducted in March 1985, each provincial directorate and training center were provided IBM-PC-XT computers. A computer was also provided to Water Resource Section of the Federal Ministry of Planning and Development. A total of 15 computers were purchased.

To implement the use of the computers by the OFWM personnel, the following actions were initiated:

A one month course at Mehran University, Hyderabad for operators from the provincial directorates and training centers was given; and

Initiation of a series of courses at three levels - senior managers, middle managers, operators and in service training for operators to introduce and implement the management information system.

A Computer Assisted Design (CAD) of Watercourses for engineers was developed and training was given to 48 engineers in the operation of the CAD. The CAD permits operators to input data from their field notes and performs the engineering design and provides schedules and costs of quantities i.e. bricks, cement, sand and labor required for the construction of the watercourse. The CAD also provides a graphic profile of the watercourse indicating slope and locations of turnouts and other structures.

d. Monitoring and Evaluation

In July 1984, the watercourse monitoring and evaluation directorate of the Planning Division of WAPDA issued their final evaluation report on the improved watercourses financed by the OFWM Project. The report covered the years 1977-81. The evaluation covered 36 sample watercourses constructed during the period and a sample of 210 farmers. The evaluation indicated that improved watercourses reduced water losses by 37 percent. Also, the farmers overwhelmingly favored the watercourse improvement program and that Precision Land Leveling had a positive effect on increasing crop yields. However, the report contained very little social and economic data on what impact the project has on the beneficiaries.

e. Local Government Pilot Program

The project amendment contained provisions for funding a pilot study in each of the four provinces to determine the ability of Local Councils to deliver water management services. This component was cancelled because the Ministry of Local Government wanted to set up a parallel organization similar to the one developed with the Ministry of Food and Agriculture to implement project activities in the provinces.

f. Establishment of Provincial Training Centers

As previously indicated, four provincial training centers were established. Buildings for classrooms, offices and lodging were remodeled and modern training equipment supplied to make each center a comprehensive training facility. Faculty members were recruited or deputed and training provided to them in planning, organizing and conducting training courses and in developing course curricula.

The institutes provide training to the professionals in agriculture and agriculture engineering who make up the OFWM field teams, sub-engineers and supervisors who have three year diplomas from polytechnic institutes, sub-professionals from the agriculture extension service including field assistants, agricultural officers and farm managers and chairmen and members of the Water Users' Association.

g. Special Water Management Studies

The special water management studies conducted for AID by the contractor are summarized below:

Canal Roads Feasibility Study. A study on the technical and economic feasibility of up-grading canal inspection paths into full access public roads.

Sociological Study of Earth Borrowing for Canal Rehabilitation. A Study on the agro-economic impact on farmers of

borrowing earth from farm fields during canal rehabilitation and recommend possible solutions.

Status of Precision Land Leveling (PLL) in Pakistan. This is a review of existing literature, an analytical framework and detailed scope of work for a future comprehensive study on the status of PLL. The study will have a special emphasis on the role of the private sector in PLL and an examination of some of the reasons why farmers, particularly small farmers have not adopted this practice.

Surface Drainage of Irrigated Land in Pakistan. A study that examines the problem of surface drainage of irrigated land in Pakistan and to develop a detailed scope of work for a more comprehensive study.

Water Users Associations in Pakistan. A study of the role of Water Users Associations in the maintenance of improved watercourses. The study addressed some of the organizational issues affecting improved maintenance of watercourse and developed guidelines to effect more adequate maintenance of watercourses. A Watercourse Maintenance Manual was published that was based upon the findings of the study.

  
John R. Anania  
Project Officer

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