Pakistan

On-farm Water Management Project

Report Date: October 2002

Field Survey: August 2001

1. Project Profile and Japan's ODA Loan

Site Map: 30districts in 4provinces, FATA and ICTA

Site Photo: A renovated Watercourse in Punjab

1.1 Background

The agricultural sector, which accounted for 26.5% of GDP in FY 1989/90, was the mainstay of the Pakistani economy. The sector employed 51.2% of the total workforce, and agricultural produce, including processed products, earned 88.5% of the total export volume that year.

Agriculture in Pakistan depends heavily on irrigation. Irrigation facilities, which are extensively developed in the country, covered 79.7% of cultivable land as of FY1986/87. However, there is substantial loss of water from irrigation systems, especially from on-farm facilities (watercourses), due to inadequate management and maintenance. Inefficient use of water, together with a lack of knowledge about modern agronomic practices, is the biggest constraint to the improvement of agricultural productivity in Pakistan.

1.2 Objectives

To improve on-farm water management, i.e., to improve the efficiency of land and water use by improving on-farm water facilities, providing other land and water works, and thereby increase agricultural production. The overall goal of the Project is to improve living standards of the beneficiary farmers by increasing farm incomes.

1.3 Project Scope

The Project is part of a nationwide program for on-farm water management[1]. There is a single overarching concept, but this Project is administered and implemented independent of the rest of the program. The Project covers selected districts in four Provinces, in FATA and in ICTA[2], and there is no overlap among the districts covered by Japan's ODA, the World Bank, and ADB. The Project comprises the following components:

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[1] The World Bank, in July 1991, approved Credit and Loan in the amount of US$84.2 million equivalent for the Third On-Farm Water Management Project.

[2] They are: in Punjab: Rawalpindi, Jhelum, Attock, Chakwal, Lahore, Shekupure, Gujrat, Sialkot, Gujranwala; in Sindh: Thattha, Larkana, Shikarpur; in Baluchistan: Musa Khel, Kalat, Killa Saifullah, Jafarabad, Lasbela; in NWFP (North West Frontier Province): Kohat, Karak, Bannu, D.I. Khan, Swat; in FATA (Federally Administered Tribal Area): Kurram Agency, North Waziristan Agency, South Waziristan Agency; and in ICTA (Islamabad Capital Territory Administration): Islamabad.

① Civil Works: renovation of watercourses; construction of water storage tanks; precision land leveling, etc.
② Procurement of vehicles and equipment
③ Training of farmers, on-farm water management (OFWM) personnel and extension personnel
④ Consulting services

1.4 Borrower/Executing Agency

The President of the Islamic Republic of Pakistan / Federal Water Management Cell (FWMC), Ministry of Food, Agriculture and Livestock (MINFAL)

1.5 Outline of Loan Agreement

Loan Amount/ Loan Disbursed Amount	8,230million yen 6,847million yen
Exchange of Notes/ Loan Agreement	January 1992 March 1992
Teams and Conditions Interest Rate Repayment Period (Grace Period) Procurement	 2.6 % p.a. 30 years (10 years) General Untied
Final Disbursement Date	March 2000

2. Results and Evaluation

2.1 Relevance

The objectives of the Project were in line with the Government's sector policies, as reflected in the following:

- In March 1988, the National Commission on Agriculture identified several major strategies for the sector, including increasing yields, upgrading agricultural technologies, and improving the social stability of small farmers by improving productivity,
- The Seventh Five-Year Plan (1988/89 – 1992/93) put emphasis on the improvement of agricultural productivity and the conservation of land and water resources.
- In 1988, the Government received credit from the World Bank for agriculture sector adjustment; the adjustment goals were competitive agriculture and sustainable growth through upgraded agricultural productivity.

Government policy still maintains its emphasis on expanding efficient use of water by improving watercourses; the Ten-year Perspective Development Plan, 2001-11[3] envisages the improvement of 75,000 watercourses, which will save about 6.5 MAF[4] of water at farm gate.

2.2 Efficiency

(2.2.1) Project Scope

The physical targets of the project included the renovation of 4,027 watercourses, precision leveling (PLL) on 16,468 ha of land and the construction of 256 water tanks. In the initial stage, project activities were slow; but gradually the implementing agencies[5] picked up the pace, and by the scheduled

[3] Planning Commission, Government of Pakistan, "Ten Year Perspective Development Plan 2001-11 and Three Year Development Programme 2001-04," Sept. 2001, Chapter 18.

[4] MAF = Million Acre Feet = 1,239 million cubic meters

[5] The OFWM directorate of each participating Province and the relevant authorities of FATA and ICTA implemented the Project's civil works. They are collectively called the "implementing agencies."

completion date (mid 1997), most had achieved their original targets for watercourse renovation, construction of irrigation water storage tanks and precision land leveling. The Government then revised the targets upward, on a province-by-province basis, for those components that had been well accomplished. While targets for some pilot components were revised downward, two participatory irrigation management pilot projects were newly included, one of which was transferred from the World Bank program. These pilot projects aimed to develop effective farmers' organizations (formation of WUAs at watercourse levels and establishment of WUA federations at the minor level[6]) that could assume responsibility for the operation and maintenance of the irrigation infrastructure at minor level

The Project surpassed targets for the main components (watercourse improvement – 143% of target; PLL – 115%; and water tanks – 147%)[7], but fell short of the targets for two other components. Targets for the farmer training centers were unfulfilled due to concerns about recurrent costs, and the pilot projects for rain-fed Barani[8] areas and the rehabilitation of structures in the irrigated Sailaba[9] areas were not achieved in full due to high project costs or poorer than expected absorptive capacities for new technologies.

Notwithstanding the shortfall in the number of the farmer training centers, the number of people who got training under the Project exceeded the targets: among on-farm water management personnel by 79%; for extension personnel by 110%; and among farmers by 14%. The extensive development of the Demonstration Farms -- in 669 places while the target was 601 -- played an important part in promoting training (refer to 2.3.3); the number of farmers who participated in training at Demonstration Farms accounts for more than 85% of the number of trained farmers.

(2.2.2) Implementation Schedule

The Project was to be implemented over 5 years (1991/92 – 1996/97). Although most of the implementing agencies had achieved their original targets for the main components by the scheduled completion date, they could not deliver all the planned outputs as originally scheduled. Some pilot projects and the farmer training centers were delayed by impediments in the land acquisition process. The disbursement period for the Project was extended by one year and was closed in March 2000. The Project was terminated at the end of 1999.

(2.2.3) Project Cost

The original estimate of the total project cost, excluding the farmers' contribution, was ¥9,682 million (Foreign cost: ¥2,190 million, Local cost: Rs1,274 million). The total accumulated cost incurred during the Project, excluding farmers' contribution, was ¥8,454 million (Foreign cost: ¥1,847 million, Local cost: Rs2,294 million), out of which ¥6,847 million, equivalent to Rs2,377 million, was financed by Japan's ODA. Despite the upward revision of the physical targets and the extension of the implementation period, there were considerable cost under-runs in terms of the ODA loan disbursement amount for all components but the consulting services. The cost under-run was a result of the appreciation of the Yen against the Pakistani Rupee.

(2.2.4) Executing set-up and cash flow

With a view to strengthening its administrative control over Project implementation nationwide, FWMC retained consultants for the purpose of implementation supervision, and exerted control over Project expenditures. FWMC was instrumental in seeing to it that funds were available equitably, even for provinces that were slow in achieving their targets. To supervise the flow of project funds, FWMC not

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6 There are two types of irrigation schemes: 'canal' and 'non-canal.' A 'canal' scheme is an irrigation system that gets water coming from the Indus, while a 'non-canal' scheme is an irrigation system that gets water from sources other than the Indus. In the case of canal schemes, watercourses get water from turnouts. The turnouts are set in the laterals of the main canals that convey water from the Indus. The lateral canals are either distributaries or minors flowing down from distributaries. The O&M of the distributaries and minors has been the responsibility of the governments. There are generally 20-30 watercourses connected to one minor canal. The importance of the distributary/minor level is that water supply is controlled at this level. Therefore, the formation of farmers' organizations at the distributary/minor level is essential for the effective participation of farmers in managing the irrigation system.

7 A total of 6,138 watercourses / water storage tanks were improved and constructed. The sum of command areas amount to about 336,362 ha, which fell short of the original target of 380,110 ha.

8 A Barani is a rain-fed area with some interspersed small irrigation schemes.

9 Sailaba is irrigation using flood flows; it is known also as Rod Kohi irrigation.

only checked requests from the implementing agencies for the reimbursement of civil works expenditures and field team staff wages, but also administered transfer instructions and other transactional procedures within the country after the disbursements from Japan. This procedural set-up for channeling loan proceeds resulted in excess time between the submission of reimbursement requests and the receipt of the loan proceeds by the implementing agencies.[10]

2.3 Effectiveness

There are no statistics available for production in the area covering all the sub-projects. The following outcomes of the Project are mainly the findings obtained through a series of before-and-after surveys of 45 sample sub-projects of watercourse renovation and/or storage tanks construction (Sample Survey)[11]. The data were collected from winter 1994-95 to summer 1997. Also quoted are findings gathered in interviews conducted as part of the post-evaluation survey, from August to October 2001. One hundred (100) farmers whose irrigation facilities were renovated or constructed between January 1993 and December 1999 were interviewed (Interview Survey).

(2.3.1) Area cropped and yields

The Sample Survey found considerable improvement in conveyance efficiency; in the winter season, the average conveyance efficiency improved 13% overall, in summer it improved 18%. Consequently, area cropped increased. In the winter season, the area planted in vegetables increased 193% and in cash crops, 10%, while the wheat and fodder area decreased[12]. In the summer season, fodder area increased more than 47%; vegetables, 34%; and cash crops (sugarcane and cotton), 42%. But the area planted in rice hardly changed. As a result, the overall annual cropping intensity rose almost 11%, (from 162% to 173%), which compares favorably against the originally projected increase of 6%, from 110% to 116%.

A majority of respondents to the Interview Survey noted that water use efficiency (75 out of 100) and cropping intensity (57 out of 100) had improved significantly. They reported that the area of cultivated land with irrigation expanded from 1,832 ha to 2,190 ha, a 20% increase, while the total area of cultivable land increased by 291 ha from 2,003 ha, to 2,294 ha. The amount of cultivated land increased for all crops: for wheat, 20%; fodder (winter, 16% and summer, 8%); vegetables (winter, 28% and summer, 32%); rice, 10%; cotton, 11%; sugarcane, 48%; maize, 23%; and orchards, 29%. As a result, the total area cropped in summer and winter increased by 23%, and cropping intensity rose 16%, from 165% before the project to 181% in year 2000/2001.

The Sample Survey indicated increases in crop yield varying from 2% to 15%, which is in the same range as the project targets for yield increase: 3-15%. Respondents to the Interview Survey said yields increased from 8 % to 25%.

(2.3.2) Incremental crop production of the Project as a whole

Crop production in the Project area was estimated based on changes reported in the Sample Survey with regard to yield and area cropped. The yields of crops used for estimation are those that were observed in Sample Survey and shown in Table 1, together with yield figures observed in Interview Survey. They commensurate somehow with the figures reported by the Interview Survey.

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10 According to some implementing agencies and to the consultants retained for assisting with project implementation, this delay often caused cash flow problems. In one case in NWFP, it took 5 months from submission (31 December 1999) to receipt (3 June 2000). For this request, Japan made the disbursement to the Borrower on 17 March 2000, 2.5 months before receipt by the Province. To overcome this drawback, some suggested disbursements be made directly to the implementing agency's account, bypassing the Federal organization, while some recommended the use of a revolving fund, from which reimbursement could be made immediately on approval.

11 The size of the sample is determined by applying a simple random sample equation. The project field teams carried out interview surveys of cultivators at least twice in winter and three times in the summer; the data collection was in-house monitoring and evaluation. Baseline interviews were done in the winter of 1994-95 and 1995-96 and in the summer of 1995, while post improvement interviews were conducted in the summer of 1996, the winter of 1996-97 and the summer of 1997. The findings reported here are based on information gathered from 544 cultivators from 44 schemes in the winter season and for 523 cultivators from 43 schemes in the summer season.

12 Two-thirds of this decrease was accounted for by only two watercourse schemes. In one of the two schemes, the land was taken out of cultivation to be used for brick kilns.

Table 1: Crop Yields and Production Increase

Crop	Unit	Yields observed in Sample Survey and used for production estimation			Yields reported in Interview Survey			Increase in Production (ton)	Target Increase in Production (ton)
		Before[1] Project	After[2] Project	Yield Increases	Before[3] Project	With[4] Project	Yield Increases		
Rice	kg/ha	3302	3682	12%	3633	4013	10%	87,908	34,000
Wheat	kg/ha	2438	2794	15%	2336	2769	19%	26,731	23,400
Vegetables	kg/ha	9750	10000	3%	-	-	-	125,829	9,600
Fodder (winter)	kg/ha	15000	15250	2%	20124	23976	19%	115,088	182,300
Fodder (summer)	kg/ha	10000	10250	2%	22389	26904	20%	32,223	
Oilseeds	kg/ha	673	701	4%	-	-	-	10,514	-
Sugarcane	ton/ha	51	52	2%	39.8	42.9	8%	443,757	90,900

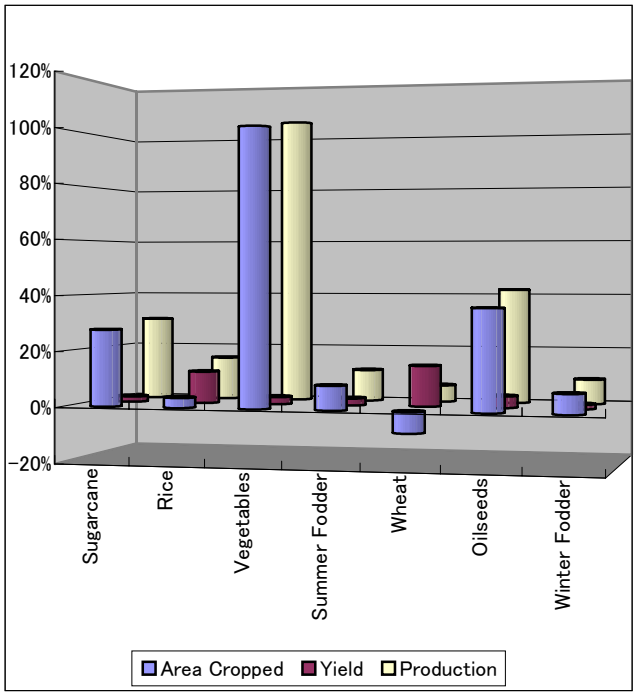
Source: FWMC, JBIC file

Note: 1) Winter 1994-95,summer 1995, or winter 1995-96; 2) Summer 1996, winter 1996-97 and summer 1997; 3) Seasons before the improvements that had taken place from January 1993 to December 1999; 4) Seasons immediately preceeding summer 2001

The figure for percentage change in area cropped used to estimate total production is shown in Figure 1. They are in line with the Sample Survey observations except for winter fodder. The total area cropped to fodder in winter, as a matter of fact, decreased according to the findings of the Sample Survey; nonetheless an increase is supported by the result of the Interview Survey. Given those estimates, the increases in the production are calculated and they exceed the original targets in all cases except fodder. Increases in rice and wheat production are due to increases in yield, while those for other crops resulted mainly from an increase in the area cropped.

Based on observed increases in yield, total area irrigated, cropping intensity and area cropped, we may infer that the Project was effective in bringing about a substantial increase in production.

Figure 1: Estimated total incremental changes in area cropped, yield and production



Source: FWMC, JBIC file

(2.3.3) Farmer Training

Table 2 presents figures summarizing the extent of training for farmers and for staff by component. 85% of farmers who participated in the training courses did so at Demonstration Farms. However, judging from observations made in the Interview Survey, the Demonstration Farms are underutilized; fewer than half of the respondents (47) said that they had actually visited a Demonstration

Farm,[13] while 90 respondents reported that they received assistance from an extension worker[14]. Extension workers' visits to farmers appeared to be regular; 89 of those who received assistance said that the extension worker's last visit was in year 2000 or 2001.

Table 2: Detail of Project Training Programs

Component/Subject	Number of Trainings	Number of Participants		
		Staff*	Farmers	Total
Farm Demonstration Centers – crop and water management techniques	228	2100	10,927	13,027
Water harvesting concept and techniques	58	605	670	1275
Micro-irrigation concepts, techniques and its operation	1	40	0	40
Precision land levelling	2	10	80	90
Water User Association concept and functions	11	136	164	300
Drainage techniques	5	127	0	127
Water measurement techniques	6	80	61	141
Monitoring and evaluation techniques and data collection	21	527	52	579
Social organisation and capacity building of farmers and social organisers	6	20	218	238
Women's development	13	0	650	650
Total	315	3645	12,822	16,467
Target		1880	11,295	
Achievement %		194	114	

Source: FWMC, MINFAL
Note: * includes OFWM personnel and extension personnel

Having seen that Demonstration Farms were underutilized, one may conclude that we should put more inputs in the agronomic components of the future projects because the Project was not successful in translating saved water measured by the improvements in conveyance efficiencies: 13% winter and 18% summer, into agronomic outputs, say measured by cropping intensity – a change from 162% to 173%, or a meager 6.8% increase of the base of 162%, citing the observation made in paragraph 2.3.1. There is no denying the importance of agronomic components, but it is important to note the effectiveness of the existing extension network. Future planners should explore ways to strengthen ties between the extension network and on-farm water management teams.

The Project recognized the role Farmer Training Centers (FTC) could play in educating local communities about the concept and function of Water User Associations. The number of the participants, however, in this course was rather limited[15] even if a course in social organization and capacity building of farmers and social organizers is taken into consideration. This was probably due to the same factor that brought about a decrease in the number of FTCs established by the Project: concerns about recurrent costs. If that were the case, the attention should be paid to the recent trends in the governments' emphasis on the

[13] In addition, 23 other farmers said that they knew of the existence of the Demonstration Farms but had never visited one. 27 said that they had never heard of them.

[14] The Project had no project components in which participating farmers were to be assisted by the extension workers.

[15] In the Interview Survey, out of 31 respondents who reported participation in training courses held at Farmers Training Centers, only 2 received training in WUA management and 6 in O&M of irrigation infrastructure.

transfer of irrigation management away from the governments to the farmers and the expected important roles WUA is to play in improving on-farm water management. Ongoing training to strengthen the capabilities of WUAs merits more attention.

(2.3.4) Internal rate of return

The **EIRR** for the Project was originally estimated at 18.1 %, assuming 20 years of project life. The **EIRR** was re-estimated in 2000, based on the production estimate explained in Section 2.3.2 above, at 26.6%. The increase can be attributed to the significant increase in incremental area cropped (35,000 ha in re-estimation as against 23,000 ha in the original), which was achieved in spite of the decrease (about 11.5%) in total area covered by the Project. Actual cropping intensity was substantially higher than the original estimate (11% as against original 6%). Other assumptions employed in the re-estimation were essentially the same as those made in the original, with some modifications to make the value more relevant to the actual achievements:

1. Costs revised to incorporate the expenditures incurred and to include the contribution of farmers are expressed in 1999-2000 prices;
2. The benefits are recalculated based on the findings obtained through the before-and after Sample Surveys, namely yields and area cropped to each crop as well as detailed cropped budgets.

2.4 Impact

(2.4.1) Farm Income

Table 3: Reported Annual Income from Crop Production

Type of Scheme	Type of Cultivator	Size of Farm (ha)	Reported Annual Income from Crop Production (Rs)		%age Change
			Project	After Project	After Project
Canal	Landowner	0 to 2	17376	23099	33%
		2+ to 5	49626	60372	22%
		5+	113791	150232	32%
	Tenant	0 to 2	10220	14912	46%
		2+ to 5	24221	25582	6%
		5+	32582	62829	93%
Non-Canal	Landowner	0 to 2	3734	24076	545%
		2+ to 5	23088	56891	146%
		5+	150047	314398	110%
	Tenant	0 to 2	8226	26907	227%
		2+ to 5	4435	8485	91%
		5+	76291	40427	-47%
All			30953	41413	34%
All at constant 1994-95 Wheat Pric			30953	38445	24%

Source: FWMC, MINFAL

Table 3 shows the annual incomes, reported in the Sample Survey, from crop production for 12 different categories of cultivators[16]. With the exception of tenants on non-canal schemes with large farm sizes, the annual reported incomes increased. The overall increase in reported real annual income was 34%, and it would be 24% if estimated with the constant 1994-95 wheat prices, as the support price of wheat significantly increased in 1996-97.

The Interview Survey Respondents were all landowners, with a median of 7 ha of cultivable farmland; 53 had land in canal areas and 47 in non-canal areas. The farmers working within the canal scheme areas reportedly achieved a 73% increase in their farm income after the Project while farmers in non-canal areas reported a 69 % increase with the Project.

[16] The 'before' project incomes include those reported for the pre-improvement seasons of winter 1994 and 1995 and summer 1995, while the 'after' project incomes include those reported for the post improvement seasons of winter 1996 and summer 1997. The incomes are adjusted to 1994-94 price levels by deflating the nominal prices with the CPI.

(2.4.2) Employment Creation

The Project generated both short-term and long-term employment. In the short-term, employment was generated through construction activities, while in the long-term, demand for agricultural labor increased. Based on the Sample Survey results, demand was estimated to be 5.8 million person days per year at the project completion. This is in addition to contractual employment for the harvest, for which payment is made in the form of crop share.

Respondents to the Interview Survey reported, as a whole, a 15% increase in family labor as well as increases in hired labor for their farm. The number of casual employees increased from 282 to 433 (54% increase) after the Project and of permanent employees from 185 to 248 (34%). If the increase in the number of permanent employees is indicative of Project performance as a whole, demand for agricultural labor equaling 6.4 million[17] person days per year was created.

(2.4.3) Living conditions and other impacts

The results of the Sample Survey concerning standards of living revealed improvements after renovation. The total population increased by over 5%, from 6,133 to 6,461, during the two and a half years that data was collected. The average size of a farming unit[18] (not necessarily one family) increased from eight to nine persons. There was a 10% increase, from 51 to 61%, in landlord farming units living in brick (not mud) houses after watercourse improvement, although the increase for tenant farming units was only 1%, from 6% to 7%. After renovation, more farming units were self-sufficient in more foodstuffs than before renovation. The percentage of farming units producing more than 50% of the basic foods they consumed increased after renovation. There were improvements in access to better drinking water, electricity, sewerage facilities and health services. Some improvements were the result of increased availability of services, while some, as for health services, may reflect the increased ability of people to buy such services. Tenant farming units, however, had poorer access to most services and commodities compared to landowner farming units.

No adverse impacts on the environment were observed or reported, as the Project mainly consisted of the renovation of small-scale irrigation ditches and the construction of concrete water storage tanks for existing small-scale irrigation systems.

2.5 Sustainability

(2.5.1) WUA and Maintenance

The formation of WUAs by beneficiary farmers is a condition of watercourse renovation. The relevant provisions are set out in Water Users' Association Ordinances (1981) promulgated separately by each of the provinces. On every watercourse, the WUA (WUA office bearers) and farmers are given formal and informal training under the Project[19] in the simple maintenance techniques required to maintain the watercourse properly. Following completion of civil works and formal hand-over to the WUA, all maintenance of the watercourse becomes the responsibility of the individual WUA. The Ordinances state that the OFWM directorate will carry out rehabilitation work at the farmers' cost, if the state of the watercourse deteriorates to such an extent that it warrants intervention.

The majority of the required maintenance is labor-intensive -- such as de-silting with a spade or cutting grass -- and is achieved using the farmers' own unskilled labor, organized and managed through the WUA. Such maintenance is undertaken generally once or twice a year, as the farming calendar, the availability of farmer labor and/or closure of the canal system permit. The results of the Interview Survey suggest that maintenance undertaken by WUA is generally satisfactory. All respondents (99) confirmed that their WUAs carried out some activities for O&M; 69 respondents said de-silting was carried out by the WUA, 84 cited minor repairs, 64 noted grass cutting/weeding and 26 pointed to the reshaping of side slopes .

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17 Estimation formula: (Total area of the Project / Total cultivable area irrigated with Project of the Interviewees) ＊ 63 persons ＊ 300 days/year = (336362/986)＊63＊300=6,447,507.

18 Seventy-three % of the farming units are landowner units and 27% are tenant or laborer units.

19 In reality, the ratio of farmers who got training appears to be small. Of the 100 interviewees, only 31 said that they got training at a farmer training center; of that 31, only 6 cited O&M as the subject they learned.

3. Recommendations

Maintenance undertaken by WUA may be satisfactory, but the maintenance of watercourses is just one function of WUAs. They should play a greater role in raising member farmers' interest in sustaining project benefits and in the associations themselves. As stipulated in the Water Users' Association Ordinances, the three primary purposes of the WUA are: the improvement of on-farm water management; the improvement of water supply from surface or groundwater; and the operation, maintenance, improvement and rehabilitation of the watercourse. To realize better on-farm water management, WUAs should consider pursuing other activities such as joint input supply, marketing and obtaining access to credit and training services.

Another area where improvement is desired is in the management of the irrigation system. The Federal and Provincial Governments have taken care of a major part of the irrigation and drainage infrastructure. However, faced with tight fiscal conditions, they have begun to transfer management of the irrigation and drainage systems, particularly at distributary / minor[20]levels. The Project adopted two participatory irrigation management pilot projects that aim to form a federation of WUAs at minor canal levels, thereby making the transfer of irrigation management to the WUA federation practical. The managerial capacity of WUAs has to be strengthened and their role expanded to facilitate the transfer of management from the government to farmers.

[20] One more essential function of WUAs is the collection of water charges, which is now being performed by the Government.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Scope		
1.Civil Works		
(Core Activities)		
A) Watercourse renovation	(Total 4027)	(Total 5,773)
-Canal irrigation area	2,308 places	2,991
-Barani area	1,719 places	2,782
B) Water storage tanks	256 places	377
C) Precision land leveling	(Total 16,468)	(Total 18,958)
-Canal irrigation area	10,350 ha	11,302 ha
-Barani area	6,118 ha	7,656 ha
(Other Activities)		
D) Establishment of demonstration farms on improved watercourses	601 places	669
E) Establishment of cooperative/ communal tube wells	5 places	As planned
F) Establishment of farm drainage sites	25 places	31
G) Sailaba/Rodkohi Areas		
-Rehabilitation of structure	47 places	43
H) Farmers training center	20 places	8
(Pilot Project)		
I) Establishment of pilot projects for Barani areas		
-Hydro Ram Pump/Water lifting devices	13 places	-
-Micro irrigation system	33 places	10
-Farmer's training and demonstration center for water harvest / conservation	33 places	24
2.Equipment	(¥687 million)	(¥423)
- Vehicles	Only amount of fund was specified at the time of appraisal	58 pick-ups, etc.
- Agricultural Equipment		108 scrapers, etc.
- Office training and survey equipment		16 computers, etc
- Micro irrigation equipment		10 systems
- Drilling Rigs		-
- Diesel Generators		No.8
- Tube-wells		No. 2
- Photocopies		No. 12
- Duplicating machines		No. 14
- Sets of flumes		No. 35
etc.		

3.Training - OFWM Personnel - Farmers - Extension Personnel 4.Consulting Services - Supervision - Monitoring - Evaluation - Others	 985 11295 895 Foreign: 118M/M Local: 811M/M	 1,764 12,822 1,881 Foreign: 191.4M/M Local: 1147.8M/M
(2) Implementation Schedule Selection of Consultant Consulting Services Civil Works Equipment (ICB)	 April 1992 to December 1992 December 1992 to June 1997 April 1992 to June 1997 July 1992 to February 1994 April 1992 to June 1997	 June 29, 1993 October 1993 to Dec.31, 1999 April 1993 to Dec. 31, 1999 1994 to 1996 1993 to Dec. 1999
(3) Project Cost Foreign currency Local currency (in Japanese Yen) Local currency (in Rs) Total ODA loan portion Exchange Rate	 2,190million yen 7,492million yen (Rs.1,274 million) 9,682million yen 8,230million yen Rs.1.0= 5.88yen (as of 1991)	 1,847million yen 6,607million yen (Rs.2,294 million) 8,454million yen 6,847million yen Rs.1.0 = 2.88yen (Average rate for the Project Period)

Independent Evaluator's Opinion on On-farm Water Management Project

Rana Sarwar, Independent Evaluator

The extensively developed Irrigation system in Pakistan, after hundred years of service increasingly facing colossal water loss needed improvement of watercourses and rehabilitation and improvement of canals and distributaries. The project under review focused on on-farm development components aspects i.e. renovating watercourses, building water storage tanks and increasing farmers' knowledge on modern agronomic practices.

There has been an perceivable progress on project targets such as 143% on renovation of watercourses, 115% in precision land leveling and 147% in construction of water tanks, yet there is enough scope for improvement in the living standards of farmers by increasing farm incomes. The main hurdle in harvesting maximum benefits of the project seems to be the lack of social mobilization at grassroots level, the key to the success of any project aimed at poverty eradication.

The personal experience and extensive interviews[♠] for writing this review observed that bigger landlords holding political and social influence dominated the activities under this program. They not only regulated decision-making of the implementing agencies but also forced the small farmers to work for their interests. Major construction and renovation of watercourses done for these local influential people and specially the precision land leveling totally grabbed by them. That is why proper Water User Associations (WUAs) could not be established or sustained.

Training component aimed at establishing effective WUAs and increase farmers capacities in adopting modern technologies. Although the number of farmers trained exceeded the targets (OFWM personnel by 79%, extension personnel by 110% and farmers by 14%), yet the Training Centers could have made this activity sustainable. Similarly, Demonstration Farms also exceeded the target (669 established, 601 original target) and they helped in increasing the number of farmers trained. The project failed to establish Farmers Training Centers (FTCs). Periodic activity i.e. demonstration farms can not justify as the substitute for an institution.

The report very innocently admitted the OFWM reasoning on not establishing FTCs "delay in acquisition of land" where as all provincial governments owns vast pieces of land in almost each district. There might be some other reason like lack of interest etc., which hindered in achieving this target despite extension in project completion period. The recurring cost of the FTCs probably may be the major factor for not taking this initiative.

Training of farmers' organizations probably not given proper attention. Properly organized, trained and motivated WUAs could have taken up other development activities i.e. transfer of irrigation management under NDP[i] and agriculture development activities. That is why the uni-functional WUAs formed by OFWM does not meet the Farmers organization (FOs) criteria for effective FOs for transfer of irrigation management under Punjab Irrigation & Drainage Authority. The OFWM department recently admitting the fact and redesigned [ii] its training program.

The OFWM directorate on the whole effectively achieved project objectives within scheduled time, but lag behind the planned outputs. The overall 35% increase in annual income, 15% in family labor, 54% in casual labor, 34% in permanent employees and improvement in other facilities, is an important development under the project. The delay in implementation of project activities and maximum harvesting of the benefits is also attributed to effective control of FWMC on reimbursement.

The project activities are supposed to sustain through the strict implementation of WUA Ordinance (1981). Still the social mobilization remains important factor, which can help a great deal in

sustaining these activities. WUAs and farmers need to be given formal and informal training, in watercourse maintenance and social organization. OFWM directorate can assist the WUAs to develop into a strong federation, which can ultimately take over the management of irrigation system from the government.

Lessons learned

1: Proper social mobilization is of prime importance for any development activity. Participation of the beneficiaries at all levels creates sense of ownership, responsibility and increases their skill.

2: People from grassroots level should be involved as groups, avoiding any political influence to promote such development schemes.

3: The knowledge and capacity of direct beneficiaries of such projects should be increased. This will decrease dependency, increase sustainability and minimize expenditure.

4: Maximum participation of all partners should be ensured to increase productivity. No single agency should wield discretionary powers like FWMC in present project. Sometimes some partners and components of the project do not receive the attention they should be given, which decelerates the speed and spirits of the implementing organs and consequently result in decreased benefits.

5: The grassroots level formal institutions elected by the people (like Union Councils in Pakistan), should be involved in promoting the activities. Due to their effective interaction with their communities, they can be of great help in cost-effective and useful implementation of such schemes.

6. All development schemes should be inter-linked with other activities going on in those areas, to increase their viability and effectiveness.

7. Ways should be explored to strengthen ties between the existing structures and the project implementing agencies and their teams. (In the case of project under review, these could be the institutions of Local Government System).

9: Flow of funds and other human and material resources should be effectively co-ordinated. No single agency should have the coercive control for supervision of the projects.

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[i] National Drainage Program for which the JBIC presently financing training component.

[ii] The OFWM presentation to the farmers and managers of Nara Canal Area Water Board (Sindh) on October 28, 2002. The author worked as facilitator to the program.