

Government of Pakistan



United Nations
Development Programme



Ministry of Science and Technology
GOVERNMENT OF PAKISTAN
October 2006

MAWCD
MASS AWARENESS FOR WATER
CONSERVATION AND DEVELOPMENT

Project Document



Project Number:		Mass Awareness for Water Conservation and Development	
Project Title:		Start Year:	October 2006
End Year:		September 2009	
Executing Agent:		NEX - National Execution Ministry of Science and Technology	
Implementing Agent:		NEX - National Execution / Pakistan Council of Research in Water Resources, Ministry of Science and Technology, in collaboration with various government departments, local government, NGOs and UNDP	
Revision Type:		LPA Approval Date:	Arif Alauddin
ARR / Programme Officer:			
Budget Financing (in Pak Rupees)			
Total Budget	Rs. 154.46 million		
Cost Sharing			
UNDP/Donors	Rs. 92.20 million		
GOP	Rs. 62.25 million		

Classification Information

DCAS Sector and Sub-sector:
 Primary Type of Intervention: Capacity Building
 Primary sub-type of Technology Adaptation Intervention:
 Primary Area of Focus: Awareness raising for water conservation and management

Brief Description:

The main objective of the project is to promote water conservation and management techniques and measures targeting end users at grass root level through a mass awareness campaign. The specific objectives are: (1) to collect and document existing knowledge on indigenous and improved technologies for water conservation in agriculture, industries and household; (2) to develop dissemination material and promote best practices for mass awareness and capacity building campaign; and (3) to conduct research and demonstrate the best practices and improved water conservation techniques at grass root level. The project has relevance to the objectives of Medium Term Development Framework (MTDF) of the Government of Pakistan for water resources conservation, management and development through awareness and dissemination of improved knowledge and technologies for water conservation and development at grass root levels.

Approved by	Signature	Date	Name / Title
Government (EAD):	<i>[Signature]</i>	13 th March 2007	AMIR TARIQ ZAMAN Joint Secretary Economic Affairs Division Government of Pakistan Islamabad
Executing Agency (PCRWR):	<i>[Signature]</i>	22/6/07	Dr M A Kahlown, Chairman
UNDP:	<i>[Signature]</i>		

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SECTION I: NARRATIVE PART

PART-I. SITUATION ANALYSIS

Increasing demand of water in Pakistan for agriculture, industries, environment and household use is putting substantial pressure on the limited water resources. The country is passing through water crisis and water has become a major political, socio-economic and development issue. The annual per capita water availability at present is about 1000 m³ and the fractional use of available resources is more than 50% (Water and New Technologies, 2002). Thus according to the UN comprehensive fresh water assessment, Pakistan is placed in the high water stress category (UN 1997).

High population growth rate, economic development, changing socio-economic conditions, and environmental pressures including climate change induced factors are major forces behind the current water scarcity in the country. The gap between availability of water (supply) and its extensive use (demand) has been widening and during the last 50 years this gap has increased by almost 250% (Beg 2000). This is mainly because, on the one hand, the country's fresh water resources have been drastically reduced due to the degradation of water related ecosystems and deterioration of water quality, and on the other hand, besides growing demand of water, the available water resources are inefficiently used in agriculture, industries, and household sectors of the economy.

The challenge of water scarcity is expected to be heightened in the future given the current pace of economic development and population expansion in the country. Climate change in the form of global warming may further increase the gap between supply and demand of water resources in the region. It is expected that increase in temperature would increase water demand in the region through increased evaporation as well as high crop water requirements (IPCC 2001) while, the receding of glaciers and abnormalities in precipitation due to climate change might also affect the water resources of the country.

A major share (95%) of the available water resources currently goes to agriculture, as geographically, the country mainly lies in the arid and semi-arid region, therefore, rainfall is not sufficient to meet the water requirement of agricultural sector. Agriculture mainly relies on irrigation, accounting for about four-fifth of the total cropped area of over 20 million hectares and contributing a bulk of food production. Owing to high population growth rates (more than 2%), Pakistan needs to double its annual agricultural food crop production every 30 – 35 years. Food self sufficiency would no longer be possible in the near future, given current water availability, and low efficiency in agricultural water use and delivery systems (the current water use efficiency in agriculture ranges between 25 - 35%, and delivery efficiency is about 50%). A large quantities of water are wasted, inducing the problem of salinity and water-logging (about 6 million hectares of land is affected presently by this menace.

Timely actions are therefore needed to devise strategies for dealing with water resources as without this the country may face serious water crises in the long run which in turn could further increase our food insecurity, deteriorate economic growth, enhance environmental degradation, and exacerbate poverty. The traditional methods mainly "supply based engineering measures through civil works" though have been instrumental in achieving high economic growth, particularly agricultural growth during the so called green revolution phase in sixties and seventies, these methods would not solve the problem of our water shortages. Engineering measures to increase the storage may only make available another 15-20 MAF but at a very high cost. Much greater economic benefits can be achieved under the current and future scenarios by improving efficiency in water use through the "demand based water management

measures" that is by using the country's scarce water resources in efficient manner which provide high economic returns to the nation.

The proposed project aims to launch a comprehensive mass awareness campaign for sustainable management of water resources in the country. The project has close relationship with the objectives of Medium Term Framework (MTDF) which stresses sustainable management and development of water resources in the country through integrated project and programmes. The project would also contribute to global targets of the Millennium Development Goals (MDGs) for reducing poverty by increasing irrigated agricultural productivity, efficient management of water resources, and improving environment. To assist the Government, the United Nations Development Assistance Framework (UNDAF) for Pakistan has been adopted as a response to the national challenges identified in the Common Country Assessment (CCA). UNDAF includes support for creating an enabling policy environment, strengthening institutional capacity and promoting sustainable land and water management practices.

Specific objectives:

1. To collect and document exiting knowledge on indigenous and improved technologies for water conservation in agriculture, industries and household;
2. To develop dissemination material and promote best practices for mass awareness and capacity building campaign;
3. To conduct research and demonstrate the best practices and improved water conservation techniques at grass root level.

PART-II, PROJECT STRATEGY

The strategy to be adopted for creating mass awareness on water conservation will essentially be based on several factors, which include Government of Pakistan's own approach on how it sees water resources to be conserved and developed. Though the work on new National Water Policy is still ongoing, the fundamental issues on water are already well know, and will be the focus of this project. The project will contribute in achieving the objectives of WAPDA's Vision 2025 on enhancement and conservation of water resources. Another aspect of the strategy is the pro-poor focus of the Government of Pakistan, which is based on the principle of ensuring equitable access to water resources particularly in rural areas of the country where about one third of the population is living below the poverty line.

The model for mass awareness is presented in Figure below. It has emerged as a result of detailed scrutiny of the water situation in the country.

Pakistan Council of Research in Water Resources (PCRWR), Ministry of Science & Technology, Government of Pakistan, would be the executing agency for the project and it will be responsible for the overall management. Other participating departments and agencies may be involved under Memorandum of Understanding (MOU).

PCRWR will appoint as per the provisions of the PCOM a National Project Director (NPD) with sufficient background in water resources management and dissemination. The NPD will be responsible for the overall supervision and implementation of the project. The regular staff from PCRWR will facilitate the PD for which they may be compensated. However, for project implementation, a National Project Manager (NPM), and other professional/staff as listed in

PART-III. MANAGEMENT ARRANGEMENTS

A central focus would be the mass awareness for water conservation and development. This is necessary to pursue sustainable water management and pro-poor policies, consistent with the goals and objectives of National Water Policy. This will be achieved through knowledge generation by conducting applied research for identifying and testing existing/new cost effective efficient water management and conservation technologies for agriculture and other uses and disseminating the research knowledge to water users and farmers. Research will be undertaken at farmers' fields/demonstration sites for site specific evaluation as well as dissemination. A brief on the identified areas of research and advancement in water conservation techniques are given in Annexure-B. Agricultural practices for water management will include efficient irrigation methods and timings, water efficient cropping patterns and water harvesting techniques. The use of partially treated wastewater for productive agriculture will be also promoted after it passes safety tests. Cost-effective treatment of industrial effluents will be promoted in line with environmental regulations. Success stories and commendation of certain industries which have reduced wastewater discharge by almost 80% and cut water use by 65% would provide examples for others to follow.

Mass Awareness on Water Conservation – The Model

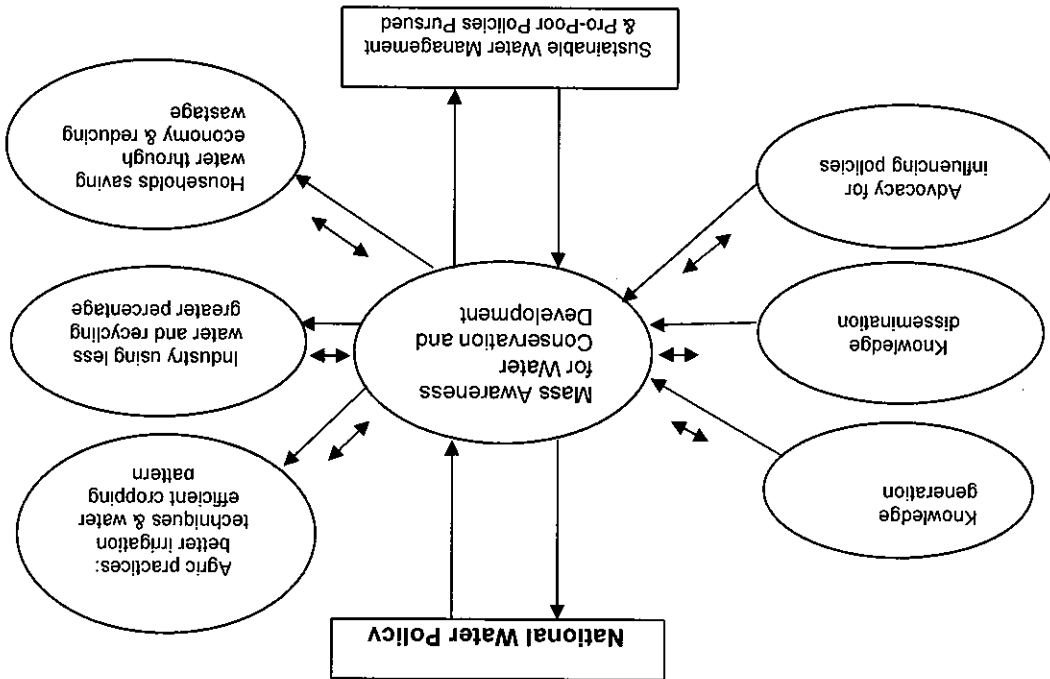


Table 1 in the Annexure-A, will be recruited according to the usual practice under Project Cycle Operations Manual (PCOM-IV) of the Government of Pakistan for UNDP-funded projects.

A Project Steering Committee (PSC) will be formed involving all stakeholders for overseeing the project. The PSC will meet at least twice a year for policy level guidance, approval of annual work plans and progress review. The structure of the PSC is given in the Annexure-A.

The PSC will be chaired by Secretary for Science & Technology with members from Ministry of Environment, Ministry of Agriculture, Ministry of Water and Power, Planning Commission, Ministry of Kashmir Affairs and Northern Areas, Pakistan Agriculture Research Council (PARC), Water and Power Development Authority (WAPDA), Ministry of Information, Provincial Planning & Development Departments, Pakistan Meteorological Department (PMD), Federal Flood Commission (FFC), Pakistan Atomic Energy Commission (PAEC), and representatives of Civil Societies. UNDP representative will also be invited to attend the PSC meetings.

A Tripartite review committee comprising UNDP, Economic Affairs Division (EAD, Govt. of Pakistan) and PCRW (Ministry of Science & Technology) will be held once a year to assess overall progress and discuss any policy issues relating to the project.

At the provincial level, Provincial Coordination Committees (PCC) will be formed under the Chairmanship of Secretary, Planning & Development Departments of Punjab, Sindh, NWFP, Balochistan, Akl and Northern Areas respectively. PCC will review progress and ensure the timely implementation of planned activities. The PCC will comprise P&D, Agriculture Department, Irrigation Department, Local Government Department, District Nazims, PCRW, and two representatives from civil societies (NGOs). The Regional Head of PCRW will be the Secretary of the Committee (PCC) in each province/region.

The National Project Director (NPD) being the Head of Project Implementation will be responsible for overall coordination among UNDP, EAD and PCRW and allied agencies, maintaining appropriate liaison with relevant ministries/ departments/ organizations, and organizing and coordinating meetings with all concerned. NPD will be assisted by a team of professionals in PMU to successfully implement the project. NPD and NPM will be the signatory to the bank account.

The total cost of the project is Rs. 154.45 Million, of which the Government contribution is Rs. 62.25 Million and the donor contribution is Rs. 92.20 Million. The Government contribution is on cost-sharing basis and will be managed under agreement between the Government of Pakistan and the UNDP provided for in the PCOM.

Regional Project Managers (RPM) will head teams of professionals within Provincial Project Management Unit (PPMU). PPMUs will ensure coordination at the provincial level and implement the project under the overall guidance of NPD and the Regional Head of PCRW. PMU and PPMU will meet regularly to review progress and ensure that all targets stipulated in the project document are achieved.

While provision for key professionals and administrative staff has been made, it is expected that executing agency will provide services of additional staff, premises (other than Karachi and Gilgit) as appropriate to facilitate implementation of the project. This arrangement would be considered as part of in-kind contribution by executing agency to the project. Professional staff hired under the contract for PMU and PPMU will work in accordance with the agreed TORs given in Annex - C

PART IV: MONITORING AND EVALUATION PLAN AND BUDGET

Project monitoring and evaluation will be conducted in accordance with the established UNDP procedures provided in PCOM-IV. This will include among other, annual Project

Implementation Review (PIR), the Annual Project Report (APR), Tripartite Review (TPR) meetings, as well as Mid-Term and Final Evaluations. A planning, monitoring and evaluation strategy for the project will be developed and approved by PSC in the first year of the project. The strategy will include systems for annual planning, progress reporting, reviews and impact assessment. Planning and monitoring workshops will be organized for participatory annual planning and progress review. Day-to-day monitoring will be the responsibility of the PMU and PPMUs.

PART V: LEGAL CONTEXT

The legal context for UNDP-assisted programmes and projects in Pakistan is established by two major agreements: 1) the Convention on the Privileges and Immunities of the United Nations, given effect by Act XX of 1948 of the Pakistan Constituent Assembly (Legislative) and assented to on June 16, 1948; and 2) the agreement between the Government of the Islamic Republic of Pakistan and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme, signed by the parties on February 25, 1960.

This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article 1, Paragraph 2 of the agreement between the Government of the Islamic Republic of Pakistan and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme.

UNDP-assisted programmes and projects for Pakistan are planned and executed in accordance with the global UNDP Financial Rules and Regulations and the Project Cycle Operations Manual (PCOM) for Pakistan.

The following types of revisions may be made to this project document in writing with the signature of the UNDP Resident Representative only, provided he or she has verified the agreement and is assured that the other signatories of the Project Document have no objections to the proposed changes: a) revisions in, or addition of, any of the annexes of the Project Document; b) revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation; and, c) mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the UNDP.

SECTION II: PROJECT WORKPLAN AND BUDGET

Cover Page

Country: Pakistan

Sustainable land and water management practices promoted.

UNDAF Outcome(s):

Expected CP Outcomes (s):

1. State-of- the-art best practices/ indigenous and improved technologies in water conservation for agriculture, industries and households identified.
2. Awareness about the water conservation techniques and best practices enhanced at all levels.
3. Efficient use of water promoted at all levels.

Expected CP Output(s):

1. Survey and documentation of state-of-the-art existing/ improved technologies/ best practices.
2. Mass awareness material for promotion of sustainable water management.
3. Improved packages for efficient use of water at all levels.

Implementing partner:

Pakistan Council of Research for Water Resources (PCRWR)

Other Partners:

Ministry of Science and Technology

Narrative

The proposed project aims to launch a comprehensive mass awareness campaign for sustainable management of water resources in the country. The specific objectives are: (1) to collect and document exiting knowledge on indigenous and improved technologies for water conservation in agriculture, industries and household; (2) to develop dissemination material and promote best practices for mass awareness and capacity building campaign; and (3) to conduct research and demonstrate the best practices and improved water conservation techniques at grass root level.

The total cost of the project is Rs. 154.46 million. The UNDP share will be 60% which will be a grant. Government of Pakistan's share is 40% which will be financed out of special allocation in the Mid Term Development Framework (MTDF) for water sector. PC-1 for the Government of Pakistan's share has been already approved.

Programme Period: 2007 - 2009

Intervention Title: Mass Awareness for Water Conservation and Development (MAWCD)

Budget Code: TBA

Duration: 3 Years

Estimated total budget: Rs. 154.46 m

Allocated resources:

- Government: Rs. 62.25 m
- Donor(UNDP/other): Rs. 92.20 m

Unfunded budget:

Agree by (Implementing Partner):

Agreed by (UNDP):

Project Work Plan and Budget

EXPECTED CP OUTPUTS And indicators including annual targets	PLANNED ACTIVITIES	TIMEFRAME			RESPONSIBLE PARTY	Source of Funds	Budget Description (Rs. Mill)	Amount
		Y1	Y2	Y3				
		PLANNED BUDGET						
<ul style="list-style-type: none"> • Enabling activities 	• Staffing	X			PCRW/UNDP	UNDP	See Table 4 of Annexure	52.98
	• Equipment	X			UNDP	UNDP	See Table 5 of the Annexure	2.16
	• Vehicles	X			UNDP	UNDP	See Table 2 S. No. 11 of Annexure	5.00
	• Operations	X	X	X	PCRWR	GOP	See Table 2 S. Nos. 13 - 19 of Annexure	14.5
	• MOUS	X			PMU	-	-	-
	1.1 Survey/review of information on best practices. This would include the assessment of current the-art-existing/ improved technologies/ best practices	X			PMU	UNDP	Include activities 1.1 - 1.4 (See Table 2 S. No. 7 of Annexure)	4.50
	1.2 Consultative workshops/ meetings involving all participating departments, agencies, civil etc. both at federal and provincial level.	X						
1.3 Documentation on the basis of the above information and discussion.	X							
1.4 Preparation of mass awareness strategy/ programme.	X							

EXPECTED CP OUTPUTS And indicators including annual targets	PLANNED ACTIVITIES	TIMEFRAME			RESPONSIBLE PARTY	Source of Funds	Budget Description (Rs. Mill)	Amount
		Y1	Y2	Y3				
	<ul style="list-style-type: none"> • Providing technical guidelines for installation of cost-effective and efficient effluent/sewage treatment systems. • cost-effective methods for treatment of industrial wastewater and effluents. 							
	<ul style="list-style-type: none"> • Raise awareness among farming community and industries about water quality and facilities available to check the water quality deterioration. • Introduce the efficient management practices for conjunctive use of low quality groundwater along with canal water to overcome the water shortage and reduce risk of salinity and waterlogging. 							
	<ul style="list-style-type: none"> • Promoting Water Quality Standards for Re-use and Treatment of Wastewater. 							
	<ul style="list-style-type: none"> • 2.6 							
	<ul style="list-style-type: none"> • 3.1 							
3. Demonstration packages for improved pilot research trials on latest technologies, innovative ideas, and best practices/techniques at established research stations of Provincial Agricultural Department	Conducting demonstration/ pilot research trials on latest technologies, innovative ideas, and best practices/techniques at established research stations of Provincial Agricultural Department	X	X	X	PMU	Total:	See details in Table 10	5.00
						GOP	Annexure (include activities 3.1 and 3.2)	3.08
						UNDP		1.92

EXPECTED CP OUTPUTS And indicators including annual targets	PLANNED ACTIVITIES	TIMEFRAME			RESPONSIBLE PARTY	Source of Funds	Budget Description	Amount (Rs. Mill)
		Y1	Y2	Y3				
	etc. A list of well established technologies for further research and dissemination has been formulated and the brief description of these is given in Annexure XIV.							
3.2	Development of improved packages for stakeholders on efficient use of water.							
3.3	Farmers days, field visits, exhibitions and water conservation days.	X	X		PMU	GOP	See details in Table 8 of Annexure	7.50
3.4	Training of farmers and improved packages to stakeholders	X	X		PMU	GOP	See details in Table 7 of Annexure	13.20
3.5	Promotion of technologies for waste water treatment and re-use.	X	X		PMU	GOP	See details in Table 11 of Annexure	3.00
3.6	Human Development Report			X	UNDP	UNDP	Consultant (See Table 2, S.No. 12 of the Annexure)	3.00
• Monitoring and Evaluation	• Steering Committee Meetings	XX	XX	XX	PCRWR			
	• Planning and Monitoring Strategy, and planning and monitoring workshops	X	X	X	PMU	GOP	See Table 2, S.No. 3 of Annexure	2.70
	• Progress Reports	XXXX	XXXX	XXXX	PMU			
	• Foreign Missions + Project Evaluation				UNDP	UNDP	Missions etc. as below (See Table 2, S.No. 10 of Annexure)	3.25
	• Tri-Partite Meetings	X	X	X				

Sr. No.	Title	No. of Positions
	Project Management Unit (PMU)	
1.	National Project Manager	1
2.	National Manager (Mass Media)	1
3.	National Manager (Sociology)	1
4.	Assistant National Manager (Water Resources)	1
5.	Assistant National Manager (Mass Media)	1
	Provincial Project Management Units	
6.	Regional Project Manager	5
7.	Regional Manager (Mass Media)	5
8.	Regional Manager (Sociology)	5
9.	Assistant Regional Manager (Water Resources)	5
	Finance / Support Staff	
10.	Admn./Finance Officer	1
11.	Admn./Finance Assistant	6
12.	Office Secretary	6
13.	Driver	12
14.	Guard (Karachi Office)	1
15.	Project Allowance of Regular PCRWR Staff (30%)	10
	TOTAL:	61

Table - 1: List of project professionals and other support staff

Table - 2: Summary of Capital Costs

Sr. No.	Item	GOP	UNDP	Total
1	Project Staff (Table - 4)	49,751.25	828,855.83	878,607.08
2	Equipment for Project (Table - 5)	-	35,820.90	35,820.90
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	44,776.13	-	44,776.13
4	Training of Farmers and Water Users (Table - 7)	218,905.50	-	218,905.50
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	94,626.88	29,751.25	124,378.13
6	Mass Awareness through Electronic and Print Media (Table - 9)	253,897.21	248,756.25	502,653.46
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	-	74,626.88	74,626.88
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	51,077.95	31,840.80	82,918.75
9	Wastewater Management and Reuse (Table - 11)	29,751.25	20,000	49,751.25
10	Foreign Mission Cost + UNDP for Project Evaluation	-	53,987.19	53,987.19
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos.** Potohar Jeeps (4x4) - 4 Nos.	-	36,484.25	36,484.25
		-	46,434.5	46,434.5
12	Human Resource Development Report on Water	-	49,751.25	49,751.25
13	TA/DA (for six regions @ Rs 0.22 million per year per region)	64,676.63	-	64,676.63
14	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	46,434.50	-	46,434.50
15	Printing and Publication (for six regions)	39,801.00	-	39,801.00
16	Rent for Karachi and Gilgit Offices	24,875.63	-	24,875.63
17	Office Furniture for Karachi and Gilgit Offices	8,291.88	-	8,291.88
18	Stationery and Supplies (for six regions)	31,509.13	-	31,509.13
19	Utilities (Telephone, Electricity, Gas etc.) for six regions	24,875.63	-	24,875.63
	Sub-Total	983,250.54	1,456,219.09	2,439,469.63
	3% Contingencies/cost-sharing	49,087.90	72,802.66	122,056.40
	Total (Dollars)	1,032,338.44	1,529,021.75	2,561,526.03

* Cost-sharing at 3%
** If not available then 4x4 Jeeps may be purchased

Table - 2b: Summary of Capital Costs

Sr. No.	Item	GoP	UNDP	Total
1	Project Staff (Table - 4)	3.00	49.98	52.98
2	Equipment for Project (Table - 5)	0.00	2.16	2.16
3	Federal and Provincial Workshops for consultation, planning and monitor project	2.70	0.00	2.70
4	Training of Farmers and Water Users (Table - 7)	13.20	0.00	13.20
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	5.71	1.79	7.50
6	Mass Awareness through Electronic and Print Media (Table - 9)	15.31	15.00	30.31
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	0.00	4.50	4.50
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	3.08	1.92	5.00
9	Wastewater Management and Reuse (Table - 11)	1.79	1.21	3.00
10	Foreign Mission Cost + UNDP for Project Evaluation	0.00	3.26	3.26
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos. ** Potohar Jeeps (4x4) - 4 Nos.	0.00	2.20	2.20
		0.00	2.80	2.80
12	Human Resource Development Report on Water		3.00	3.00
13	TA/DA (for six regions @ Rs 0.22 million per year per region)	3.90		3.90
14	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	2.80		2.80
15	Printing and Publication (for six regions)	2.40		2.40
16	Rent for Karachi and Gilgit Offices	1.50		1.50
17	Office Furniture for Karachi and Gilgit Offices	0.50		0.50
18	Stationery and Supplies (for six regions)	1.90		1.90
19	Utilities (Telephone, Electricity, Gas etc.) for six regions	1.50		1.50
	Sub-Total	59	88	147
	Contingencies/cost-sharing	0	4	7
	Total (Dollars)	59	92	154

* Cost-sharing at 3%.

** If not available then 4x4 Jeeps may be purchased.

Table - 3: Financial Phasing of Project Cost *

Sr. No.	Item	1 st Year	2 nd Year	3 rd Year	Total
1	Project Staff (Table - 4)	292,869.02	292,869.02	292,869.02	878,607.07
2	Equipment for Project (Table - 5)	35,820.9	-	-	35,820.9
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	26,534.00	8,291.875	9,950.25	206,776.125
4	Training of Farmers and Water Users (Table - 7)	82,918.75	101,160.87	34,825.875	218,905.50
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	36,484.25	51,409.62	36,484.25	124,378.12
6	Mass Awareness through Electronic and Print Media (Table - 9)	239,966.86	139,635.17	123,051.42	502,653.46
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	33,167.5	16,583.75	24,875.62	74,626.87
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	29,850.75	39,801.00	13,267.00	82,918.75
9	Wastewater Management and Reuse (Table - 11)	8,291.87	33,167.5	8,291.87	49,751.25
10	Foreign Mission Cost + UNDP for Project Evaluation	17,578.77	16,583.75	19,734.66	53,987.19
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos.** Potohar Jeeps (4x4) - 4 Nos	36,484.25	-	-	36,484.25
		46,434.50	-	-	46,434.50
12	Human Resource Development Report on Water	49,751.25	-	-	49,751.25
13	TA/DA (for six regions @ Rs 0.22 million per year per region)	24,875.62	19,900.50	19,900.50	64,676.62
14	POL, R&M of Vehicles (for six regions @ Rs 0.08 million per month per region)	16,583.75	16,583.75	13,267.00	46,434.5
15	Printing and Publication (for six regions)	16,583.75	11,608.62	11,608.62	39,801
16	Rent for Karachi and Gilgit Offices	8,291.87	8,291.87	8,291.87	24,875.62
17	Office Furniture for Karachi and Gilgit Offices	8,291.87	-	-	8,291.87
18	Stationery and Supplies (for six regions)	11,608.62	9,950.25	9,950.25	31,509.12
19	Utilities (Telephone, Electricity, Gas etc.) for six regions	8,291.87	8,291.87	8,291.87	24,875.62

Dollars

Dollars

Sr. No.	Item	1 st Year	2 nd Year	3 rd Year	Total
	Sub-Total	1,030,680.06	774,129.45	634,660.112	2,439,469.62
	3% Contingencies	51,575.46	38,640.14	31,674.96	122,056.4
	Total (Pak Rupees in Million)	1,082,255.52	812,769.59	264,535.08	2,561,526.03

* Cost sharing at 3%.

** If not available then 4x4 Jeeps may be purchased.

Table - 3a: Financial Phasing of Project Cost *

Sr. No.	Item	1st Year	2nd Year	3rd Year	Total
1	Project Staff (Table - 4)	292,869.02	292,869.02	292,869.02	878,607.07
2	Equipment for Project (Table - 5)	35,820.90	-	-	35,820.90
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	26,534.00	8,291.88	9,950.25	206,776.13
4	Training of Farmers and Water Users (Table - 7)	82,918.75	101,160.87	34,825.88	218,905.50
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	36,484.25	51,409.62	36,484.25	124,378.12
6	Mass Awareness through Electronic and Print Media (Table - 9)	239,966.86	139,635.17	123,051.42	502,653.46
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	33,167.50	16,583.75	24,875.62	74,626.87
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	29,850.75	39,801.00	13,267.00	82,918.75
9	Wastewater Management and Reuse (Table - 11)	8,291.87	33,167.50	8,291.87	49,751.25
10	Foreign Mission Cost + UNDP for Project Evaluation	17,578.77	16,583.75	19,734.66	53,987.19
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos.** Potohar Jeeps (4x4) - 4 Nos.	36,484.25	-	-	46,434.50
12	Human Resource Development Report on Water TA/DA (for six regions @ Rs 0.22 million per year per region)	49,751.25	-	-	49,751.25
13	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	24,875.62	19,900.50	19,900.50	64,676.62
14	Printing and Publication (for six regions)	16,583.75	16,583.75	13,267.00	46,434.50
15	Rent for Karachi and Gilgit Offices	8,291.87	8,291.87	8,291.87	24,875.62
16	Office Furniture for Karachi and Gilgit Offices	8,291.87	-	-	8,291.87
17	Stationery and Supplies (for six regions)	11,608.62	9,950.25	9,950.25	31,509.12
18	Utilities (Telephone, Electricity, Gas etc.) for six regions	8,291.87	8,291.87	8,291.87	24,875.62
19	Sub-Total	1,030,680	774,129	634,660	2,439,470
	3% Contingencies	51,575	38,640	31,675	122,056
	Total (Pak Rupees in Million)	1,082,256	812,770	264,535	2,561,526

* Cost sharing at 3%
** If not available then 4x4 Jeeps may be purchased.

Table - 3b: Financial Phasing of Project Cost *

Sr. No.	Item	1st Year	2nd Year	3rd Year	Total
1	Project Staff (Table - 4)	17.66	17.66	17.66	52.98
2	Equipment for Project (Table - 5)	2.16	0.00	0.00	2.16
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	1.60	0.50	0.60	2.70
4	Training of Farmers and Water Users (Table - 7)	5.00	6.10	2.10	13.20
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	2.20	3.10	2.20	7.50
6	Mass Awareness through Electronic and Print Media (Table - 9)	14.47	8.42	7.42	30.31
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	2.00	1.00	1.50	4.50
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	0.00	0.00	0.80	0.80
9	Wastewater Management and Reuse (Table - 11)	0.50	2.00	0.50	3.00
10	Foreign Mission Cost + UNDP for Project Evaluation	1.06	1.00	1.19	3.25
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos.** Potohar Jeeps (4x4) - 4 Nos.	2.20	0.00	0.00	2.20
12	Human Resource Development Report on Water TA/DA (for six regions @ Rs 0.22 million per year per region)	3.00	0.00	0.00	3.00
13	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	1.00	1.00	0.80	2.80
14	Printing and Publication (for six regions)	1.00	0.70	0.70	2.40
15	Rent for Karachi and Gilgit Offices	0.50	0.50	0.50	1.50
16	Office Furniture for Karachi and Gilgit Offices	0.50	0.00	0.00	0.50
17	Stationery and Supplies (for six regions)	0.70	0.60	0.60	1.90
18	Utilities (Telephone, Electricity, Gas etc.) for six regions	0.50	0.50	0.50	1.50
	Sub-Total	62	47	38	147
	3% Contingencies	3	2	2	7
	Total (Pak Rupees in Million)	65	49	40	154

* Cost sharing at 3%.
** If not available then 4x4 Jeeps may be purchased.

Table - 3c: Financial Phasing of Project Cost *

Sr. No.	Item	1 st Year			2 nd Year			3 rd Year			Total
		GNP	UNDP	GNP	UNDP	GNP	UNDP	GNP	UNDP		
1	Project Staff (Table - 4)	1	16.66	1	16.66	1	16.66	1	16.66	52.98	
2	Equipment for Project (Table - 5)	0	2.16	0	0	0	0	0	0	2.16	
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	1.6		0.5		0.6		0.6		2.7	
4	Training of Farmers and Water Users (Table - 7)	5		6.1		2.1		2.1		13.2	
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	1.6		2.5		0.7		1.6		7.5	
6	Mass Awareness through Electronic and Print Media (Table - 9)	7.31		7.16		4.17		3.75		30.32	
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	0		2		1		0		4.5	
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	1.12		0.69		0.92		0.5		5	
9	Wastewater Management and Reuse (Table - 11)	0.29		0.21		0.6		0.5		3	
10	Foreign Mission Cost + UNDP for Project Evaluation		1.07		1		1.19		3.26		
11	Project Vehicles: Single Cabins (with back hood) 2 Nos. ** Potohar Jeeps (4x4) - 4 Nos.		2.2		2.8				2.2		
12	Human Resource Development Report on Water TA/DA (for six regions @ Rs 0.22 million per year per region)	1.5						0		3.9	
13	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	1		1		0.8			2.8		
14	Printing and Publication (for six regions)	1		0.7		0.7			2.4		
15	Rent for Karachi and Gilgit Offices	0.5		0.5		0.5			1.5		
16	Office Furniture for Karachi and Gilgit Offices	0.5		0					0.5		
17	Stationery and Supplies (for six regions)	0.7		0.6		0.6			1.9		
18	Utilities (Telephone, Electricity, Gas etc.) for six regions	0.5		0.5		0.5			1.5		
19	Sub-Total	24	38	21	25	14	24		147		
	Contingencies	1	2	1	1	1	1		7		
	Total (Rs. In Million)	25	40	22	26	15	26		154		

* Cost sharing at 3%
 ** If not available then 4x4 Jeeps may be purchased

Table - 3d: Financial Phasing of Project Cost * (US Dollars)

Sl. No.	Item	1 st Year	2 nd Year	3 rd Year	Total
		GDP	UNDP	GDP	UNDP
1	Project Staff (Table - 4)	16584	276285	16584	276285
2	Equipment for Project (Table - 5)	0	0	0	0
3	Federal and Provincial Workshops for consultation, planning and monitor project activities (Table - 6)	26534	8292	9950	44776
4	Training of Farmers and Water Users (Table - 7)	82919	0	34826	0
5	Farmers days, Field Visits, Exhibitions, and Water Conservation Days (Table - 8)	26534	41459	11609	9950
6	Mass Awareness through Electronic and Print Media (Table - 9)	121227	118740	70647	60862
7	Sub-Contracts (Base-line survey, studies, assessment, etc.)	0	33167	16584	24876
8	Demonstration and Dissemination of Efficient Water Conservation and Management Technologies (Table - 10)	18574	11443	24212	15257
9	Wastewater Management and Reuse (Table - 11)	4809	3483	16584	9950
10	Foreign Mission Cost + UNDP for Project Evaluation	0	17745	0	16584
11	Project Vehicles: Single Cabins (with back hood) - 2 Nos. ** Potohar Jeeps (4x4) - 4 Nos.	0	36484	0	0
12	Human Resource Development Report on Water	0	46434	0	0
13	TA/DA (for six regions @ Rs 0.22 million per year per region)	24876	0	19900	19900
14	POL, R&M of Vehicles (for six regions @Rs 0.08 million per month per region)	16584	0	16584	0
15	Printing and Publication (for six regions)	16584	0	11609	0
16	Rent for Karachi and Gilgit Offices	8292	0	8292	0
17	Office Furniture for Karachi and Gilgit Offices	8292	0	0	0
18	Stationery and Supplies (for six regions)	11609	0	9950	0
19	Utilities (Telephone, Electricity, Gas etc.) for six regions	8292	0	8292	0
	Sub-Total	391,708	637,645	353,566	415,423
	Contingencies	19,543	31,813	17,640	20,726
	Total (Rs. In Million)	411,251	669,458	371,205	436,149
					249,850
					423,613
					2,561,525

* Cost sharing at 3%
 ** If not available then 4x4 Jeeps may be purchased

Table - 4: Estimate for Project Staff

Sr. No.	Title	No. of Positions	Pay Package (per month)	1 st Year	2 nd Year	3 rd Year	Total
Project Management Unit (PMU) *							
1.	National Project Manager	1	1,161	13,930.35	13,930.35	13,930.35	41,791.05
2.	National Manager (Mass Media)	1	829	9,950.25	9,950.25	9,950.25	29,850.75
3.	National Manager (Sociology)	1	829	9,950.25	9,950.25	9,950.25	29,850.75
4.	Assistant National Manager (Water Resources)	1	663	7,960.20	7,960.20	7,960.20	23,880.60
5.	Assistant National Manager (Mass Media)	1	663	7,960.20	7,960.20	7,960.20	23,880.60
Provincial Project Management Units *							
6.	Regional Project Manager	5	962	57,711.45	57,711.45	57,711.45	173,134.35
7.	Regional Manager (Mass Media)	5	663	39,801.00	39,801.00	39,801.00	119,403.00
8.	Regional Manager (Sociology)	5	663	39,801.00	39,801.00	39,801.00	119,403.00
9.	Assistant Regional Manager (Water Resources)	5	498	29,850.75	29,850.75	29,850.75	89,552.25
Finance / Support Staff *							
10.	Admn./Finance Officer	1	332	3,980.10	3,980.10	3,980.10	11,940.30
11.	Admn./Finance Assistant	6	249	17,910.45	17,910.45	17,910.45	53,731.35
12.	Office Secretary	6	166	11,940.30	11,940.30	11,940.30	35,820.90
13.	Driver	12	166	23,880.60	23,880.60	23,880.60	71,641.80
14.	Guard (Karachi Office)	1	138	1,658.38	1,658.38	1,658.38	4,975.13
15.	Project Allowance of Regular PCRWR Staff (30%)	10		16,583.75	16,583.75	16,583.75	49,751.25
Total				292,869.03	292,869.03	292,869.03	878,607.08
* All allowances inclusive.							

Table - 5: Estimate of Equipment for the Project

Sr. No.	Item	Units	Unit Cost	Total
1	Photocopier (Heavy duty)	01	5,804.31	5,804.31
2	Photocopiers - medium duty (for Regional Units)	06	2,072.97	12,437.81
3	Desktop Computers (branded)	10	1,160.86	11,608.63
4	Laser Printers	07	348.26	2,487.56
5	Scanner	07	248.76	1,824.21
6	UPS	10	165.84	1,658.38
Total (Dollars)				35,820.90

Dollars

Table – 6: Estimate for Federal and Provincial Level Workshops

Sr. No.	Details of Workshops	Purpose/Contents	Participants / Organization Responsible	Time of Year	Duration	1 st Year	2 nd Year	3 rd Year	Total
1	Consultative Workshop at Federal Level involving all partners	Review existing status of mass awareness and technologies being used and mode of dissemination	All Project partners (departments, agencies, local govt., civil societies)	6th week	2 Days	16,583.75	-	-	16,583.75
2	Workshop at Federal and Provincial Levels	First Year Annual Review	PSC, PCC, PMU, PPMU and NGOs	46th week	1 Day	9,950.25	-	-	9,950.25
3	Workshop at Federal and Provincial Levels	Second Year Annual Review	PSC, PC, PMU, PPMU and NGOs	92nd week	1 Day	-	8,291.87	-	8,291.87
4	Workshop at Federal and Provincial Levels	Final Project Review/Recommendations	PSC, PCC, PMU, PPMU and NGOs	138th week	1 Day	-	-	9,950.25	9,950.25
Total (Dollars)						26,534.00	8,291.87	9,950.25	44,776.12

* All project partners will be the participants of Workshops and are meant for review, planning activities and monitor project progress.

Dollars

Table – 7 : Estimate for Training Programmes for Farmers and Water Users

Sr.No.	Description	Location	No. of Trainings	No. of Participants	Training Duration	Dollars			Total	Organization Responsible
						1 st Year	2 nd Year	3 rd Year		
1	Training of Project Staff to train professionals/farmers/water users	Federal and Provincial Level	7*	100	2 days	16,583.75	-	-	16,583.75	PCRWR
2	Training of Local Govt. Staff to train farmers/ water users	Provincial Levels	7	3500	3 days	21,558.87	21,558.87	-	43,117.75	PCRWR, Local Govts. and related Training Institutes
3	Training of Middle Level Professionals to train farmers/ water users	Federal and Provincial Level	7	3500	2 days	11,608.62	11,608.62	-	32,217.25	PCRWR, Local Govts.
4	Farmers Training on Desertification Control	Provincial Levels	7	3500	3 days	11,608.62	32,217.25	11,608.62	46,434.50	PCRWR, CDA, PARC
5	Farmers/Users Training on Rainwater harvesting	Federal and Provincial Level	7	3500	2 days	11,608.62	11,608.62	-	32,217.25	Prov. Agri. Dept., PCRWR, NGOs
6	Farmers Training in Efficient Irrigation Methods and Cropping System	Provincial Levels	6	3000	2 days	9,950.25	9,950.25	-	19,900.50	OFWM, Prov. Agri. Dept., PCRWR
7	Farmers/Users Training on reuse of recycled water	Federal and Provincial Level	7	3500	2 days	-	11,608.62	11,608.62	32,217.25	PCRWR, Prov. Agri. Dept., PAEC
8	Farmers/Users Training on irrigation water quality	Federal and Provincial	7	3500	2 days	-	11,608.62	11,608.62	32,217.25	PCRWR, PARC, Agri. Dept., Local

Sr. No.	Description	Location	No. of Trainings	No. of Participants	Training Duration	1 st Year			2 nd Year			3 rd Year			Total	Organization Responsible
						1 st Year	2 nd Year	3 rd Year	1 st Year	2 nd Year	3 rd Year	1 st Year	2 nd Year	3 rd Year		
		Level														
		TOTAL (Dollars)														
						82,918.75	101,160.87	34,825.87	218,905.5							
* One training in each region x No of regions = Total No. of Trainings																

Dollars

Table – 8: Estimate for Farmers Days, Field Visits, Exhibitions and Water Conservation Days under Project

Sr. No.	Description	Location	Nos.	Purpose	Duration	1 st Year			2 nd Year			3 rd Year			Total	Organization Responsible
						1 st Year	2 nd Year	3 rd Year	1 st Year	2 nd Year	3 rd Year	1 st Year	2 nd Year	3 rd Year		
1	Farmers Days	Fed & Prov	14*	To promote message of water conservation and efficient use of technologies	1 Day	8,291.87	13,267.00	8,291.87	29,850.75							PCRWR, Prov. Agri. Dept., Local Govts., NGOs
2	Field Visits	Fed & Prov	14	To disseminate efficient technologies	1 Day	8,291.87	13,267.00	8,291.87	29,850.75							PCRWR, Prov. Agri. Dept., Local Govts., NGOs
3	Exhibitions (water quality, water conservation technologies, awareness etc.)	Fed & Prov	7	To promote message of water conservation and disseminate efficient technologies for wastewater and irrigation	1 Day	8,291.87	13,267.00	8,291.87	29,850.75							M/Env, Agri Dept, Local Govts., PAEC, Industries

Dollars

Sr. No.	Description	Location	Nos.	Purpose	Duration	1 st Year	2 nd Year	3 rd Year	Total	Organization Responsible
4	Water Conservation Days	Fed & Prov	21 (one in each year in all 7 project regions)	To deliver message of water conservation and development	1 Day	11,608.62	11,608.62	11,608.62	34,825.87	All Participating Depts., Local Govts., and NGOs
Total						36,484.25	51,409.62	36,484.25	124,378.12	
* No. of Regions x No. of Farmers days = Total No. of Farmers Days										

Dollars

Table – 9: Mass Awareness through Electronic and Print Media

Sr. No.	Description	Target Community	Nos.	Purpose	Frequency	1 st Year	2 nd Year	3 rd Year	Total	Dollars
1	Promotional Advertisements on TV	Agriculture/Water Users Community	3 (one for agri., one for industry and one for domestic)	To promote message of water conservation and efficient technologies	In 1 st year three ads in every month then one ad after every month (total 58 times)	95,522.40	31,840.80	26,534.00	153,897.20	
2	Documentary Presentation on TV	Agriculture Community	3 (for water, rainwater harvesting, water saving, water quality, conservation)	To promote message of water conservation and disseminate	In 1 st year one documentary presentation after every two weeks then after every	60,530.69	30,182.43	25,207.30	115,920.41	

Dollars

Sr. No.	Description	Target Community	Nos.	Purpose	Frequency	1 st Year	2 nd Year	3 rd Year	Total
			technologies etc.)	efficient technologies	month (total 46 times)				
3	TV Talks	All major water users (Agriculture, Industry and Domestic) and related communities	34 (12 for agriculture, 11 for industry and 11 for household)	To promote message of water conservation and disseminate efficient technologies	One talk during each month on alternate topics (total 34 talks)	26,534.00	26,534.00	23,217.25	76,285.25
4	Promotional Advertisements on Radio	All major water users (Agriculture, Industry and Domestic) and related communities	6 (2 for Agriculture, 2 for Industry and 2 for Domestic)	To promote message of water conservation and disseminate efficient technologies	In 1st year one ad after every two weeks then after every month (total 46 times)	15,920.40	7,960.20	6,633.50	30,514.10
5	Radio Talks	All major water users (Agriculture, Industry and Domestic) and related communities	34 (12 for agriculture, 11 for industry and 11 for household)	To promote message of water conservation and disseminate efficient technologies	One talk during each month on alternate topics (total 34 talks)	18,242.13	19,900.50	18,242.13	56,384.75
6	Awareness Advertisements in National and Local Newspapers	All major water users (Agriculture, Industry and Domestic) and related communities	140 (48 for agriculture, 46 for industry and 46 for household)	To promote message of water conservation and disseminate efficient technologies	One ad after every weekend (total 140 times) in two newspapers (Urdu and English)	13,267.00	13,267.00	13,267.00	39,801.00

Dollars

Sr. No.	Description	Target Community	Nos.	Purpose	Frequency	1 st Year	2 nd Year	3 rd Year	Total
7	Supplement Issues	All major water users (Agriculture, Industry and Domestic) and related communities	3 (one every year on Water Conservation Day)	To promote message of water conservation and disseminate efficient technologies	Yearly Issue (total 3 times) in two newspapers (Urdu and English)	9,950.25	9,950.25	9,950.25	29,850.75
Total						239,966.86	139,635.18	123,051.43	502,653.46

Table – 10: Estimate for Demonstration of Efficient Water Conservation and Management Technologies

Area	Demonstration Activity	No. of Sites	1 st Year	2 nd Year	3 rd Year	Total	
Punjab	Demonstration on efficient land and water management technologies in irrigated areas including:	Bed and furrow, pressurized irrigation and Saline agriculture techniques	1	3,316.75	1,658.38	1,658.38	6,633.50
		Demonstration on efficient land and water management technologies in rain fed areas:					
		Rainwater harvesting, soil conservation and Efficient Irrigation techniques	1	3,316.75	1,658.38	1,658.38	6,633.50
Sindh	Demonstration on efficient land and water management technologies in irrigated areas including:						
	Bed and furrow, pressurized irrigation and Saline agriculture techniques	1	3,316.75	1,658.38	1,658.38	6,633.50	
	Demonstration on efficient land and water management technologies in irrigated areas including:						
	Rainwater harvesting, soil conservation and Efficient Irrigation techniques	1	3,316.75	1,658.38	1,658.38	6,633.50	
Balochistan	Demonstration on rainwater harvesting, groundwater recharge and water management technologies in uplands:						
	Rainwater harvesting, Artificial recharge, High efficiency irrigation systems and Introducing drought resistant crops/varieties	1	4,145.94	8,291.88	1,658.38	14,096.19	
NWFP	Demonstration on rainwater harvesting and efficient land and water management technologies:						
	Rainwater harvesting (surface and	1	4,145.94	8,291.88	1,658.38	14,096.19	

Dollars

	rooftop), High efficiency irrigation systems, Erosion control structures/check structures						
Northern Areas	Demonstration on rainwater harvesting and efficient land and water management technologies:						
	Rainwater harvesting, High efficiency irrigation systems, Erosion control structures/check structures	1	4,145.94	8,291.88	1,658.38	14,096.19	
AJK	Demonstration on rainwater harvesting and efficient land and water management technologies:						
	Rainwater harvesting, High efficiency irrigation systems and Erosion control structures/check structures	1	4,145.94	8,291.88	1,658.38	14,096.19	
	Total (Dollars)		29,850.75	39,801.00	13,267.00	82,918.75	

1

Table – 11: Estimates for Wastewater Management

Sr. No.	Activities	Year – 1	Year – 2	Year – 3	Total
1.	Promotion for Re-use of Wastewater / Grey water for Productive Use	3,316.75	8,291.88	3,316.75	14,925.38
2.	Wastewater Management / Low Cost Treatment	4,975.13	24,875.63	4,975.13	34,825.88
	Total (Dollars)	8,291.88	33,167.50	8,291.88	49,751.25

PHYSICAL WORK PLAN

YEAR-WISE PHYSICAL WORK PLAN OF THE PROJECT

Sr. No.	Activity	Year - 1				Year - 2				Year - 3							
		I	II	III	IV	I	II	III	IV	I	II	III	IV				
1	Project Planning Meetings																
2	Review of existing stock of messages and water saving technologies being used.																
3	Develop comprehensive mass awareness plan for water conservation and development through consultation and consensus.																
4	Develop methodology to conduct base-line survey and data analysis																
5	Sub-Contracts (Base-line survey, studies, periodical assessments, etc.)																
6	Awareness campaign targeting water users and agriculture community.																
7	Electronic and print media campaign based on material produced.																
8	Introduction of water conservation courses in consultation with Education Ministry to include in High Level Relevant Professional degree.																
9	Demonstration of efficient water conservation and management techniques by establishing dissemination sites.																
10	Liaison with industry/ water users to develop and adopt water saving techniques, low cost effluent treatment, safe reuse of wastewater for productive																

Sr. No.	Activity	Year - 1				Year - 2				Year - 3			
		I	II	III	IV	I	II	III	IV	I	II	III	IV
	use and enforcement of laws												
11	Trainings (Project Staff, Farmers, Water Users, Local Govt. Teachers, Women and Children, Middle Level Professionals, etc.					Trainings							
12	Workshops, Farmers days, Group Discussions, Exhibitions, Field Visits, Water Conservation Days, Social Mobilization, etc.									WORKSHOPS, EXHIBITIONS, ETC.			
13	Monitoring and Evaluation of project activities					Monitoring and Evaluation							
14	Impact Assessment of Project											Impact Assessment	
15	Annual Review				AR					AR			AR

ANNEXURE - B : WATER CONSERVATION TECHNOLOGIES

In this Annex, water conservation technologies for research and dissemination under mass awareness programme are discussed in detail.

OVERVIEW

In Pakistan, agricultural followed by domestic and industrial sectors are the major consumers of surface and groundwater. Despite the enormous shortage of water for irrigation and domestic consumption, the users community in Pakistan continues to misuse water in extravagant and injudicious ways. It is well known and has been pointed out by many researchers that the inefficient use of water is one of the most serious problems in Pakistan. Water management however at every level right from the reservoirs to the farm coupled with appropriate institutional and regulatory reforms is needed to alter the situation. There is urgent need to address some of the key issues at the field level by introducing latest water management technologies. The following sections describe some of the most important water management technologies identified for different areas of Pakistan. Some of the technologies are already being tried on limited scale in various parts of the country and have been proved very useful. Under the project, these technologies would be disseminated to the real users in a much coherent way using appropriate dissemination media and fora. This is not the exhaustive list and further technologies could be introduced as consider appropriate.

A. TECHNOLOGIES RELATED TO AGRICULTURE SECTOR

1. TECHNOLOGIES FOR IRRIGATED AREAS

Pakistan's agriculture is classified as irrigated agriculture with about 17 million hectares (Mha) of irrigated area contributing 90% of total agriculture produce. Despite enormous losses in the irrigation system and reduced supplies due to prolonged drought and reduced river flow, the farmers are still using highly inefficient and obsolete methods of irrigation. The following interventions have been proven helpful in saving water to considerable extent.

i. Watercourse Improvement

The total potential of water from the Indus River and its tributaries is about 146 MAF, however, the crops hardly use 31 MAF and the rest is lost as conveyance and application losses (Khan, 1997). The main causes of these operational losses are: seepage, overflow, thin distorted, silt-loaded banks, vegetation, convoluted sections rodent holes etc. (Kahlown et al., 1998). A considerable amount of water wastage also occurs in the form of application losses due to undulations in the fields coupled with basin irrigation and because of adoption of obsolete agricultural and irrigation practices at farm level. About 21,000 watercourses have been improved so far saving reasonable amount of water. It has been estimated that improving the remaining watercourses in the Indus Basin could save about 20 MAF of water.

ii. Improved Farm Layout

The layout of most of the fields is based on traditional flood basin comprising a number of unwanted dikes and ditches, which cover a length of over two kilometers in each square (25 acres of land). These fields are not properly leveled which results in wastage of land and low irrigation efficiencies. Removing unnecessary field dikes and ditches, trees etc. and designing farm layout and irrigation system based on the infiltration characteristics of the soil and stream size coupled with proper irrigation scheduling would greatly increase the land use intensity and water application/water use efficiency.

iii. Laser Land Levelling

Precision land leveling (PLL) is a topographic modification of land and involves grading and smoothing of land to an even level, with little or no slope. PLL improves irrigation application efficiency and increases the uniformity of water application with less chance of over and under

irrigation. It has been reported that this technology can increase the land use intensity from 8-63% and cropping intensity from 6-70% (Gill, 1994). Therefore, leveled fields not only help reduce the amount of irrigation water required but also help reduce the labor requirements.

iv. Zero Tillage Technology

In rice-wheat rotation system, after harvesting rice, sufficient moisture is available. If the soil is ploughed as in the conventional practice, it not only wastes the moisture present in the soil but also causes extra financial burden on farmers in term of ploughing, planking and pre-sowing irrigation (round). It also unnecessarily delays wheat sowing by a couple of weeks, which adversely affects the crop yield. Nevertheless, these fields can be sown with zero tillage or technology well in time with minimum labour and without pre-sowing irrigation. In zero tillage or direct planting, seed is placed directly in the uncultivated field with the help of a seed drill. Several kinds of seed drills have been developed for the purpose. Direct planting increases the soil fertility and organic matter in the soil, improves infiltration and moisture retention characteristics of the soil. Because of less tractor wheel traffic, soil compaction is also reduced. In contrast, plowing and turning the soil reduces the organic matter in the soil. Besides tillage and hoeing are extremely labor and energy intensive, therefore, the availability of labor and machinery are the deciding factors in the adoption of zero tillage technology. The technology was first introduced in Pakistan during 1997 by the On Farm Water Management Directorate of the Punjab. Since then more than 0.12 million acres in Punjab have been sown by this technique during 2001-2002 Rabi season (OFWM, 2001). Kahlown and Azam (2001) evaluated various resource conservation technologies and found that this technology resulted in increased water and fertilizer use efficiencies.

v. Improved Irrigation Application Methods

These methods include the bed and furrow, drip, bubbler, sprinkler irrigation methods etc. A brief description of each method follows.

a. **Bed and Furrow Irrigation:** Basin irrigation is the conventional method commonly used in Pakistan. However, application efficiency of basin irrigation is very low. Surface irrigation techniques can be improved by developing crop specific field layouts. Efficient surface irrigation methods such as bed and furrow irrigation system are well developed and help save water. Kahlown et al. (1998) concluded that cotton showed maximum water use efficiency for bed and furrow method of irrigation whereas the flat basin method of irrigation had the lowest yield and the highest water consumption. The weed seeds, which are transported through canal water, are trapped in the furrows from which growing seedlings can be removed or controlled easily. Moreover, the same fields may be used for inter-cropping e.g. sugarcane in furrows and wheat on beds etc. Water saved in bed and furrow irrigation can be used to increase the cropping intensity and also for leaching the salts in salt affected soils.

b. **Rain-gun Irrigation System for Round:** After seedbed preparation significant amount of water is applied as pre-sowing irrigation for most crops. Though, proper moisture is required only in the upper few centimeters of soil profile where the seeds are to be placed, it is not possible to irrigate just a few centimeters of soil with the conventional irrigation methods. Therefore, farmers either have to leave their lands fallow due to non-availability of pre-sowing irrigation or wait unless water becomes available. The crop sowing is delayed that finally affects the crop yield. Portable rain-gun however, could be used to apply desired shallow depth of water during pre-sowing and 1st irrigation. In this way more area could be sown with the same available water. Portable rain-gun system is being locally manufactured now and available at low cost.

c. **Efficient Irrigation System for Orchards:** Pakistan is known for citrus and mango orchards. Farmers normally flood irrigate their orchards which results in the wastage of water and fertilizers. The moisture and fertilizer in the fallow area also encourage germination and growth of weeds. Farmers normally cultivate the land between the plants to control the weeds. The movement of machinery in the orchard damages the plants as well as the roots. Introducing

ditch irrigation system can save significant amount of water. The fallow area between the plants may be covered with mulches of crop residues. Mulches conserve moisture in the soil and discourage the weed germination. Mulches also reduce the evaporation and hence the salinization of the soils. Moreover, these mulches after some time decompose and add organic matter to the soil surface.

d. **Drip/Trickle and Bubbler Irrigation:** It is a method of water supply to plants efficiently according to the requirement of plants and has a relatively low initial cost. Water trickles from small tubes and directly feeds the roots of the plants. Thus, on the average, the water required by drip irrigation is only 20 to 30% of that required by conventional methods like flooding and furrow methods. Moreover, drip irrigation avoids over-irrigation that is applied in other methods.

These above defined high efficiency irrigation systems were introduced by various organizations however, the utilization of these systems has been limited due to various factors including: i) improper design, ii) high capital cost, iii) non-availability of spare parts, iv) no back up support. However, low cost efficient systems have been evaluated by PCRW/R and others on agricultural fields at limited scale. They demonstrate major potential for reducing water use in the production of high value crops. These systems would be extended to farmers in other areas under the project in cooperation with local manufacturers.

vi. Improved Cropping Pattern

High delta crops such as sugarcane and rice not only consume a major portion of the available water but also contribute to waterlogging. At present, sugarcane is sown on about 1.0 million hectares and consumes about 6.0 MAF of water in addition to huge deep percolation losses. The high delta crops can be substituted with low delta crops of high market value.

vii. Skimming Wells

The thin fresh water layers overlying deeper saline waters is the characteristic profile over most of the Indus basin. This thin layer of freshwater can often be skimmed and brought to the surface by using shallow and low capacity skimming wells. These are of several types, prominent ones being the compound or scavenger well, the radial collector type, the multi-strainer type, and the re-circulation type of wells. The scavenger, radial collector, and the re-circulation type of skimming wells are costly due to their complex design, construction and operation. These options are economically out of the reach of most small farmers. Skimming wells offer an economical and feasible alternative against tile drainage and deeper high capacity wells where fresh water is accumulated in unconfined and permeable aquifers over native saline groundwater existing 30 m or more below ground surface (Chandio et al., 1987). These wells besides supplementing irrigation supplies provide drainage needed to relieve water-logging without the disposal problem of saline effluent.

viii. Use of Low Quality Groundwater for Agriculture

Groundwater contributes nearly 60% of the total irrigation water available at the farm gate. Most of these groundwater supplies are however, inferior to canal water (NESPAK, 1991). Out of a total 562,000 privately owned tube-wells used for irrigation in Pakistan, nearly 70 percent of them pump out inferior quality water either due to high residual alkalinity, Sodium Adsorption Ratio (SAR) or soluble salts. The share of low quality waters in irrigated agriculture is only 21% of the total irrigation water supply in Punjab Province of Pakistan. In other developing countries such as India the overall contribution of low quality water is about 32% (Gupta et al., 1994). For the analogous conditions of fertilizer use, productivity of rice and wheat crops grown on partially reclaimed alkali soils is higher in India than in Pakistan. This clearly suggests that agricultural productivity can be significantly improved in these environments through use of low quality waters with appropriate use of chemical/biological amendments. In conjunction with the canal water, low quality groundwater can significantly increase the irrigation water supplies. However, the farmers need to be encouraged in simplified terms to enhance the productive use of low quality waters for agriculture. Part of the information which they need for economically

successful use of these saline waters is listings of species and varieties of crops with tolerance to waters of the quality which they have.

ix. Reuse of Wastewater

The main non-conventional source of water is sewerage from cities and towns. The total annual potential of wastewater in the country is over 3.6 MAF out of which 2.5 MAF is from municipal waste and 1.1 MAF from industrial waste. About 1.4 MAF of wastewater is disposed off into the river system and the rest is allowed to recharge the groundwater thus degrading its quality. Only on limited scale, raw sewerage near cities and towns is used for agriculture especially for vegetables with questionable quality of the produce. However, viewing the growing water shortage in the country, there is need to potentially reuse wastewater for agriculture production. In this regard the farmers are required to be motivated alongwith back up support to use sewage water for crop production to overcome water shortage. Crop varieties and species which grow erect and furrow irrigation practices which well keeps the harvestable product out of contact with the sewage water should be developed for farmers who will use sewage water.

2. TECHNOLOGIES FOR BARANI AREAS

The barani agriculture contributes about 10% of the total agricultural production and depends only on rainfall. In the context of crop production, barani lands have often been underestimated. However, more than 1200 kg/acre of wheat have been produced in these areas (Ashraf and Mian, 1979) which reveals a high potential for crop production. Water is the only limiting factor for agriculture development in these areas. The occurrence of rainfall in the rain-fed areas is erratic with high spatial and temporal variation. Most of the rainfall occurs during monsoon (July to September). Due to the uncertainty of rainfall, farmers normally use less inputs to reduce the risk of loss in the event of drought. Nevertheless, there is high potential for the development and management of water resources and therefore crop yield could be increased many-fold by adopting proper land and water resources development and management practices. These technologies are described in the following sections.

I. Soil and Water Conservation

These rainfed areas are generally located in the upper region of the country and contribute a major source of inflow to the storage reservoirs. Heavy rainfalls during the monsoon season carry huge amount of soil to the streams. Due to enormous amount of sediment load being brought in by the feeding rivers, the storage capacity of major reservoirs have already reduced significantly. Indus basin carries about 350,000 acre-feet of suspended sediment per year, perhaps one of the greatest sediment loads in the world, and about 200,000 acre-feet of these sediments is deposited in reservoirs and canals. Similarly, small dams in Pothwar region are also subject to silt problems due to inadequate watershed management. The average annual sediment yield of various catchments of Soan and Haro (excluding Chirah) is 3.83 acre-ft/mile². The protection and management of this element is of crucial importance for sustainable agriculture development. Appropriate activities must be carried out to reduce the soil erosion and to conserve soil moisture to enhance the agricultural productivity of the soils. Several government agencies have undertaken soil and water conservation/watershed management in uplands. The projects though contributed in the agricultural development of the areas, the actual effectiveness of these projects with reference to sediment control has not been limited. There is need to train and provide the farmers with efficient low cost activities to manage soil and conserve moisture.

II. Small/Mini Dams

It has been estimated that about 9 million-acre feet (MAF) of water is lost annually as surface runoff from the Barani regions (Latif, 1979). If 50% of this runoff is retained in small/mini dams, water equivalent to more than half the capacity of the Tarbela dam could be stored. There are many potential sites for the construction of small/mini dams in northern areas of the country as well as in Pothwar region. Besides supplying water for irrigation, these dams have many indirect

benefits. They help recharge the groundwater, provide water for domestic and municipal purposes, control soil erosion, control floods in hilly and plain tracts, help to develop fish culture, and also provide recreational activities. However, there are several issues relating to these dams that need to be addressed, such as development of command area, low water conveyance and application efficiencies, reduction in reservoir capacity due to sediment deposition and vegetation growth, evaporation and seepage losses.

iii. Dug Wells

Large-scale water resources development through mini and small dams involves large capital investment. Moreover, these reservoirs need special attention in terms of operation and maintenance. Since these dams are mostly public owned, disputes over water rights and sharing maintenance cost also arise. Small-scale on farm water resource development and management activities however, can play an important role in increasing the income of the farmers. The individual farmers, or a micro community owns these systems, therefore they make best use of the water resource available and the problems of disputes over water are also eliminated. The Barani Master Plan reports that there is considerable potential for development of open wells in the cultivable lands of the Pothwar Plateau. However, the design of such wells needs to be based on aquifer transmissivity and recharge characteristics of the aquifer. The development of a typical dug well can provide water for about 2 ha of flood irrigated, 4 ha of sprinkler-irrigated or 6 ha land with low-pressure drip, typically for high-value orchards.

iv. Pressurized Irrigation Systems

Due to the scarcity of water, merely 25% of total rain-fed area is under cultivation. The farmers use obsolete methods of irrigation resulting in poor application and distribution efficiencies. In most of the area, the land is highly undulated and precision land leveling is, therefore, not a feasible economically justified option. Under the prevalent topographic conditions, gravity irrigation is also not possible in these areas. Therefore, it is of utmost importance that the scarce water resources in the region are utilized most aptly and efficiently with minimum losses. Highly efficient sprinkler and trickle irrigation techniques have been successfully introduced on a small scale in Pakistan, and are particularly well suited to the water scarce barani areas. Application efficiencies of these systems can be very high (75 to 85%) thus permitting almost full use of the scarce water supplies.

3. TECHNOLOGIES FOR DESERT AREAS

According to an estimate, 51% of Pakistan's land is affected by desertification, which can be brought under cultivation, if the available water resources are developed and managed properly, both qualitatively and quantitatively. The main deserts of the country are Thar, Cholistan, Thal, and Kharan with a total area of 1.1 million hectares. Different types of desertification processes in these deserts are significantly active. The groundwater in the almost desert areas of Pakistan is generally saline. The soils in such areas are sandy in the form of sand dunes or clayey in the form of dense calcareous alkaline pans. Rainfall is the only source of freshwater in deserts. Due to high infiltration rates in sandy soils, high temperatures, and low humidity, most of the rainwater is lost as seepage and evaporation. Moreover, a significant amount of rainfall is lost as runoff, which gets collected in calcareous clay pans and gets evaporated. There have been developed optimized techniques for water management in desert areas, the most important are defined below.

i. Rainwater Harvesting

Rainwater could be collected by adopting rainwater-harvesting techniques and by using appropriate interventions to store and utilize water. The water harvesting besides fulfilling domestic and livestock needs, could be used for developing small-scale agriculture with pressurized irrigation systems such as sprinkler and trickle. In this regard, the systems implemented in Cholistan Desert by PCRWR have been successful.

The upland areas of Balochistan, the Northern Western Frontier Province (NWFP) and the Northern Areas (NA) constitute about 60-65% of the country and support about 10% of the population. Most of the upland areas are classified as dry and cold. Precipitation is very variable with some areas receiving more rain during winter whereas others are under more rain during summer season. Agriculture is the mainstay of the people and depends upon income from farmland and livestock to survive. Productive landholdings are small as compared to other parts of Pakistan. There are several physical constraints to agriculture in these areas: remoteness and inaccessibility, marginality, and fragility in terms of moisture stress and poor soil conditions and a short growing season. Added to these are socio-economic constraints such as small landholdings, low productivity, poor resource management, labor shortages and post production

4. TECHNOLOGIES FOR MOUNTAINOUS AREAS

In most of the areas, the rainfall is very low to meet the water requirements. The groundwater is the only source of water but is highly saline and not fit for direct use for domestic and related purposes. Desalination (desalting) is a process of removing salts from water. The concept of desalination is not new, as it has been used over the ages. The development of a number of commonly viable large-scale processes has intensified over the past few decades. Distillation, reverse osmosis, electro dialysis, ion exchange and freezing are the established desalination processes. Solar distillation of water for drinking is immediately available for minimal cost.

v. Low Cost Saline Water Treatment System

The water scarcity is a major constraint for agriculture development in desert areas. Therefore, it is of utmost importance that the scarce water resources in these areas should be utilized most aptly and efficiently with minimum losses. Highly efficient sprinkler and trickle irrigation techniques have been successfully introduced on a small scale in Pakistan, and are particularly well suited to the water scarce barani areas. Application efficiencies of these systems can be very high (75 to 85%) thus permitting highly efficient use of the scarce water supplies.

iv. High Efficiency Irrigation System

Overgrazing is perhaps the most important factor that increases desertification. Cattle goats and other livestock, left uncontrolled to graze, remove protecting vegetation and disturb the root bound top layer of fields, which opens these soils to extreme erosion. Moreover, tree and bush cutting also accelerates the land degradation. Sustainable soil management requires that the soil be protected all round the year by mulching/crop residues. The crop residues favour both water infiltration and soil organisms. Soil erosion increases as the percentage of soil surface cover (vegetative cover, mulches etc.) decreases. It is therefore imperative that maximum area should be covered with crops, trees, shrubs and overgrazing should be controlled. Plantation of drought tolerant, short duration, and long-rooted plants could be an appropriate option to mitigate soil erosion and to combat desertification.

iii. Afforestation / Drought Resistant Plants

The secondary source of water in the desert is groundwater, which is mostly moderately saline to highly saline. This water is not useable for drinking but has been used in many countries for agricultural purposes. Salt-tolerant plants can utilize land and water unsuitable for salt-sensitive crops for the economic production of food, fodder, fuel, and other products. Halophytes (plants that grow in soils or waters containing significant amounts of inorganic salts) can harness saline resources that are generally neglected and are usually considered impediments rather than opportunities for development. Many of these barren lands can become productive by growing selected salt-tolerant crops and employing special cultural techniques using brackish water for irrigation. Highly successful results have been reported by researchers in the Pakistan Council of Research in Water Resources and the University of Agriculture, Faisalabad.

ii. Saline Agriculture

management. All these have led to under utilization of the resources and limited the economic growth of these areas.

i. Northern Areas and NWFP

In northern areas and NWFP, natural streams generally flow downhill with high speed due to steep slopes. People living on either side of the streams are unable to use the flowing water, which sometimes takes the form of flash floods with devastating effect. The people have to travel long distances to fetch water for their daily household needs. Nearly all irrigation is done through khulis – small, often-lengthy, leaky channels usually constructed and maintained by the farmers collectively. Khulis carry water through a crude intake structure from mountain stream. The khul system is increasingly restricted to higher elevations.

a. Lift Irrigation Systems

NWFP and Northern areas have high potential for implementing lift irrigation schemes. There are several locations in the area where perennial flow of water is available in the low-lying areas and there are fertile lands on either side of the stream. Therefore, highly productive lands remain uncultivable due to non-accessibility of water. Renewable water lifting schemes such as hydraulic ram pump and water turbine pumps can easily be installed in these areas to pump water. The water thus pumped may be used for domestic, livestock and agricultural purposes. However there are limitations in the proper installation and operation of these systems. Moreover, irrigation is practiced through inefficient irrigation practices.

b. High Efficiency Irrigation System

The farmers use obsolete methods of irrigation resulting in poor application and distribution efficiencies. Moreover, the water availability is limited due to agricultural fields lying much above the stream/rivers passing the area. Under the prevalent topographic conditions, it is of utmost importance that the scarce water resources should be utilized most efficiently with minimum losses. Highly efficient sprinkler and trickle irrigation techniques have been successfully introduced on a small scale in Pakistan, and are particularly well suited to the water scarce areas. Application efficiencies of these systems can be very high (75 to 85%) thus permitting almost full use of the scarce water supplies.

c. Improved Soil and Water Conservation Practices

The Northern Areas and uplands of NWFP contribute major share of sediment load in the main river system. This has seriously hampered the productivity of these fertile lands. There are various agencies involved in the area undertaking soil and water conservation measures. However, the affectivity of these activities has been limited due to various technical and social constraints. There is need to introduce efficient soil and water conservation measures specific to the problem of certain area.

ii. Balochistan Plateau

Balochistan is an arid mountainous region receiving an average annual rainfall of about 200 mm. Mean annual rainfall in Quetta valley is 234 mm and the total crop water requirement is 1072 mm (MINFAL, 2002). Therefore, about 5 times less rainfall is available than the total crop water requirement (if 100% rainfall is assumed as effective rainfall). This shortfall has to be met by groundwater abstractions. In Balochistan, the cultivable land and the number of tubewells have increased rapidly over the last two decades. Due to increased and indiscriminate groundwater extractions, the groundwater has been depleted. There is need to manage the capacity of groundwater aquifers for sustainable water availability in the province.

Current water supplies to the industrial sector are estimated at 1.18 MAF representing about 1% of total water demand in Pakistan. Supplies are largely derived from privately owned tubewells, though a number of major industrial users in Sindh (for example, Pakistan Steel)

C. TECHNOLOGIES FOR INDUSTRIAL WATER REUSE

Municipal wastewater often is a significant water resource that can be used for a number of purposes, especially in water short areas. Reuse of water has now been accepted as an essential component of water resource management. The domestic wastewater (kitchen, bathing etc.) could be reused for gardening, car washing, vegetable growing etc. At present most of this water is wasted without any use, whereas fresh water is used extensively for these purposes. The reuse of grey waters could help save much water.

ii. Reuse of Grey Waters

In urban and rural areas, the water is available mainly through public water supply system. Due to continuous growth in population, the water demand is increasing and resultant gap between water availability and demand is growing at faster rate. To cope with the growing shortage, the rainwater harvesting could be a potential technique. During rainy season, sufficient water is available due to rainfall in many parts of the country. The rooftop rainwater harvesting especially in urban and remote hilly areas where direct supply of water is limited, is a good technique. This has been successfully implemented in parts of Murree and other areas. This stored water could be used for domestic use other than drinking. Moreover, with low cost filter, the harvested water could also be used for drinking. The rainwater could also be harvested for small scale agriculture and vegetable growing.

i. Rooftop Rainwater Harvesting

Domestic water needs are increasing mainly with increase in population. Current water supplies are estimated as 5.2 MAF, which are likely to increase to 9.7 MAF by 2025. There are various social habits which are required to be changed through this awareness programme. The developed techniques and options available to enhance the water availability for domestic use are defined below:

B. TECHNOLOGIES FOR DOMESTIC WATER USE

In Balochistan water is a scarce source. Due to continuous increasing gap in demand and water availability, the water is required to be utilized most judiciously. The farmers use obsolete methods of irrigation resulting in poor application and distribution efficiencies. In most of the area, the land is highly undulated and precision land levelling is, therefore, not a feasible economically justified option. Highly efficient sprinkler and trickle irrigation techniques have been successfully introduced on a small scale in Pakistan, and are particularly well suited to the water scarce barani areas. Application efficiencies of these systems can be very high (75 to 85%) thus permitting almost full use of the scarce water supplies.

b. High Efficiency Irrigation System

A number of methods have been developed to recharge groundwater artificially. The most widely used are delay action dams, percolation basins, modified streambeds, diversion structures, ditches and furrows, and recharge through injection wells. There have been scattered efforts in Balochistan to manage capacity of depleting aquifers by these recharge methods. However, various assessment studies have shown that these activities could be achieve the require objectives due to various technical and social reservations. Under the programme, efficient methods would be introduced in terms of effective design and operation.

a. Artificial Groundwater Recharge

have direct access to fresh surface water sources. According to estimates, only about 2% of water used by the industries is provided by the municipalities. Since there is currently no effective government licensing or regulation of groundwater abstraction, the total estimated use of water by industrial sector is subject to considerable uncertainty. Industrial demand for water may be expected to increase in the near future. The Statistical Survey of Pakistan indicates that GDP growth generated by the major water-consuming sectors of industry has increased at an average rate of 2.9% over the past decade. Assuming that this growth rate will be sustained, 33% (1.57 MAF) increase in the industrial demand is expected by the year 2011. On the same basis, it is estimated that by 2025, the demand may increase by 100% (2.36 MAF). On the other hand, the industrial effluents generally untreated also pose threat to fresh water bodies – surface and groundwater. There are various techniques developed and options available to meet the industrial water demand and protect hazardous impacts of industrial effluents such as:

i. Water Treatment Plants – at site

The industries are required to treat their effluents partial/complete before disposal to conveyance system. There are now available locally made low cost treatment plants for industrial re-use. However, there is need to promote this technology with strong legislative control.

ii. Chemical Cleaner/Reuse Plants – at site/downstream

The effluents from industry such as tanneries, oil industry, sugar, textile etc., are rich of mineral and other useful chemicals which could be separated for various productive use. This activity is being undertaken at limited scale in the country and most of the useful effluents are wasted besides contamination of water bodies. The industrial sector should be encouraged through various interventions to reuse the valuable material. This would control not only environmental degradation but would also generate revenue and employment.

REFERENCES:

- Ashraf M. A. and M. A. Mian (1979). Land conditions affecting soil and water conservation in barani areas of the Punjab. In: Land and water resources development of barani (rainfed) areas. (Ed. N. M. Awan), CEWRE, University of Engineering and Technology, Lahore pp. 153-159.
- Chandio, B.A., M.K. Marri and A.H. Sheikh, 1987. Skimming Well Concept, Suitability and Cost. Proceedings and Recommendations of One Day National Seminar on Water table and Salinity Control, DRIP Tandogram.
- Gill M.A. (1994). On-Farm Water Management: A historical overview. In: Water and Community: An Assessment of On-Farm Water Management Programme (ed. C. Inayatullah), SDPI, Islamabad, pp. 24-39.
- Gupta, R.K., N.T. Singh and M. Sethi, 1994. Groundwater Quality for Irrigation in India, Tech. Bull. 19, CSSRI Publication, CSSRI, Karnal, 1994, p 16.
- Kahlown M. A., M. S. Shaifque and M. Iqbal (1998). Improved Irrigation Methods for Efficient Use of Irrigation Water under Different Water table Depths. Mona Reclamation Experiment Project, WAPDA, Bhalwal, Pub. No. 231.
- Khan S.R. (1997). Does Climate Change Matter in Pakistan? In: SDPI News and Research Bulletin, 3, 8-11.
- MINFAL (2002). Agricultural Statistics of Pakistan, 2000-01. Ministry of Food Agriculture and Livestock, Government of Pakistan, Islamabad.
- NESPAK (1991). Evaluation of small dams in Punjab and N. W. F. P. Volume II-Part A-C, Government of Pakistan, Ministry of Planning and Development Division.
- OFWM (2001). Water Management News. Directorate General Agriculture (Water Management) Lahore, Vol. 10.

ANNEX – C: TERMS OF REFERENCE FOR PROJECT STAFF

Terms of Reference (TORs) for the project staff are give in this Annex:

1. TORs FOR THE POSITION OF PROJECT DIRECTOR

Duty Station: Islamabad

Duration: Three Years

Background:

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will appoint/recruit, a full time Project Director (PD) for a period of three years. The PD will serve as one of the core staff member of PMU to provide technical support and assistance in all aspects of the project i.e. from programming to management, coordination, and monitoring and evaluation. The incumbent will work under the supervision of the PSC and in collaboration with the staff of PMU and PMUs carry out the following specific tasks:

- Lead and manage the PMU, applying administrative and technical procedures as required by PCRWR and UNDP.
- Develop and launch, in consultation with all the stakeholders and relevant organisations a well-designed campaign on mass awareness for water conservation and development.
- Develop and strengthen coordination within media circles for launch and consistent follow up on mass awareness programme.
- Provide close and regular administrative and technical backstopping to all project components and respective PMUs.
- Coordinate the technical activities of all project components.
- Prepare and update consolidated work plans and budgets for PMU and liaise for the same for Pumas.
- Provide assistance to the implementing agencies in the preparation and regular updating of their work plans and monitoring of the progress of planned activities.
- Organise workshops / Training sessions as planned
- Coordinate resource mobilisation efforts to be initiated under the project.
- Organise quarterly meetings of the PMU and ensure that PMUs also follow the pattern.
- Assist the implementing agency in preparation of TORs for the national and international consultants, identification and evaluation of prospective candidates.
- Assist the implementing agency in preparation of the TORs for the Sub-contracts, evaluation of tender documents and execution of subcontracts.
- Participate in the development of methodological framework for various technical studies to be carried out by different organisations.
- Assist the implementing agencies in the organisation and implementation of training programmes.
- Arrange for financial disbursement of the project budget in accordance with the agreements reached with the implementing agencies.
- Establish reporting systems between the PMU and PMUs.
- Lead the preparation of APR and report physical and financial progress of the entire project.
- Act as a liaison with the national implanting agencies, UNDP and other donors providing financial support to the project.
- Assist the implementing agencies in the finalisation of planned outputs in the form of reports and technical papers.

Qualifications and Experience:

The incumbent should hold an advance degree in Water Resources/Environmental Management or Sciences/Natural Resources Management/ or any other closely related field. Significant experience (at least 15 years) in programme/ project development, management,

monitoring and evaluation is required, especially, dealing with environment generally but water sector particularly in areas of conservation and development. Preference will be given to PhD degree holders. A good understanding of issues involved in poverty and how best it can be eliminated within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with the working of electronic and print media and its effective use for mass awareness programme would also be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent reporting writing skills.

2. TORs FOR THE POSITION OF REGIONAL PROJECT MANAGER

No. of Positions:	Five (5)
Duty Stations:	Lahore/Karachi/Feshawar/Quetta/Gilgit
Duration:	Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, 5 full time Regional Project Managers (RPMs) for a period of three years. The RPM will serve as one of the core staff member of PMU to provide technical support and assistance to the National Project Manage (NPM) in all aspects of the project i.e. from programming to management, coordination, and monitoring and evaluation. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU to carry out the following specific tasks:

- Lead and manage the PMU, applying administrative and technical procedures as required by PCRWR and UNDP.
- Implement all tasks planned for the Province. Coordinate with all participating departments/organizations and civil societies. organizations for successful implementation of the project.
- Ensure that decisions taken by PSC and PCC are implemented as stipulated.
- Coordinate the technical activities of all project components.
- Prepare and update work plans and budgets on regular basis in close coordination with PMU.
- Maintain the records of all financial transactions made under the provincial programme.
- Coordinate with all relevant parties in monitoring the progress of activities planned under the project for the province.
- Develop good working relationship within media circles for mass awareness programme.
- Preparation of TORs for national and international consultants, as well as evaluation of prospective candidates.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Assume lead role in monitoring the execution of sub-contracts.
- Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- Liaise with NGOs/ civil societies organizations to promote understanding and effective project implementation.
- Preparation of APR and reporting progress of the provincial programme.
- Act as a liaison with the PMU, national implementing agencies, UNDP and other donors providing financial support to the project.
- Establish effective reporting systems between the PMU and PMUs.

Qualifications and Experience

The incumbent should hold an advance degree in Water Resources/Environmental Management or Sciences/ Natural Resources Management/ or any other closely related field. Significant experience (at least 7 years) in programme/ project development, management, monitoring and evaluation is required, especially, dealing with environment generally but water resources particularly in areas of conservation and development. A good understanding of issues involved in poverty and how best it can be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English language with excellent report writing skills.

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit a full time Media Specialist (MS) for a period of three years. The NM (MS) will serve as one of the core staff member of PMU to provide technical support and assistance to the National Project Manager (NPM) in all aspects of the project particularly in areas of expertise i.e. from programming to management, coordination, monitoring and evaluation. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU carry out the following specific tasks:

- Compile and analyze the methodologies used for information dissemination and propagation on water resources of Pakistan by electronic and print media in areas of conservation and development.
- In consultation with fellow professionals in other organizations / agencies and the PMU, develop a media policy which could be used for mass awareness programme of the project.
- Maintain appropriate liaison with electronic and print media and ensure that the project philosophy and thrust on mass awareness is being properly understood and well received by media.
- Organize periodic meetings / briefings for politicians, parliamentarians, ministers, bureaucrats, donors, civil societies organizations to highlight the issues in water resource availability and how the project is contributing in creating awareness among the general public.
- Coordinate and liaise with other members in the PMU on preparation of work plans, budgets, overall implementation, monitoring and evaluation of the project.
- Prepare materials for advocacy
- Preparation of TORs for national and international consultants, as well as evaluation of prospective candidates.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- Prepare periodic progress reports on the area of responsibility.

Qualifications and Experience

The incumbent should hold an advance degree in mass communication/journalism/media or any closely related field. Significant experience (at least 10 years) in programme/project development, management, monitoring and evaluation is required, especially, dealing with issues on environment and water resources. A good understanding of issues involved in poverty and how best it can be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent reporting writing skills.

4. Terms of Reference for the Position of National Manager (Sociology)

Duty Stations: Islamabad

Duration: Three Years

3. TORs FOR THE POSITION OF NATIONAL MANAGER (MASS MEDIA)

Duty Stations: Islamabad

Duration: Three Years

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, a full time Sociologist for a period of three years. The NM (S) will serve as one of the core staff member of PMU to provide technical support and assistance to the National Project Manager (NPM) in all aspects of the project particularly in areas of training and mobilization of social masses besides management, coordination, monitoring and evaluation activities. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU carry out the following specific tasks:

- Compile and analyse all relevant information relating to various civil societies organisation / NGOs generally but more particularly dealing with issues on natural resources conservation and development.
- In consultation with all stakeholders develop a social mobilization approach, which could be used in mass awareness programme.
- Prepare a database of all projects / programmes running in water sector where social mobilization is a key component. Develop linkages with CSOs / NGOs to intensify thrust of the project.
- Organize workshops / training sessions as required
- Coordinate and liaise with other members in the PMU on preparation of work plans, budgets, overall implementation, monitoring and evaluation of the project.
- Preparation of TORs for national consultants / civil societies, as well as evaluation of prospective candidates / organizations.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- In developing and implementing social mobilization use participatory approaches to reflect problems and perceptions of the different categories of water users.

Qualifications and Experience

The incumbent should hold an advance degree in Sociology or any closely related social sciences. Significant experience (at least 10 years) in programme/project development, management, monitoring and evaluation is required, especially, dealing with social mobilization and community development in areas relating to environment / water on conservation and development. A good understanding of issues involved in poverty and how best it can be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent report writing skills.

5. TORs FOR THE POSITION OF ASSISTANT NATIONAL MANAGER (WATER RESOURCES)

Duty Stations: Islamabad
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, a full time Assistant National Manager for Water Resources for a period of three years. The ANM (WR) will serve as one of the core staff member of PMU to provide technical support and assistance to the National Project Manager (NPM) in all aspects of the project particularly in areas of his/her expertise i.e. water related programming to management, coordination, monitoring and evaluation. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU carry out the following specific tasks:

- Compile and analyse all relevant information on water resources of Pakistan in the context of supply and demand situations over short and long run.
- Review and assess the need for water saving technologies and methods as well as water testing water quality and quantities.
- Devise a framework for water saving in different sub-sectors enabling major water users i.e. agriculture, industry and households to be aware in advance of likely quantum and quality of water on regular basis.
- Coordinate and liaise with other members in the PMU on preparation of work plans, budgets, overall implementation, monitoring and evaluation of the project.
- Preparation of TORs for national and international consultants, as well as evaluation of prospective candidates.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- In developing and implementing the project, rely on participatory approaches to reflect problems and perceptions of the different categories of water users.

Qualifications and Experience

The incumbent should hold an advance degree in Water Resources/Hydrology/ Environmental Engineering/ or any closely related field. Significant experience (at least 05 years) in programme/project development, management, monitoring and evaluation is required, especially, dealing with issues on water quality and overall availability of water resources in areas of conservation and development. A good understanding of issues involved in poverty and how best it can be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent report writing skills.

6. TORs FOR THE POSITION OF ASSISTANT NATIONAL MANAGER (MASS MEDIA)

Duty Stations: Islamabad
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, a full time Assistant National Manager Mass Media i.e. ANM (MM) for a period of three years. The ANM (MM) will serve as one of the core staff member of PMU to provide technical support and assistance to the National Project Manager (NPM) in all aspects of the project particularly in areas of expertise i.e. from programming to management, coordination, monitoring and evaluation. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU carry out the following specific tasks:

- Compile and analyse the methodologies used for information dissemination and propagation on water resources of Pakistan by electronic and print media in areas of conservation and development.
- In consultation with fellow professionals in other organisations / agencies and the PMU, develop a media policy which could be used for mass awareness programme of the project.
- Maintain appropriate liaison with electronic and print media and ensure that the project philosophy and thrust on mass awareness is being properly understood and well received by media.
- Organise periodic meetings / briefings for politicians, parliamentarians, ministers, bureaucrats, donors, civil societies organisations to highlight the issues in water resource availability and how the project is contributing in creating awareness among the general public.

Qualifications and Experience

The incumbent should hold an advance degree in mass communication/journalism/media or any closely related field. Significant experience (at least 07 years) in programme/project development, management, monitoring and evaluation is required, especially, dealing with issues on environment and water resources. A good understanding of issues involved in poverty and how best it can be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent reporting writing skills.

7. TORs FOR THE POSITION OF REGIONAL MANAGER (MASS MEDIA)

Duty Stations: Lahore/Karachi/Peshawar/Quetta/Gilgit
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, 5 full time Media Officers for a period of three years. The RM (MS) will serve as one of the core staff member of PPMU to provide technical support and assistance to the Regional Project Manager (RPM) in all aspects of the project particularly in areas of expertise i.e. from programming to management, coordination, monitoring and evaluation. The incumbent will work under the supervision of the RPM and in collaboration with the staff of PPMU carry out the following specific tasks:

- Compile and analyse the methodologies used for information dissemination and propagation on water resources of the province by electronic and print media in areas of conservation and development.
- Following an agreed media policy to be pursued for the project, ensure that all concerned in electronic and print media are contacted and provided the right information for dissemination.
- Maintain appropriate liaison with the electronic and print media circles in each geographic location and ensure that issues, thrust and achievements of the project are adequately highlighted before the public.
- Maintain records of all newspaper clippings and videos/pictorials on the project.
- Prepare press releases on activities being undertaken by the project.
- Prepare materials / documentaries for politicians, ministers, bureaucrats, academia, and donors to effectively project the essence of mass awareness programme.
- Write quarterly reports or any other reports for the section.
- Prepare materials for advocacy
- Preparation of TORs for national and international consultants, as well as evaluation of prospective candidates.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- Prepare periodic progress reports on the area of responsibility.

- Coordinate and liaise with other members in the PPMU on preparation of work plans, budgets, overall implementation, monitoring and evaluation of the project.
- Prepare materials for advocacy
- Preparation of TORs for national and international consultants, as well as evaluation of prospective candidates.

Qualifications and Experience

The incumbent should hold an advance degree in mass communication/journalism/media or any closely related field. Significant experience (at least 7 years) in programme/project development, management and monitoring, especially, dealing with issues on environment and water resources. A good understanding of issues involved in poverty and how best these could be tackled within the context of Pakistan is essential. Prior experience with UNDP rules institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with excellent reporting writing skills.

8. TORs FOR THE POSITION OF REGIONAL MANAGER (SOCIOLOGY)

Duty Stations: Lahore/Karachi/Peshawar/Quetta/Gilgit
 Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, 5 full time Social Mobilizers for a period of three years. The RM (SM) will serve as one of the core staff member of PPMU to provide technical support and assistance to the Regional Project Manager (RPM) in all aspects of the project particularly in areas of expertise i.e. from programming to management, coordination, monitoring and evaluation. The incumbent will work under the supervision of the RPM and in collaboration with the staff of PPMU carry out the following specific tasks:

- Compile and analyze all relevant information relating to various civil societies organization / NGOs in the province generally but more particularly dealing with issues on natural resources conservation and development.
- Following the agreed policy on social mobilization, provide the required input during the implementation of the project.
- Organize workshops / training sessions as required.
- Coordinate and liaise with other members in the PMU on preparation of work plans, budgets, overall implementation, monitoring and evaluation of the project.
- Preparation of TORs for national consultants / civil societies, as well as evaluation of prospective candidates / organizations.
- Preparation of TORs for sub-contracts and evaluation of tender documents. Coordinate and supervise the technical activities of national and international consultants to secure the outputs planned under the project.
- In developing and implementing social mobilization, ensure that participatory approaches are being used to reflect problems and perceptions of the different categories of water users.

Qualifications and Experience

The incumbent should hold an advance degree in Sociology or any closely related social sciences. Significant experience (at least 7 years) in programme/project development, management, monitoring and evaluation is required, especially, dealing with social mobilization and community development in areas relating to environment / water on conservation and development. A good understanding of issues involved in poverty and gender and how best these could be tackled within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules

with respect to national execution modality will be an added advantage. Should be fluent in English with excellent report writing skills.

9. TORs FOR THE POSITION OF ASSISTANT REGIONAL MANAGER (WATER RESOURCES)

Duty Stations: Islamabad
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, a full time Assistant Regional Manager (Water Resources) i.e. ARM (WR) for a period of three years. The incumbent will work under the supervision of the ARM (WR) and carry out the following specific tasks:

- Assist in compilation and analysis of all relevant information on water resources of Pakistan in the context of supply and demand situations for short and long run.
- Review and assess the need for water saving technologies and methods as well as water testing water quality and quantities.
- Devise a framework for water saving in different sub-sectors enabling major water users i.e. agriculture, industry and households to be aware in advance of likely quantum and quality of water on regular basis.
- Carry out the required water tests in assessing quality and quantities of water.
- Be part of the exercise to regularly forecaster and update water related information.
- Assist in carrying out various surveys to assess the impact of the project.

Qualifications and Experience

The incumbent should hold an advance degree in Hydrology/Water Resources/ Environmental Engineering/ or any closely related field. Significant experience (at least 5 years) in programme/project development, management and monitoring, especially, dealing with issues on water quality and overall availability of water resources particularly in areas of conservation and development. A good understanding of issues involved in poverty and gender within the context of Pakistan is essential. Prior experience with capacity / institutions building programmes / projects will be highly desirable. Familiarity with UNDP rules with respect to national execution modality will be an added advantage. Should be fluent in English with good writing skills.

10. TORs FOR THE POSITION OF ADMINISTRATIVE / FINANCE OFFICER

Duty Stations: Islamabad
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, one full time Administrative/Finance Officer for a period of three years. The AFO will serve as one of the core staff member of PMU to provide support to National Project Manager (NPM) in all aspects of the project administration and finance. The incumbent will work under the supervision of the NPM and in collaboration with the staff of PMU carry out the following specific tasks:

- Provide administrative support functions in relation to staff, office premises, furniture, equipment, vehicles, maintenance and transportation in accordance with UNDP guidelines.
- Develop and operate proper accounting systems consistent with UNDP projects/programmes and practices.

The incumbent should hold at least a Bachelor's degree in Finance and Accounting. At least 5 years experience working in similar environment. The candidates are required to have good understanding of the financial management, accounting procedures and ability to analyze and prepare reports. Computer literacy is essential. Fluency in English and Urdu required. Knowledge of one or more local languages would be desirable.

Qualifications and Experience

- Provide administrative support functions in relation to staff, office premises, furniture, equipment, vehicles, maintenance and transportation in accordance with UNDP guidelines.
- Develop and operate proper accounting systems in consultation with AFO and consistent with UNDP projects/programmes and practices.
- Develop procedures for disbursement of salaries, per diems, travel claims, operating expenses, leave record etc.
- Prepare annual budgets for project activities in the province and monitor the project accounts and expenses.
- Review the invoices of consultants on monthly basis and ensure timely records and adoption of required procedures for the project.
- Maintain all files relating to administration and finance.
- Maintain service agreements for security, equipment and vehicles.
- Undertake any work from time to time assigned by AFO/RPM for purposes of the project

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit 6 full time Administrative/Finance Assistants (AFA) for a period of three years. One position will at the HQ while others will be assigned to each province. The AFAs will carry out the following specific tasks:

Background

No. of Positions:	Five (6)
Duty Stations:	Islamabad/Lahore/Karachi/Peshawar/Quetta/Gilgit
Duration:	Three Years

11. TORs FOR THE POSITION OF ADMINISTRATIVE / FINANCE ASSISTANT

The incumbent should hold an advance degree in Finance and Accounting. At least 10 years experience working in similar environment. The candidates are required to have good understanding of the financial management, accounting procedures and ability to analyze and prepare reports. Computer literacy is must. Fluency in English and Urdu required. Knowledge of one or more local languages would be desirable.

Qualifications and Experience

- Develop procedures for disbursement of salaries, per diems, travel claims, operating expenses, leave record etc.
- Prepare annual budgets for project activities and monitor the project accounts and expenses.
- Review the invoices of consultants on monthly basis and ensure timely records and adoption of required procedures for the project.
- Maintain all files relating to administration and finance.
- Maintain service agreements for security, equipment and vehicles.
- Undertake any work from time to time assigned by NPM for purposes of the project

12. TORS FOR THE POSITION OF OFFICE SECRETARY

No. of Positions: Five (6)
Duty Stations: Islamabad/Lahore/Karachi/Peshawar/Quetta/Gilgit
Duration: Three Years

Background

In accordance with the agreement with Government of Pakistan to support the Mass Awareness Programme on Water Conservation and Development, UNDP will recruit, 6 full time Office Secretaries for a period of three years. One position will be at the HQ while others will be assigned to each province/region. The person appointed will be expected to carry out following specific tasks:

- Provide overall administrative support to the NPM and RPMs in smooth functioning of the offices established under the project.
- Maintain and update inventories of all office equipment, furniture, vehicles and other properties of the project.
- Maintain and update records pertaining to all appointments, leave account, staff movements etc.
- Maintain appropriate liaison with the counterpart staff in the executing agency and other participating departments/organisations including the civil societies.
- Assist in organising and holding workshops/seminars and other meetings as appropriate. Ensure participation of all concerned agencies.
- Assist in preparation of annual work plans and budgets.
- Maintain service agreements for security, equipment and vehicles.
- Undertake any work from time to time assigned by AFO/RPM for purposes of the project

Qualifications and Experience

The incumbent preferably female candidates should hold at least a Bachelor's degree in Administration/Finance or any closely related discipline. At least 5 years experience working in similar environment. The candidates are required to have good communication skills. Computer literacy essential. Fluency in English and Urdu is required. Knowledge of one or more local languages would be an advantage.