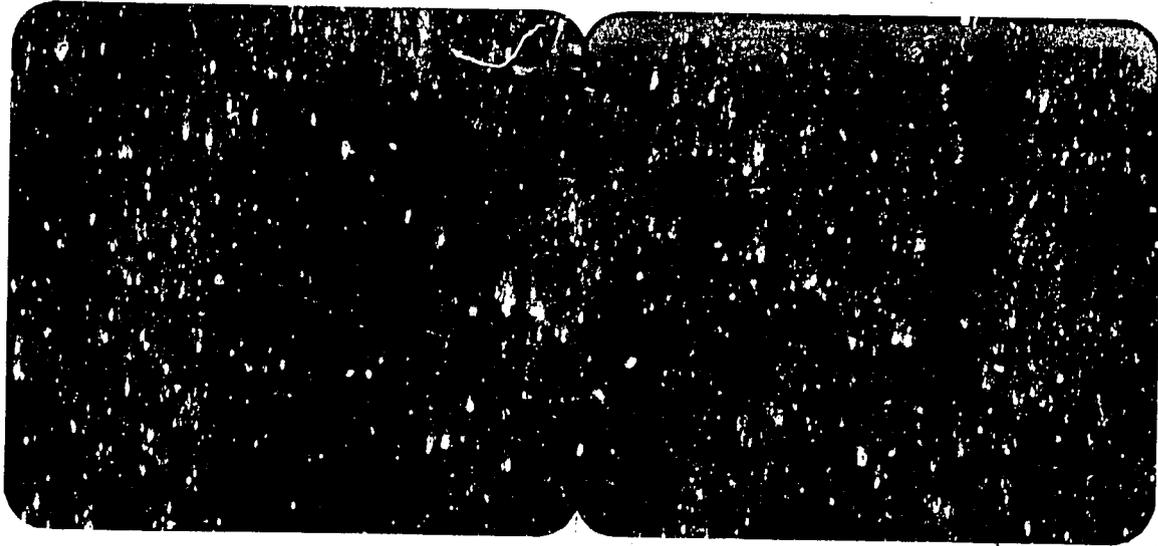


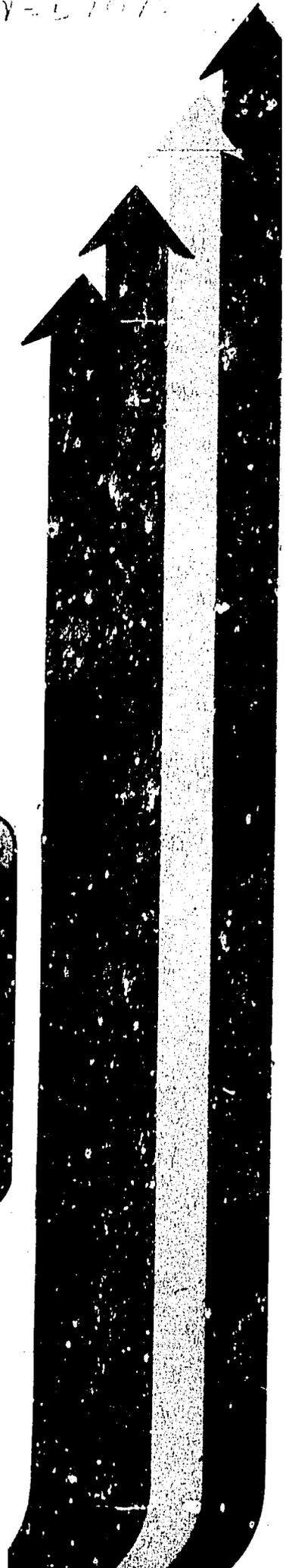


ON-FARM WATER MANAGEMENT
DEVELOPMENT PROJECT.

Progress Report
1979-80



DIRECTORATE OF
ON-FARM WATER MANAGEMENT
PUNJAB, LAHORE.
JULY — 1980



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DEVELOPMENT PROJECT,

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DIRECTORATE OF
ON-FARM WATER MANAGEMENT PUNJAB,
LAHORE.

July, 1980.

P R E F A C E

During the year under report which is the fourth year of implementation of On-Farm Water Management Project, the pace of progress has been very encouraging. In certain cases, particularly the improvement of watercourses and professional training the Project targets have been exceeded. The most important activity during the year was the implementation of watercourse renovation and improvement crash programme which envisaged the improvement of about 10,000 problem watercourses in 10 irrigated districts of the Province. The implementation of the crash programme is the recognition of added benefits of the On-Farm Water Management technology by the planners and policy makers. In view of the popularity of the programme, many international agencies have come forward to finance the improvement of all the 54,000 watercourses in the Punjab. Another significant achievement under the On-Farm Water Management Project was the introduction of On-Farm Water Management activities in the Northern Rain-fed Areas of the Punjab. The work done regarding development of Misriot Dam Demonstration-cum-Progeny Garden Development Farm, Rawalpindi and the Water Management of Barani Livestock Research Farm, Kheri Morat, Tanaza Dam (Attock) was highly appreciated. The Government of the Punjab, accordingly decided to establish On-Farm Water Management units for the development of commands of other small dams in the Barani areas. The achievements of the Project were appreciated by higher authorities particularly by the Governor of the Punjab and the Implementation Division of President of Pakistan. The timely coordination and assistance provided by the lined Government agencies, water users associations and the staff of the On-Farm Water Management Project are acknowledged.

It is hoped that the stipulated targets under the Project will also be achieved during the coming financial year, provided the same spirit and missionary zeal is maintained by all concerned.

Lahore, the July, 17, 80'

M. S. Cheema
Director
On-Farm Water Management Dev. Project
Punjab.

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- A = Organizational Chart
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- G = Advisory Services.
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-1-

I- INTRODUCTION:

Background:

Agriculture occupies the most central position in economy of Pakistan, and constitutes about 35% of the gross national product. Agricultural exports account for 40% of the total foreign exchange earnings and about 70% of the people living in the rural areas are directly dependent upon it. The industrial sector is also mainly concerned with it.

The level of production of Agriculture in Pakistan is extremely low despite favourable climatic conditions for year round cropping. The agriculture in Pakistan fundamentally depends on irrigation and we have one of the most extensive and well developed systems of irrigation in the world. However, when compared with other countries water efficiency in Pakistan is very low. According to an estimate, only about 20% of the total available water is effectively used by plants. This is colossal waste of the most critical factors of agri. production, mainly on account of un-scientific irrigation practices. This lack of proper water management has not only resulted in the wastage of most vital resource but has also aggravated the problem of water logging and salinity. This menace has bedevilled Pakistan for a long time and impeded the growth of our agriculture to a considerable extent.

The nature of water management problem is such that it has revealed that efficient irrigation of the available water is as important in Pakistan as securing of additional supply. Timely and adequate, but not excessive allocation of water to different crops would not only improve their yields, but will also, conserve available supplies, minimise other losses and reduce the possibility of water logging and salinity. After realizing the extent of losses of irrigation water, from various segments of irrigation system, the issue came under exploration of various organizations concerning with it. It was established that greater emphasis should be given to water management beyond the outlet as substantial quantities of water could be saved by proper water management in the watercourses and in the field, by improving conveyance and application efficiencies respectively. All this lead to the establishment of Punjab On-Farm Water Management

Development Project during the year 1976-77, on a pilot programme basis in seven tehsils, namely; Faisalabad, Jaranwala, Summandri, Toba Tek Singh, Chiniot, Sahiwal and Khanewal at a total cost of Rs.190.6 millions. The On-Farm Water Management Dev. Project is being implemented with the technical and financial support of USAID under a loan agreement with the following objectives :

OBJECTIVES:

- a) To achieve an increase in agricultural production through judicious use of water by minimization of watercourse losses and efficient application of water on precisely level fields;
- b) To introduce an integrated programme of improvement of water-course and precision land levelling to minimize delivery losses and to permit uniform application of water to all parts of the field.
- c) To undertake training programmes of field personnel, contractors, bankers and farmers in various disciplines of On-Farm Water Management techniques.
- d) To develop an institutional infrastructure at various levels, including organization of water user's associations for a subsequent nation wide Water Management Programme.

This is the fourth year of the Project and detailed account of the achievements made during the year 1979-80 are presented in the coming pages. The targets under various activities of the Project are appended as Annexure "B".

II- ORGANIZATIONAL SET-UP:

Secretary to Government of the Punjab, Agriculture Department is the Administrative Head of the Project. Director, On-Farm Water Management is responsible for implementation of the programme under the direct supervision of the Director General Agriculture(Field), Punjab. One Deputy Director stationed at Lahore is supervising the training and research activities of the Project. He has been provided with Specialist Officers of various fields. The Water Management Coordinators (Area Team Leader) are responsible for supervising field activities of the programme. They have been provided with the necessary technical and auxiliary staff. Twenty five(25) Field Teams are in position by now. Each field team comprises of one Water Management Specialist,

two Watercourse Development Officers, 5 Land Development Officers and one Agricultural Officer for undertaking watercourse improvement and precision land levelling work. Organizational Chart is attached at Annexure "A". The services of two Advisors from U.S. Department of Agriculture, Soil Conservation Service have also been placed at the disposal of the Project. These Advisors, one Irrigation Agronomist and another Irrigation Engineer provided technical guidance in organizing the training programmes in addition to technical guidance to the field teams in watercourse design, precision land levelling techniques and follow-up assistance programme. However, during the year the services of Irrigation Agronomist were with-drawn whereas the Irrigation Engineer was assigned duties to provide assistance to On-Farm Water Management Dev. Project at Federal level.

III- ACTIVITIES OF THE PROJECT:

a. WATERCOURSE IMPROVEMENT:

Watercourse improvement is an important component of On-Farm Water Management Programme. The great amount of irrigation water losses from the 54,000 badly constructed and poorly managed watercourses indicate an immediate need for improvement of these watercourses. Under the On-Farm Water Management Dev. Project, complete re-construction of the watercourses according to an engineering design based on topo-graphic and profile survey of watercourse command is carried out. The earthen improvement is thereafter carried out according to the standards and specifications with uniform slope for minimizing the watercourse conveyance losses and to provide sufficient irrigation head to each and every acre commanded by the watercourse. It is followed by installation of water control structures include pre-cast re-inforced concrete panel nakkas, culverts at crossings, buffalo-wallow at appropriate places. Moreover, the essential portions of the watercourse upto 10% of the total length of watercourse are bricklined under the cost sharing programme. The improvement of watercourses is carried out with the involvement of

water-users through organizing their water-users associations.

The Watercourse Improvement Programme under the On-Farm Water Management Development Project has gained real popularity amongst the farming community on account of its added benefits. The watercourse improvement programme has also been very much appreciated by the International Aid Giving Agencies like World Bank, Asian Development Bank and USAID. On the basis of the impact of watercourse improvement programme on farm production, the Watercourse Improvement Action Plan for expeditious renovation involving heavy cleaning and maintenance of 10,000 watercourses was implemented by the Punjab Government during the year under report.

ACHIEVEMENTS: Significant achievements were made regarding watercourse improvement in the Project Area during the year under report. The targets assigned during the year have been surpassed, as 333 watercourses have been improved against a target of 200 watercourses. Total 1257 miles length of watercourse was improved which includes 81 miles of brick-lining in the Project Area. Moreover, 14985 water control structures were installed on the improved watercourses during the year under report.

Blockwise achievements regarding watercourse improvement in the Project Area are given in Annexure "E".

b. PRECISION LAND LEVELLING:

Land Levelling is necessary to allow the irrigation water to spread as evenly as possible in a field. It also needs to flow at such a velocity causing little or no erosion of top soil. The uniform distribution of water helps to improve the uniformity of seed germination and reduces the loss of plant nutrients through leaching. Further land levelling enhances the application efficiency of the irrigation water and consequently lowers the amount of labour to irrigate a field and thus ultimately helps in increasing agricultural yields.

Precision land levelling is the technique to translocate the soil between high and low spots in a field with the application of engineering principles to achieve increase in irrigation application

efficiency and increased crop productivity. Precision land levelling is a second major component of On-Farm Water Management strategy which results elimination of un-necessary ditches, bunds and trees from the field in addition to the precise levelling of plots for application of border irrigation.

Under the On-Farm Water Management Dev. Project farmers' field are precisely levelled under a cost sharing programme in the Project Area. Small farms are redesigned after reconducting necessary engineering, soil and other resources inventory surveys. Fifty percent cost of precision land levelling is paid to the small farmers upto Ist five acres in addition to free technical assistance. Moreover, land levelling equipment i.e. wheel type soil scraper, land plane, chiesel plough, ditcher, border disc. etc. are provided to the farmers on a very nominal rental charges.

The studies indicate that with the implementation of precision land levelling following benefits occrue :

- i) 25% increase in application efficiency resulting about 0.75 acre foot saving of water per acre annually.
- ii) 5% increase in cropped area previously occupied by bunds and ditches.
- iii) Uniform application of irrigation water and fertilizer.
- iv) Uniform seed germination resulting even crop stand and maturity of the whole field at the same time.
- v) Increase in working efficiency of agricultural machinery and decreased breakage due to longer field and less turnings at corners.

ACHIEVEMENTS:

Concerted efforts were made by the On-Farm Water Management personnel to introduce precision land levelling amongst the small farmers. As precision land levelling is a new technique, wherein the existing layout of fields and irrigation system is changed from basin to level border irrigation system, the problems were faced in popularization the innovation amongst the farming community. The pace of progress under the precision land levelling component was accordingly not at par with that of watercourse improvement.

About 11,410 acres were precisely levelled during the year under report against a target of 18,000 acres. The targets of precision land levelling for the year, also, included, 33% share of private contractors which were to be established with the participation of Pakistan Banking Council. These contractors could not be established and accordingly the fixed targets could not be achieved. The Field Team-wise progress regarding precision land levelling for the year under report is given at Annexure "E".

C. TRAINING PROGRAM

i) Training of Personnel:

On-Farm Water Management is a newly introduced technology in Pakistan. There are very limited training facilities regarding different disciplines of On-Farm Water Management in the existing training and academic Institutions of the Punjab. The facilities for on the job field training are completely lacking with the educational institutions at present.

On account of inadequate On-Farm Water Management training facilities, as well as the paucity of the training material in the Province, a Training Centre was established at Niaz Beg, Lahore, to meet the training requirements. This centre has now been developed into a full fledged training institute at the Provincial HQ to provide following types of training to field personnel, bankers, private contractors, staff of the lined Government Departments, semi-autonomous bodies, Farm Managers and farm operators :-

- a) Precision land levelling techniques.
- b) Watercourse design and improved irrigation techniques.
- c) Irrigation Water Management Extension techniques.

Training courses of different durations in the above mentioned disciplines are organized at the training institute. These training courses are mainly field oriented wherein at least 2/3rd of the time is spent in the field for on-the-job training whereas only 1/3rd of the total time is assigned for academic training.

ACHIEVEMENTS: During the year under report the construction of a multi-storeyed, On-Farm Water Management Training Institute at Niaz Beg was near completion for meeting the future training requirements of On-Farm Water Management Dev. Project, alongwith other agencies. The finishing work and provision of necessities like sewerage, electricity and water etc. is in progress. After the completion of the training institute building, the additional training needs of the future project, presently under negotiation with the World Bank, Asian Development Bank and USAID etc. will be met with adequately.

The achievements regarding training of field personnel, bankers, private contractors, farmers & para staff of the Nation Building Departments have been quite upto the mark and in certain cases the targets assigned have been surpassed and 863 tractor operators have been trained in the Project Area. The upto date achievements against targets of the training programme are given at Sr.No.4 in Annexure "C".

ii) Applied Research and Demonstration Trials:

To see the impact of different improved water management practices for onward recommendations in the field to the farmers, an applied and research trial programme was started. Accordingly, different research and demonstration trials were carried out at the farmers' fields and research farm with the involvement/cooperation of different Govt./Semi Government and private organizations. as under:

<u>Sr.No.</u>	<u>Organization/Deptt:</u>	<u>Nature of Applied Research Trials</u>
1.	Irrigation Research Institute	Seepage losses on different watercourse improvement alternatives e.g., a. Kacha Improvement. b. Polyethylene sheet lining at one ft. deep. c. Bitumen emulsion spray one ft. deep.
2.	CIBA GEIGY/CSU/ USAID	Comparison of traditional vs;herbicide methods of weed control and their effects on yield in wheat :

<u>Sr.No.</u>	<u>Organization/Deptt:</u>	<u>Nature of Applied Research Trials</u>
		a) Weed control in maize crop. b) Weed control in wheat crop. c) Insect pest control in maize and rice crop. d) Weed control in rice by Treflan-R.
3.	Jaffar Brothers	Effect of NPK on the yield of rice crop.
4.	USAID	Effect of precisely levelled and un-levelled soil with measured irrigation on the yield of wheat crop.
5.	On-Farm Water Management T&R Institute	a) Trial on different types of structures. b) Syphon irrigation. c) Border irrigation. d) Effect of inter row-spacing on the growth and yield of wheat. e) Met eteorological station was also arranged at the farm to study the consumptive use of water for different crops having : i) Lysimeter. ii) Pan Evaporation. iii) Sunshine Recorder. iv) Hygro thermo graph. v) Solometer. vi) Anemo-meter. vii) Maximum-minimum temp. thermo-meter.

iii) On-Farm Water Management Demonstration & Research Farm:

Importance of field training to the in-service personnel in a newly introduced technology like On-Farm Water Management Development Programme needs no emphasis. The impact of latest irrigation techniques like precision land levelling, water channel improvement, improved irrigation agronomy practices and mechanized farming has to be demonstrated to the On-Farm Water Management field personnel so as to build a working confidence amongst them in addition to popularizing programme amongst the farming community. Keeping the above mentioned field training requirements in view, 74 acres piece of land was taken on lease to establish a mechanized Training-cum-Demonstration and

Research Farm with the following objectives :-

- 1) To provide on-the-job training to the trainees in irrigation water management i.e. precision land levelling, water measurement techniques and watercourse improvement.
- 2) To evaluate the benefits of different On-Farm Water Management activities for further recommendations to the farmers through demonstrations.
- 3) To conduct applied research on :
 - a) Different alternatives of watercourse improvement and maintenance.
 - b) Studies on increase in delivery and application efficiencies through watercourse improvement and precision land levelling.
 - c) Determination of consumptive use requirements of major crops.
 - d) Working efficiency of land levelling machinery.
- 4) To study the economic impact of watercourse improvement and precision land levelling on the yield of crops.

Farm Improvement:

The development of the demonstration farm was carried out in phases by different groups of the trainees. Following operations were carried out under the development phase :

- a) Topographic farm survey.
- b) Detailed Farm survey.
- c) Detailed soil survey.
- d) Design lay-out.
- e) Precision land levelling.
- f) Division of farm into ten blocks ranging from 2 to 12 acres according to soil classification.
- g) Watercourse improvement.
- h) Installation of pacca nakkas.

With the adoption of the above mentioned operations/surveys the previous lay-out of the farm was changed which resulted in saving of water, area and crop acreage.

Reclamation Programme:

The detailed soil survey of the farm indicated that there were only

about 17 acres out of the total farm land which could be recorded as good agricultural land. The rest of the farm soil was to be reclaimed. Accordingly, the reclamation programme was started with the following operations :

- a) Precision land levelling.
- b) Deep ploughing.
- c) Leaching of salt through heavy irrigation.
- d) Gypsum application.
- e) Green-manuring.

Cropping Scheme:

Improved cropping scheme was prepared and implemented at the farm for better crop production without lossing soil fertility and to increase the cropping intensity as under :

i)	1977-78	-	149.25 %
ii)	1978-79	--	192.40 %
iii)	1979-80	-	195.3 %

ACHIEVEMENTS: In addition to the field training to the trainee officers and other para-staff in precision land levelling, water-course improvement and water management extension services and modern agronomic practices, different demonstration type and applied research was also carried out at the farm for onward recommendations in the field. Prior to the development of the farm, only about 40 acres out of 74 acres were under cultivation, rest of the land had severe salinity and sodicity problems. The entire land of the farm was developed and brought under crops through different reclamation practices. The demonstration plots in different crop seasons were also laid out to demonstrate the effect of improved water management practices at the farm. The farm was taken on lease annually for 3 years. The lease was expired at the end of fiscal year under report. The farm was accordingly handed over to the land-lord after its development and reclamation with increased cropping intensity from 120 % before improvement to 195% after improvement. The summary of the year-wise income and expenditure from the farm is given at Annexure "F". The development cost for precision land levelling by

the trainees has not been included in the expenditure of the farm which has been covered under the training programme by the trainees in different batches.

Irrigation Water Management Advisory Services:

To benefit the farmers of the area falling out of the existing jurisdiction of the Project and also to meet the daily requests for technical assistance from the farmers throughout the Punjab, a Water Management Extension Advisory Service was started under the Training and Research Institute during the year under report. It includes technical guidance and supervision in respect of farm surveying, topographic/contour maps, detailed soil surveys, farm designs and planning and agronomic services are provided under this activity to the farmers through the Province on their request.

ACHIEVEMENTS: Tangible achievements were made in this regard during the year under report. The progress for the year is given Annexure "G".

IV. ACTION PROGRAMME FOR RENOVATION OF WATERCOURSE 1979-80:

In compliance of the directive of President of Pakistan the Government of the Punjab formulated an action programme under the auspices of On-Farm Water Management Project, with an objective of renovation of 10,000 watercourses in the Punjab. The renovation programme was coordinated efforts of Irrigation, Agriculture (OFWM), Cooperatives and the Rural Development Departments. The renovation strategy included re-alignments or straightening of watercourses, re-construction of watercourse banks, provision of sufficient section and free-board, removal of trees, shrubs, etc. installation of pre-cast concrete pakka nakkas at junction places, construction of culverts at crossings, desilting and unloading of banks and brick lining at the weak and sandy reaches of the watercourses.

The renovation of watercourses was undertaken by the establishment of Khal Cooperative Societies. All the coordinated Departments were assigned specific duties with definite time schedule for its completion.

Maximum participation of the farming community was managed and all important decisions concerning with watercourse renovation were arrived at with the consultation of Khal Cooperative Societies. These societies, were registered with the Cooperative Department and this Department advanced loans to the societies for the purchase and installation of pakka nakkas at the junction places. The construction of the culverts at the crossings was financed through Rural Development Department A.D.P. allocations with the help of the Project Managers.

As far as earthen improvement component of the programme is concerned, it was achieved successfully. The other component like purchase and installation of pakka nakkas confronted some problems like mode of payment of the cost of the structures and acceptance of loans by Khal Cooperative Societies. This aspect of the programme needs to be streamlined further for its efficient working. However, some headways were made and the programme was not allowed to suffer to any greater extent.

The programme was launched initially in the following districts of the Punjab and the district-wise allocation of the watercourses is as under :-

<u>S.No.</u>	<u>District</u>	<u>No. of Watercourses</u>
1.	Gujranwala	1100
2.	Sheikhupura	1053
3.	Sargodha	1135
4.	Faisalabad	1053
5.	Jhang	815
6.	Sahiwal	1565
7.	Multan	1000
8.	Vehari	460
9.	Bahawalpur	1203
10.	Rahim Yar Khan	1000

The progress made under the programme has been presented in annexure "H". A review of the annexure reveals that 10,036 watercourses were renovated and 7619 Khal Cooperative Societies were registered. 2651 structures were installed on these watercourses and 1337 culverts were constructed. The work of installation of pakka nakkas and construction of culverts is still in progress on the renovated watercourses.

Benefits Derived: The installation of nakka at junction places is under way at this stage and after its completion, a saving of about one MAF is expected annually. This much saved water will help to bring about one million acres of additional agricultural land under irrigation and thus agricultural production shall be raised considerably.

V. FINANCIAL UTILIZATION:

Rs.40 millions were allocated for On-Farm Water Management Dev. Project in the annual development programme for 1979-80. Funds to the tune of rupees 35.20 millions were released out of which rupees 34.91 were utilized during the year under report. The financial utilization during the year was quite satisfactory inspite of the constraints on account of late establishment of field teams and due to recruitment problems of the staff. The year-wise financial utilization under the project also indicating the cost sharing expenditure which is given at Annexure "D" at Sr.No.V.

VI- EXPANSION OF ON-FARM WATER MANAGEMENT PROGRAMME:

The significant impact of On-Farm Water Management Technology on the farm economy has invited the undivided attention of planners and policy makers. Many national and international agencies engaged in water management have shown their interest in supporting the accelerated On-Farm Water Management Project throughout the province. On-Farm Water Management Research Project was started during the year under report by the University of Agriculture, Faisalabad, to conduct basic and applied research on different parameters of On-Farm Water Management Technology. This project is funded by USAID under PL-480 grant. The results of the applied research carried out under the supervision of the University of Agriculture and that by WAPDA under Mona Project will be utilized in the accelerated On-Farm Water Management Project/Programme.

The external evaluation and monitoring of the existing On-Farm Water Management Project was initiated by the Master Planning & Review Div.

of WAPDA during the year under report. The results of the evaluation will be applicable in future planning and expansion of the On-Farm Water Management Programme in the country.

Keeping in view the added benefits of the existing On-Farm Water Management Project towards water savings and increase in crop yields, following projects are under preparation with the collaboration of Ministry of Food and Agriculture for expansion of On-Farm Water Management Programme :

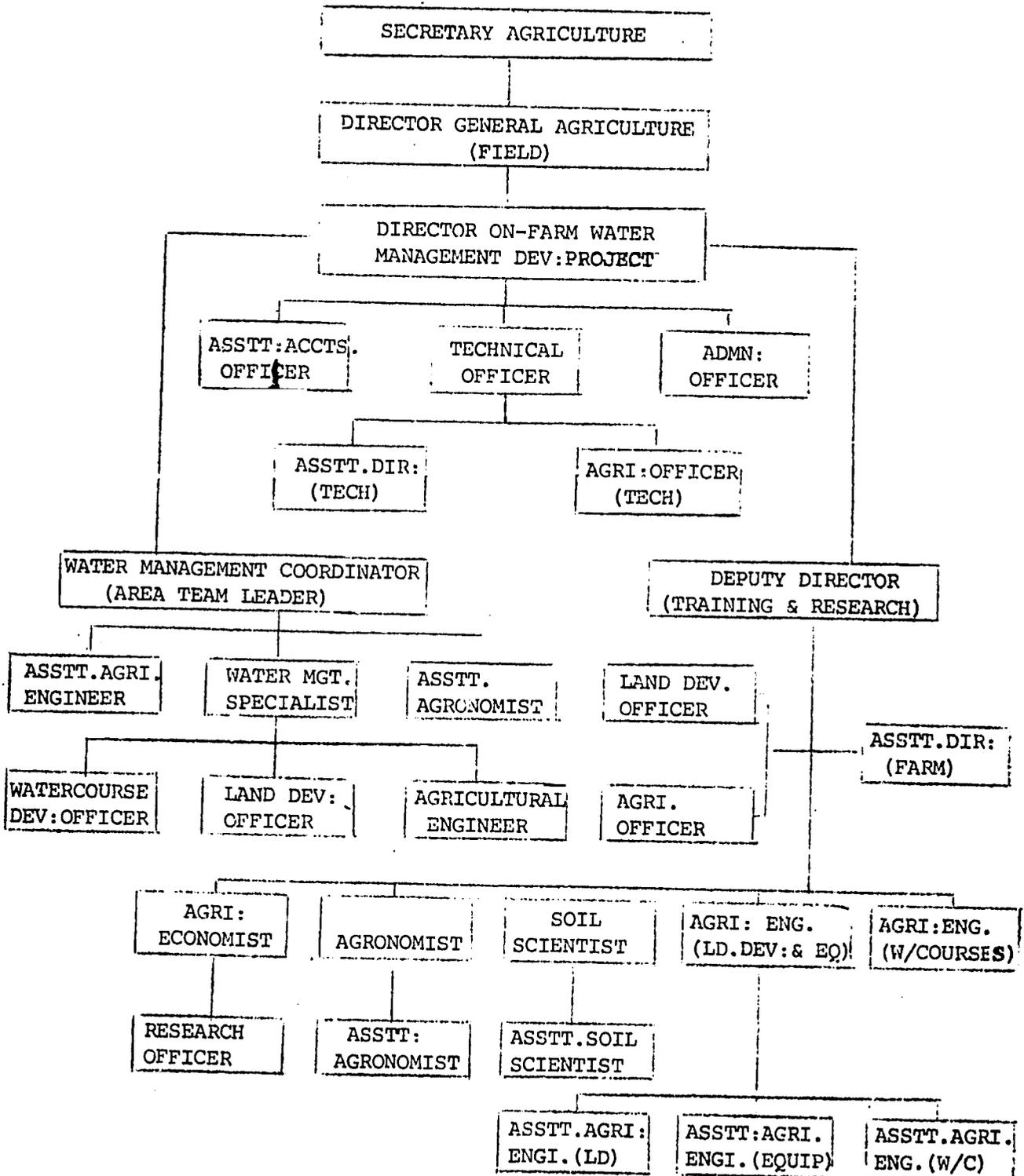
a) Accelerated water management under the World Bank Assistance:

The proposed project will cover reconstruction of about 2100 watercourses according to engineering design. Precision land levelling of 52,500 acres and water management extension services to about 3,000 individual farmers in a span of 3 years. The project is planned to be implemented from July, 1981 in the districts of Faisalabad, Jhang, Multan, Sahiwal, Sargodha and Sheikhpura. The technology will cover the heavy cleaning and renovation of about 30,000 watercourses under a crash programme throughout all the irrigated areas in the Punjab. The project PC-I is under preparation and negotiations for loan with World Bank are under way by the Ministry of Food and Agriculture.

b) Water Management Programme in Thal Canal Command Area under Asian Development Bank Assistance.

To minimize the water losses in the irrigation system of Thal Canal Command particularly in sandy reaches a feasibility study was carried out for implementation of On-Farm Water Management Programme with the Asian Development Bank. The proposed project will cover a command area of about four lac acres in Kot Addu and ^{Tehsils} Leiah/of Muzaffargarh district. It is planned to improve 800 watercourses and also to provide Water Management Services to the entire Thal Command area. The Project PC-I is under preparation and negotiations for loan with the Asian Development Bank will start in September, 80', in order to implement the project from July, 1981.

ORGANIZATIONAL CHART
ON-FARM WATER MANAGEMENT DEVELOPMENT PROJECT



(Khalid)

ANNEXURE "B"

PHYSICAL & FINANCIAL TARGETS

S.No.	Particulars	T A R G E T S						Total
		<u>76-77</u>	<u>77-78</u>	<u>78-79</u>	<u>79-80</u>	<u>80-81</u>	<u>81-82</u>	
1.	No. of Field Teams established (cumulative)	5	10	15	25	35	40	40
2.	No. of watercourses to be improved	5	51	150	200	300	360	1066
3.	Precision land levelling (in acres)	555	6500	7000	18000	30000	40000	102055
4.	<u>Training Programme:</u>							
	a. Technicians and officers training	40	80	80	80	80	80	440
	b. Farmers, Contractors & Bankers Training.	10	30	30	30	30	30	160
	c. Para-staff, Field Assistants training.	10	50	50	70	70	70	320
	d. Tractor drivers on-the-job training.	20	200	400	400	500	500	2020
	e. Refresher courses	2	5	5	8	10	10	40
5.	FINANCIAL (in millions)	3.683	39.793	24.169	35.251	41.870	45.294	190.060

ANNEXURE "C"

PHYSICAL & FINANCIAL ACHIEVEMENTS & TARGETS DURING 1979-80

<u>I- PHYSICAL</u>	<u>Targets</u>	<u>Achievements</u>
1. Establishment of Field Teams	25	25
2. <u>Watercourse Improvement:</u>		
A. <u>No. of Watercourses:</u>		
a. Improved	200	333
b. Under Improvement	-	173
B. <u>Length Improved (In meters)</u>		
a. Pacca	-	1,34,694
b. Katcha	-	19,60,571
C. Structures Installed (All types)	-	14,985
D. Water User Associations Organized	-	700
3. <u>Precision Land Levelling (in acres):</u>		
A. By OFWM Project	13,500	11,409.55
B. By Private Contractors	4,500	Not yet establi- shed.
	<hr/>	<hr/>
(Total A+B)	18,000	11,409.55
4. <u>Training Programme:</u>		
A. Technicians & Officers training	80	75
B. Private Contractors, Bankers & Farmers training	30	-
C. Para Staff, Field Assistants & Project Managers training	50	-
D. Tractor drivers on-the-job training	400	.863
E. Refresher Courses Organized	8	10
 <u>II- FINANCIAL (Rs. IN LAC):</u>		
1. Funds allocated	=	400.00
2. Funds released	=	352.00
3. Funds utilized	=	349.16

ANNEXURE "D"

YEARWISE ACHIEVEMENTS UPTO 30-6-1980I- PHYSICAL

<u>S.No.</u>	<u>Particulars</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>Total</u>
I.	No.of Field Teams established(cumulative)	5	10	15	25	25
II.	<u>A.Watercourse Improvement:</u>					
	a. Improved	5	46	151	333	535
	b. Under Improvement.	-	-	-	173	173
	<u>B.Length Improved (in meters)</u>					
	a. Katcha	9124 (5.50 miles)	229534 137.7 miles)	655730 393 mi- les)	1960571 (1176 miles)	2854959 (1713 miles)
	b. Pacca	-	14875 (9 miles)	62438 (37.5 mil.)	134694 (84.2)	212007 (127 miles)
	<u>C.Structures Installed (all types)</u>	31	2023	6455	14985	23494
	<u>D.Water User Associations organized</u>	6	98	214	700	1018
III.	<u>Precision Land Levelling (in acres)</u>	555	6461	6885	11409.55	25310
IV.	<u>Training Programme:</u>					
	a. Technicians & Officers training.	50	123	100	75	348
	b. Private contractors, bankers etc.training.	-	6	7	-	13
	c. Para Staff, Field Asstts.-training.		17	297	-	314
	d. Tractor drivers on-the-job training.	82	598	643	863	2186
	e. Refresher courses organized.	3	10	2	10	25
V.	<u>FINANCIAL UTILIZATION (IN LAC)</u>					
	Funds utilized	33.41	99.55	289.32	349.16	771.44
	Cost sharing expenditure	6.76	35.57	160.00	221.00	423.33

ANNEXURE "E"

TEAMWISE PHYSICAL PROGRESS FOR THE YEAR 1979-80

S.No.	Field Team	No.of water- courses Improved (No.)	Length Improved (in me- ters)	Structures installed (No.)	No.of water users assoc. organi- zed.	P.L.L. (Acres)	Tractor Drivers on-the-job training (No.)
1.	Faisalabad	28	144651	1720	69	884.2	60
2.	T.T.Singh	34	355178	2488	73	1016.27	55
3.	Summandri	32	224294	1117	71	633.37	88
4.	Jaranwala	24	154088	1262	61	581.84	40
5.	Tandalianwala	18	113741	763	48	671.02	50
6.	Gojra	15	107396	998	40	356.92	35
7.	Pir Mahal	-	7040	10	8	25.50	1
8.	Thikriwala	-	30148	-	4	22.12	8
9.	Mamun Kanjan	-	3500	-	8	20.19	2
10.	Chiniot	22	91907	885	22	746.71	31
11.	Lalian	21	83685	613	21	748.41	82
12.	Chak Jhumra	21	86223	517	21	1200.71	-
13.	Khurarianwala	4	5300	126	4	261.82	-
14.	Sahiwal	29	169979	858	46	845.70	106
15.	Noor Shah	16	116080	912	29	552.39	3
16.	Chichawaini	12	121507	819	77	532.25	40
17.	Mian Channu	19	104512	779	30	578.56	40
18.	Khanewal	19	103023	561	31	883.06	89
19.	Jahanian	17	69013	528	41	806.50	88
20.	Kacha Khu	2	4000	29	6	42.01	5
		<u>333</u>	<u>2095265</u>	<u>14985</u>	<u>700</u>	<u>11409.55</u>	<u>863</u>

ANNEXURE "F"

YEARWISE INCOME AND EXPENDITURE STATEMENT OF ON-FARM
WATER MANAGEMENT DEMONSTRATION & RESEARCH FARM:

Expenditure for 1977-78

1. Rent	Rs.74,150.00
2. Seed	Rs. 4,010.00
3. Fertilizer	Rs.20,468.00
4. Pesticides	Rs. 2,098.50
5. Misc.	Rs. 3,000.00
6. Machinery	Rs.13,457.00
TOTAL:	Rs.1,17,183.80

Income for 1977-78

1. Rice	Rs.13,113.00
2. Wheat	Rs.46,113.90
3. Fodder	Rs.11,000.00
4. Garden	1,000.00
5. Others	1,277.00
TOTAL:	Rs.77,503.90

Expenditure for 1978-79

1. Rent	Rs.74,150.00
2. Seed	Rs. 7,468.00
3. Fertilizer	Rs.21,867.00
4. Pesticides	Rs. 1,040.00
5. Machinery	Rs. 9,402.55
6. Misc.	Rs. 2,000.00
TOTAL:	Rs.1,15,927.55

Income for 1978-79

1. Rice	Rs.34,164.85
2. Wheat	Rs.59,169.64
3. Fodder	Rs.16,800.00
4. Others	Rs. 300.00
5. Garden	Rs. 7,700.00
TOTAL:	Rs.1,18,134.40

Expenditure for 1979-80

1. Rent	Rs.74,150.00
2. Seed	Rs. 6,021.25
3. Fertilizer	Rs.19,274.50
4. Pesticides	Rs. 2,181.70
5. Zinc.Sulphate	Rs. 1,200.00
6. Machinery	Rs.11,090.00
7. Misc.	Rs. 1,500.00
TOTAL:	Rs.1,15,417.45

Income for 1979-80

1. Rice	Rs.44,135.15
2. Wheat	Rs.53,567.31
3. Fodder	Rs.17,450.00
4. Others	Rs. -
5. Garden	Rs. 2,500.00
TOTAL:	Rs.1,17,652.46

ANNEXURE 'G'

PROGRESS REGARDING FARM ADVISORY SERVICE ON-FARM WATER MANAGEMENT DEVELOPMENT PROJECT (TRAINING & RESEARCH INSTITUTE), LAHORE, 1979-80

<u>S.No.</u>	<u>Name of Farmers</u>	<u>Nature of work</u>	<u>Area</u>
1.	Chaudhry Rehmat Ali, Manga, LHR.	Precision land levelling and layout of watercourses.	16 acres
2.	Raja Aurengzeb, Manga, Lahore.	Technical guidance precision land levelling	20 "
3.	Ch. Bashir Ahmad Khan, Manga, LHR.	-do-	60 "
4.	Col. Asaf Naiz Baig, Lahore.	Layout of watercourse and installation of nakkas.	-
5.	Aitchision College, Lahore.	Precision land levelling by training class.	7 "
6.	Begum Sardar Noor Bath, Lahore.	-do-	11 "
7.	Amir Ali Jaliana, Lahore.	-do-	5 "
8.	Mohammad Ali Jaliana, Lahore.	-do-	5.80 "
9.	R.C. Colla Farm, Moza Thather, Bedian Road, Lahore.	Technical guidance precision land levelling & layout of watercourses and installation of nakkas.	150 "
10.	Brig. Afandi, Badian, Lahore.	Technical guidance and precision land levelling.	20 "
11.	Air Commadore Sulahud-Din Padahna, Ghazi Road, Lahore.	-do-	65 "
12.	Tarandi Border Area Coop. Society Farm, Kala Khatai, S/Pura.	Technical guidance precision land levelling and layout of watercourses.	185 "
13.	Col. Yousaf Motasingh (Thater) Badian Road, Lahore.	-do-	47 "
14.	Govt. Seed Farm (Agri. Deptt.) Chillialwala, Gujrat.	Technical guidance and layout of watercourses.	-
15.	Siddiqui Farm, Nehla Village, LHR.	Technical guidance precision land levelling.	50 "
16.	Aslam Bajwa Farm, Muridke, Sheikhupura.	Technical guidance and layout of watercourses and installation of nakkas.	44 "
17.	Tariq Masood Farm, Amanabad, Muridke.	Technical guidance and layout of watercourses.	25 "
18.	Col. (Rtd.) Amanullah Khan, Pajuwali, Saialkot.	Technical guidance and layout of watercourses.	30 "
19.	Col. (Rtd.) Mazhar Ali Chohan, Village Nathowal, Lahore.	Technical guidance and precision land levelling and layout of watercourses.	37 "
20.	Misriot Dam, Demonstration-cum-Progeny Garden Farm, Rawalpindi.	-do-	90 "
21.	Barani Live stock production & Research Institute, Kharimurat Tech: Fateh Jang, Attock.	Technical guidance of precision land levelling layout of watercourses.	115 "
22.	Brig. Shafi, Moza Heer Badian, Lahore.	Technical guidance of precision land levelling.	8 "

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ANNEXURE "H"

PHYSICAL PROGRESS OF WATERCOURSE IMPROVEMENT UNDER
CRASH PROGRAMME, 1979-80

S.No.	Name of District	Total No. of water-courses to be improved	No. of water-courses for which renovation plans submitted	No. of water-courses renovated.	No. of Khal Coop. Soc. registered.	No. of Nakkas installed.	No. of culverts constructed.	No. of water-courses completely improved (Renovation & installation of nakkas & culverts completed).
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
1.	Gujranwala	1100	1100	1100	952	484	150	119
2.	Sheikhupura	1053	1053	1053	650	36	63	-
3.	Sargodha	1135	1135	1135	641	158	109	-
4.	Faisalabad	1053	1053	1053	666	1259	203	27
5.	Jhang	815	815	815	470	200	22	-
6.	Sahiwal	1565	1565	1442	1303	88	22	2
7.	Multan	1000	960	931	759	5	-	-
8.	Vehari	460	450	390	408	260	1	-
9.	Bahawalpur	1203	1203	1117	1007	121	214	8
10.	Rahim Yar Khan	1000	1000	1000	763	40	553	-
	TOTAL:	10384	10334	10036	7619	2651	1337	156

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ON-FARM WATER MANAGEMENT DEV:PROJECT

BASIC DATA

I- STATISTICS

1. Date of commencement of the Project	=	31-12-1976
2. Date of completion of the Project	=	30-6-1982
3. Total approved cost of the Project	=	1900.06 lac
4. Total No. of watercourses	=	8,750
5. Total area	=	42.94 lac acre
6. Total No. of tehsils	=	7
7. Total No. of villages/chaks	=	3,500
8. Total population	=	118.92 lac

II- PRECISION LAND LEVELLING

1. Average expenditure per acre	=	Rs.800/-
2. Expenditure for the one cubic meter of earth move	=	Rs.4/-
3. Average water saving per acre/year	=	0.75 acre ft.
4. Average volume of earth to be moved per acre	=	200 cubic meter

III- WATERCOURSE IMPROVEMENT

1. Average overall cost of improvement of one watercourse with 10% lining	=	Rs.1,26,550
2. Average cost per running meter for earthen improvement	=	Rs.6.0
3. Average cost per running meter for pucca improvement(material cost only)	=	Rs.120/-
ii) Average total cost of pucca lining including labour etc. per meter	=	Rs.148/-
4. Cost of nakka	=	Rs.65/-
5. Cost of installation of nakka	=	Rs.200/-
6. Cost of culvert	=	Rs.1500/-
7. Cost of buffalo-wallows	=	Rs.6,650/-
8. Average No.of farmers per one watercourse	=	48
9. Average command area per one watercourse	=	400 acres
10. Water saving per improved watercourse per year	=	243 acre ft.
11. Cost benefit ratio of watercourse improvement	=	1:2.67
12. Average increase in delivery efficiency of improved watercourse	=	40 %
13. Average saving in water in terms of time of application per acre	=	38 minutes
14. Change in cropping pattern due to watercourse improvement	=	Switching over towards high delta water crops like rice & sugarcane.
15. Average increase in cropping intensity	=	20 %
16. Overall cost of watercourse improvement per acre commanded	=	Rs.253/-
17. Cost/acre with Govt. share only	=	Rs.163/-
18. Cost/acre contributed by farmers	=	Rs.90/-

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