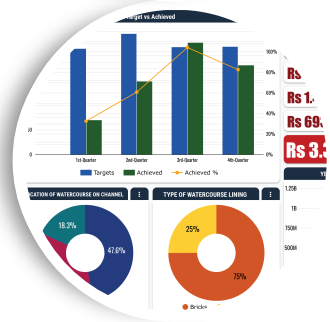
FEDERAL PROJECT MANAGEMENT UNIT
MINISTERY OF NATIONAL
FOOD SECURITY & RESEARCH
ISLAMABAD - PAKISTAN



INCEPTION REPORT

DRAFT

MARCH 2021

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP)

MONITORING, EVALUATION AND IMPACT EVALUATION (ME&IE) CONSULTANTS

A Joint Venture of

G3 Engineering Consultants (Pvt.) Ltd. — Lead Firm

EASE-PAK

ADA Consultants Inc.

Federal Project Management Unit (FPMU)
Federal Water Management Cell (FWMC)
Ministry of National Food Security & Research, Islamabad

Monitoring, Evaluation and Impact Evaluation (ME&IE) Consultants
For
Water Conservation in Barani Areas of Khyber Pakhtunkhwa

DRAFT INCEPTION REPORT

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ACRONYMS

ADA	Assistant Director Agriculture
AF	Acre-Feet
AWPB	Annual Work Plan and Budget
AWPs	Annual Work Plans
BCR	Benefit Cost Ratio
CMS	Content Management System
CSRD	Center for Social Research and Development
DDA	Deputy Director Agriculture
EAs	Executing Agencies
EIRR	Economic Internal Rate of Return
FCR	Financial Completion Report
FCRs	Final Completion Reports
FMFSR	Framework for Federal Financial Management System
FOs	Farmers Organizations
FPMU	Federal Project Management Unit
FWMC	Federal Water Management Cell
GAP	Gender Action Plan
GIS	Geographic Information System
IAs	Implementing Agencies
ICR	Intermediate Completion Report
ICT	Islamabad Capital Territory
IRR	Internal Rate of Return
ICT	Information & Communication Technology
KP	Khyber Pakhtunkhwa
LPS	Liter Per Second
M&E	Monitoring and Evaluation
MAF	Million Acre Feet
ME&IE	Monitoring, Evaluation and Impact Evaluation
MIS	Management Information System
MNFSR	Ministry of National Food Security and Research
MT	Monitoring Template
MTE	Mid-Term Evaluation
NPC	National Project Coordinator
NPV	Net Present Value
OFWM	On Farm Water Management
PC	Project Consultants
PC-1	Planning Commission-(Form-One)
PDO	Project Development Objectives
PIC	Project Implementation Committee
PIES	Project Impact Evaluation Study
PQC	Pre-Qualification Committee
RBM	Results-Based Management
RWD	Responsive Web Design
SOPs	Standardized Operating Procedures
SPSS	Statistical Package for Social Sciences (Software)
SSCs	Supply and Service Companies

SWCAs	Soil & Water Conservation Associations
TABs	Tablets
TOR	Terms of Reference
TPV	Third Party Validation
TWRD	Tail-Water Recovery Ditch
WG	Women Group
WST	Water Storage Tank

1 INTRODUCTION TO WC-KP

1.1 INTRODUCTION

Agriculture is the main stay of Pakistan economy which share in GDP is 19.3% which is in decreasing trend. However, there is a lot of potential in the sector to increase its share in GDP through increased in area, productivity utilization of latest agricultural technologies. In order to boost agriculture GoP constituted a "Task Force on Agriculture" (TFA) in order to formulate strategy to realize the true potential of agriculture sector. One of the TAF strategy which was presented to Prime Minister' (PM) was "Conserve & Increase Productivity of Water" held on 31st October 2018 in the PM, Islamabad. Ministry of National Food Security & Research (M/o NFS&R) apprised the Prime Minister that about 95% of the available fresh water is being used for agriculture in Pakistan with dismally low irrigation water use efficiency, i.e., 40%. About 47 MAF of water is lost in conveyance in canals, distributaries, and Water conservation.

PM was also briefed about the initiatives undertaken by the Directorate General Soil & Water Conservation Khyber Pakhtunkhwa (KP) for protection/conservation of agriculture lands and water harvesting. The protection of erosion prone/eroded lands is undertaken through water conservation structures, check dams, water ponds, field inlets, mini dams, and spring development etc. These would decrease scoring of land, reduce runoff, raise infiltration, and supplement the aquifer recharge and lift the ground water table in addition to shift from mono-cropping to multiple cropping. It was also mentioned that the requirements and needs of KP are different from other provinces. With an organizational setup different from other provinces, the needs of the population and the intensity of their involvement, the difference of terrain, topography, and climate, in addition to the cropping pattern in practice necessitates the development of need based proposal. The objectives of thus KP's water conservation effort differs as it requires small investments in infrastructure which can be implemented though local government.

The province has an agrarian economy where four fifth (80%) of population resides in rural area and having agriculture as their main source of livelihoods. Generally, the low income group of pupils of the rural area is occupied in agriculture occupation. Unfortunately, large numbers of farming community have switched over to new occupation and migrated to urban areas as they find it the slightest rewarding profession today. The share of agriculture in the provincial Gross Domestic Product is 22% whereas it provides 44% of employment of the total labor force. However, 15.5 and 5.8% of the provincial population continues to be moderate and swear food insecure with high rate of malnourishment, whereas this was reported higher as 27.1 and 12.1% in the KP.

KP farmland is small, and people depend on the available land for their basic food needs. Although there is irrigated agriculture in KP (0.870 million hectares), about 0.760 million hectares area comprises of rain fed cultivation production only one crop per year with very low production. An area of 1.245 million hectares lays barren because of want of water and has been termed as culturable waste land. Out of the total of 34 districts in the province (including the newly merged tribal districts), 19 districts are rain fed while the remaining irrigated districts also have major tracts of land that depend on rainfall for agriculture.

Agriculture sector has both forward and backward linkages with almost all other sectors that is acts as engine of growth for the rest of the country. However, the performance of the agriculture sector in terms of water use and capacity as well as quality has remained very low for the last few decades. More importantly, the crop water productivity has been lowest than its potential because almost 50 percent agriculture lands of KP are rain fed; the main limiting factor being water. Water is the determining factor for agriculture development.

1.2 BACKGROUND

The province of KP asks as a bowel catchment covered from three sides by the Himalayan Mountains in the north, Hindu Kush Mountains in the west and the Suleiman mountain ranges in the south. These mountains receive precipitation which drains out of the watershed quickly because of the undulating topography; the uneven terrain of the foothills which drain the areas quickly. While the plains of Peshawar valley (comprising of district Peshawar, Charsadda, Mardan, Swabi and Nowshera) is irrigated by the river Kabul and its tributaries, D.I. Khan which are being irrigated through the CRBC canal from the Indus and steps being taken for Gomalzam dam, majority of the agriculture lands of the province need to be supplemented through local water harvesting because of the uneven terrain.

In relation to the scope of the problem and the opportunity at hand, previously the idea of conversion of rain fed agriculture to irrigated agriculture have not been taken as it should have been. Projects like Barani Area Development Program were steps in the right direction, and were donor funded and could not extract the complete potential of the opportunity. This important sector has seriously been ignored.

Water is the limiting factor in the rainfed Districts of KP that hinder the production of crops and adversely affects human and animal life. On the other hand, enormous amounts of water are being lost through runoff without being utilized, carrying with if fertile topsoil. These waters induce flash floods on one hand and decrease the storage capacity of the dams due to siltation, on the other. The runoff water, if harvested and stored in small units at local level, can be used to supplement irrigation for increase in agriculture production, stabilize the ground water table by inducting ground water recharge, can be used for human and animal use and improve climatic conditions of the rain-fed areas.

Inadequate water availability is a major constraint in future expansion of agriculture to enhance agriculture productivity of the country for meeting growing food and fiber demands. Based on current water shortage and rapidly competing future demands, the foreseen situation would simply be unsustainable for agriculture on which national economy is based. Horizontal as well as vertical expansion of agriculture is, therefore, urgently needed for the purpose. It is particularly important to consider possible strategies for increasing crop productivity through efficient management of the scarce water resources.

1.2.1 Project Objectives

The main objective of agriculture sector is to make the country self-sufficient in food grains and make raw' material available for agro based industries. The project will be encouraging the farming community through financial assistance for water conservation for ensuring timely irrigation. The project has designed to achieve the following long-run objectives:

- *To conserve land and water resources through various interventions for supplemental irrigation, livestock, farm forestry and fish farming,*
- *To increase cropping intensity and per unit of land and water productivity,*
- *To improve livelihood standards of poor fanners,*
- *To improve socio-economic stability.*

The project objectives in quantifiable terms are as follows:

i) To induce aquifer/ground water recharge by pounding water in > 300 water storage reservoirs,
ii) To convert 15,032 acres of culturable wastelands into productive agriculture lands through development of 70 micro-watersheds,
iii) To reduce soil erosion by containing flash floods through provision of soil & water conservation structures and check gulley erosion by plugging gullies through 3,000 check dams,
iv) Minimize the adverse effects of drought by maximizing the irrigation water supplies through exploitation of sub-surface water from tube wells,
v) Conversion of around 43,225 acres of rain fed land into irrigated land through installation of 300 agricultural tube wells and solarization of 700 existing/new tube wells,
vi) To enhance the capacity of the stakeholders in water harvesting and for sustainable use of land and soil resources for increased agriculture production,
vii) To improve the socio-economic status of the farmer community.

The project is in line with specific objectives of National Water Policy and Provincial Implementation Plan of the agriculture sector for enhancing water productivity, efficient and harvesting runoff water to ensure farm productivity, economic uplift of small farmers and improving economy of the country as a whole. The proposed project is closely related to the recently completed water conservation schemes, which form an important element of the integrated rural development program within the agriculture sector.

1.2.2 Description of Sub-Components

The project will have two components: Component-A & B.

- *Component-A*
- *Component-B*

1.2.2.1 Component-A

Component-A will be executed by the Directorate General Soil & Water Conservation KP through its provincial setup. It will comprise the following activities (Table 1.1):

Table-1.1. Activities under Component A Executed by the Directorate General Soil & Water Conservation KP.

Sr. No.	Name of Activity	Sr. No.	Name of Activity
1.	Water Ponds	2.	Check Dams
3.	Water Reservoir	4.	Stream-bank stabilization
5.	Gated field Inlet Outlet/ Spillway	6.	Terracing
7.	Micro-Watershed Development	8.	Water Seepage harvesting Galleries
9.	Agronomic low-cost interventions	10.	Sand Dunes stabilization
11.	Capacity Building		

Component A: Soil & Water Conservation Component

A brief description of various interventions is mentioned as under:

Water Pond:

A pond is a body of standing water that is usually smaller than a lake. It may be cemented or earthen, depending on the site and location. Water ponds serve as source of water, harvested from runoff or perennial springs. Typically, the water storage capacity of a pond is 5-to-10-acre feet.

The rain-fed areas of KP are solely depended on rainfall for their agriculture. The construction of small water ponds at local level will bring revolutionary changes in the lives of the inhabitants of these areas converting monoculture into multiple copping, helping in fish rearing, cattle drinking, ground water recharge and associated purposes. Some of the areas have perennial springs where farmers use them for irrigating their fields, but they are only possible when a water storage pond is built to store the flowing water.

Check Dam:

Check dams generally consist of a vertical barrier constructed on ditches, small streams, channels, and gullies that have often been formed by the erosive activity of water. These structures are commonly constructed using stone, gravel bags, sandbags or masonry etc. These can include productive dams for creating farmlands, flood control dams for preventing floodwater and intercepting sediments, water-storage dams for irrigation, rock check dams for stabilizing vegetation or reducing bed gradient and gully check dams for controlling gully development. Each check dam is expected to control a limited drainage area; however, a series of check dams can be constructed if the drainage area is large. The distance between check dams depends upon the length and width of the channel. There are various types of check dams depend on the available financial resources and the site where check dams are supposed to be constructed. Some of them are low cost while the others are high cost check dams.

Water Reservoirs

A water reservoir is natural or artificial place where water is collected and stored for the use of a community or irrigating land, furnishing power etc. Water reservoir may be a small dam or a large dam. DGS&WCADKP is dealing with small/ mini dams. These small dams are constructed in the areas where rainfall water is collected. The collected water can be used for livestock, irrigation and for drinking purpose also after purification. Many districts of KP have feasible sites for constructing thousands of small dams. These dams will not only fulfill the requirement of water but also recharge aquifers and increase in the esthetic value of the areas.

Stream Bank Stabilization

A vegetative, structural or combination treatment of streams designed to stabilize the stream and reduce erosion is called stream bank stabilization. Stream banks are more susceptible to erosion with running water. During rainy season, this process accelerates and hence loses precious land of the farmers. In KP, this happens too much due to its topography and climatic conditions. DGS&WCADKP is working in all districts of the province and is continuously working for conserving agriculture land of the farmers in different ways. In case of stream bank stabilization, we use both vegetation and engineering structures like protection bunds, spurs etc.

Field Spillways/ Gated Inlet Outlets

A field spillway is a structure used to provide the controlled release of excess flow of water from field to a downstream area. In the rod-kohi area of southern Districts of KP, the sailaba water from mountains is

harvested in large tracts of land to allow it to percolate for crop production and improve ground water recharge. These are structures where soil is protected from being lost with excess of runoff water. Field spillways not only harvests floodwater in fields but also trap soil sediments to increase soil fertility and enhance crop productivity.

Terracing

In agriculture, a terrace is a piece of sloped plane that has been cut into a series of successively receding flat surfaces or platforms, which resemble steps, for the purposes of more effective farming. This method of farming uses "steps" that is built into the side of a mountain or hill. On each level, various crops are planted. When it rains, instead of washing away all the nutrients in the soil, the nutrients are carried down to the next level. Additionally, these steps prevent land sliding that would take plants with it and destroy all the crops on the hillside. This type of landscaping is therefore called terracing. Most of the area of KP is mountainous type and here this method of farming is very suitable for agriculture and for controlling erosion of fertile soil.

Micro Watershed Development

Watershed is defined as any surface area from which runoff resulting from rainfall is collected and drained through a common point. It is synonymous with a drainage basin or catchment area. Some watersheds are very small (less than one acre) while other watersheds are very large and may cover thousands of square miles. Any place where you stand can be part of many watersheds of varying sizes.

For the development of a micro watershed, two things are very important to be conserved, namely; soil conservation and water conservation. In KP, there are some feasible sites where we can develop micro watersheds. Each micro watershed will consist of water conservation interventions like water ponds, mini dams, check dams and soil conservation interventions like protection bunds, spurs, contour ploughing etc. For the livelihood of the local community, fields and gardens will be developed which will be irrigated from the water ponds, mini dams etc.

Water Seepage Harvesting Galleries

Water seepage harvesting galleries are sub-surface groundwater collection system (tank) with perforated pipes, typically shallow in depth, constructed in a sloppy area. These underground water-collecting tanks can be built alone in a gully or inside a check dam. These tanks will receive seepage water from the adjacent wet soil. The tanks are connected with external pipes from where water continuously discharges by the force of gravity. The discharged water can be used for both irrigation and drinking purposes. This is a low-cost intervention where we can get pure and continuous supply of water.

Low-Cost Interventions

By low-cost intervention, we mean those interventions of soil and water conservation which are locally available and applicable with low cost. Some of them are biological while others are engineered structured which are constructed with very low cost.

Agronomic Low-Cost Intervention

Agronomic low-cost interventions include cover crops like gram, peanuts etc. These crops are locally available and have the ability to cover soil surface, thus protecting the soil from the direct effect of rain drops which ultimately help in controlling soil erosion. We will include such type of intervention in our activities which will improve livelihood of farmers and conserve soil and water.

Low-Cost Brush Wood Check Dam

Brushwood check dams made of posts and brush are placed across the gully. This type of soil conservation activity is highly economical where plenty of the bushes, trees etc. are locally available. The main objective of brushwood check dams is to hold fine material carried by flowing water in the gully. Small gully heads, no deeper than one meter, can also be stabilized by brushwood check dams.

Loose Stone Check Dams

Loose stone check dams made of relatively small rocks are placed across the gully. The main objectives for these dams are to control channel erosion along the gully bed and to stop waterfall erosion by stabilizing gully heads. Loose stone check dams are used to stabilize the incipient (initial) and small gullies or gully network. The length of the gully channel is not more than 100 meters and the gully catchment area is two hectares or less. These dams can be used in all regions of KP.

Sand Dunes Stabilization

Sand dune is a ridge of sand created by the wind, found in deserts or near lakes and oceans. Sand dunes can be

stabilized by a number of methods in which herbaceous plantation method is the bestone in which these plants are grown at a distance for effective control of sand dunes. Few distracts of KP Karak, D.I. Khan, Lakki Marwat have sand dunes. Kana (Saccharum Mujga L.) plantation etc. will be done in these districts to stabilize sand dunes. These plants require less water and care. These plants not only help in stabilization of sand dunes but also a source of income for the local community by making house made items from the stems Kana plants.

Capacity Building

Capacity building or capacity development is the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently or to a greater capacity.

An estimated 500 trainings/exposure visits will be conducted for improving the capacity of the stakeholders. Trainings will be designed for farmers as well as the officers and officials of the DGS&WCADKP. Exposure visits to other countries having proven experience in soil and water conservation techniques like highway water harvesting, ground water recharging wells, subsurface check dams, series mini dams etc. will be arranged for selected regular officer of Directorate General SWC from own resources of KP component. Whereas federal share mentioned under capacity building head will be utilized for arranging exchange visits of farmers to the project intervention sites for knowledge dissemination. Annual Plan Review meetings will also be organized between the stakeholders.

1.2.2.2 Component-B

The Component-B will be implemented by the Directorate of Agricultural Engineering KP (DAEKP). It will comprise of the following activities:

i) Installation of Tube wells,
ii) Solarization of Agricultural Tube Wells.

The best solution to the problem of water scarcity in the rain fed areas of KP is the harvesting of rain/ runoff/ spring water at the local level; on-farm or in the immediate vicinity of the farmland. The water can be harvested in water ponds (earthen in low lying area while cemented in sloped/ terraced mountainous areas), earthen water reservoirs, mini dams, sailaba water harvesting through field inlets/spillways in the rod kohi areas of southern KP, check dams in the gullied lands for land reclamation and ground water recharge, sand dunes stabilization in the arid southern regions of the province, terracing for moisture conservation in hilly tracts and stream bank stabilization for protection of prime agriculture lands along the bank of water channels and micro-watershed demonstration sites.

A package of interventions comprises installation of agricultural tube wells and solarization of agricultural tube wells is proposed as minor component of this project. The combined effect of these advancements would lead to enhance output of available water resources. The harvested water will be utilized at local level for the production of high value crops, fruits, stone fruits and vegetables (seasonal and off season). The cultivation of vegetables and fruits will boost the agriculture sector multi-folds. The harvested water will have an enormous effect on ground water recharge will indirectly benefit many industries that use ground water in its processes. The harvested water decreases the occurrences of flash floods by utilizing most of the water in the field and reducing stream bank erosion, thereby protecting the already available agriculture land.

The Directorate General Soil & Water Conservation of the Agriculture Department KP (DGS&WCADKP) extends financial and technical assistance to the farmers. The technical assistance to the beneficiaries is provided free of cost while the department supports soil conservation and water harvesting interventions to the farmers through 80:20 cost sharing basis from the funds provided through provincial ADP schemes, the district developmental funds and funds from the non-Governmental Organizations and International donor organizations.

The DGS&WCADKP has undertaken initiatives for protection/ conservation of agriculture lands and water harvesting. The protection of erosion prone/ eroded lands is undertaken through water conservation structures, check dams, water ponds, field inlets, mini dams, and spring development etc. which would reduce scoring of land, reduce runoff, increase infiltration and supplement the aquifer recharge and raise the ground water table in addition to shift from mono-cropping to multiple cropping.

The scope of the problem encompasses all the agro-ecological zones of KP spread throughout the length and breadth of the province. Water is the main limiting factor, be it the mountainous north, the rigged west, or the arid southern districts of KP. The project shall be

implemented in all the 34 districts of KP including the newly merged tribal districts.

The implementation of the project will be accomplished by the already available setup of the provincial government. The DGS&WCADKP has a district equipped offices in 24 districts of the province wherein the below mentioned activities are being undertaken amicably by the field force in collaboration with the farming community utilizing the meager resources of the provincial/ district setup.

Component B: Agricultural Engineering Component

A brief detail of various interventions which will be provided by Agricultural Engineering Department is given below:

Tube Well

A Tube Well is a device which is constructed to draw ground water contained in an aquifer. Its design varies with the geological conditions of the formation and the purpose for which ground water is to be used. Tube wells are installed to supply water for irrigation and water supply. The required depth of Tube Well depends upon the depth of the water table. The main components of the Tube Well are as follows:

i) The top housing or suction pipe,
ii) Blank or blind pipe to cut off low water yielding zones,
iii) A bail plug or sand trap fixed at the bottom end of a tube well the strainer or the screen to receive inflow from the formation,
iv) A filter pack comprising of graded gravel and sand installed around the strainer or the blind pipe.

Solar Pumping System

A Solar-powered pump is a pump running on electricity generated by photovoltaic panels or the radiated thermal energy available from collected sunlight as opposed to grid electricity or diesel run water pumps. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs and has less environmental impact than pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable/expensive and alternative sources (in particular wind) do not provide sufficient energy.

Working of Solar Pumps

- *The solar system consists of PV array, inverter, controller, submersible I centrifugal pump and water tank at ground surface,*
- *When light falls on the active surface of the PV (photovoltaic) panel containing silicon cells, the electrons in a solar cell become energized and Photo voltaic array converts solar energy directly into electricity as DC and inverter converts it into AC. The AC water pump needs AC current, which is supplied from inverter,*
- *Water is pumped from the well and stored in an appropriate size Water tank constructed at ground surface and Irrigation is done from the Tank water whenever required,*
- *The power from a solar system and the volume of water pumped varies with the amount of solar radiation,*
- *The pump will have its own optimum discharge depending on the type and size of panel/motor.*

There are significant variations in depth of water-table within the KP. It varies from 50 ft in some parts to even beyond 90 ft in other parts. In some areas, it is estimated that further drilling of 100 ft to 320 ft within water bearing strata produce enough water to fulfill the irrigation requirement of 10 to 40 hectares of land. To be covered under the purview of the activities of the project, the diameter of the Tube well (Filter/ Blind Pipe) should be minimum of 8 inches. Solar pumping system does not require any specific arrangements except there should be enough secured space available for placement/installation of silicon cells (Solar) panels fully exposed to sun light. Water should preferably be initially pumped in a small reservoir and from where irrigation water shall be provided to the land through water courses whenever required.

1.3 PROJECT TARGETS AND OUTPUTS

Project targets and outputs of both components are presented at Table 1.2.

Table-1.2. Project Targets and Outputs.

S.#	Input	Output
1.	Construction of 5,000 water ponds	Approximately 12,500 acres of agriculture land will be irrigated from these interventions.
2.	Construction of 3,000 Check dams	Approximately 7,500 acres of the land will be reclaimed.
3.	Construction of 330 Water Reservoir	Approximately 9,900 acres of land will be irrigated from this intervention.
4.	Construction of 2,500 Streambank stabilization.	Protecting/ reclaiming about 6,250 acres of agricultural land from erosion with floods water.
5.	Construction of 1,000 Gated field Inlet Outlet/Spillway	Sufficient amount of water will be provided to about 2,500 acres of land for irrigation in rod kohi areas of the province.
6.	Development of 370 acres land for terracing	Farmer's income will be increased by increasing agricultural land due to terraces development.
7.	Development of 70 numbers of micro-watershed areas	Approx 7,000 acres of the area will be converted into agriculture/ forest land which will improve the aesthetic value of the area.
8.	Constructing 370 numbers of water Seepage harvesting Galleries	Approx 925 acres of land will be irrigated from this intervention.
9.	800 numbers of Agronomic low-cost interventions	Approx 2000 acres of land will be protected from erosion by these interventions.
10.	230 acres of Sand Dunes stabilization	Approx 230 acres land of sand dunes will be stabilized by growing kana plants.
11.	500 Nos Capacity Building	An estimated 500 trainings will be conducted for stakeholders including farmers and departmental staff.
Agricultural Engineering Component		
12.	Procurement and installation of 700 Solar, pumping System and 300 Tube Wells.	Irrigation of 17,500 hectares (43,225 acres) of land.
13.	700 on-site training of farmers in adaptation of new techniques for pumping sub-surface water.	Irrigation water Pumping cost will be reduced by adopting solar technology.

2 SCOPE AND SERVICES OF ME&IE CONSULTANTS

The scope of the ME&IE Consultants is as follow:

2.1 ACTIVITIES OF THE ME&IE CONSULTANTS

The assignment includes consultancy services for 5-year period. The ME&IE Consultants will be responsible for monitoring, evaluation, and Impacts Evaluation and in this context will carry out, but not limited to the following activities:

i) Undertake baseline, midline, and end line surveys of the project activities/interventions in all the project areas,
ii) Develop monitoring strategy, framework, and Result Based Monitoring (RBM) indicators,
iii) Preparation of Monthly, Quarterly and Annual Monitoring and Evaluation of the project activities,
iv) Assessing the improvement in water availability and soil losses due to project interventions,
v) Assessing the water saving per annum due to the project interventions,
vi) Assessing the economic benefits to the agriculture in terms of changes in irrigated area, area under cultivation, crop yields, cropping pattern, cropping intensity, farm income and employment,
vii) Assessing the extent of community mobilization, financial and administrative sustainability of Soil & Water Conservation Associations (SWCAs) and ensuring the maintenance of project interventions,
viii) Carryout impact evaluation of the project investment on the economy and stakeholders.

2.2 CORE TEAM – PROJECT OFFICE (INDICATIVE STAFFING)

The core team consists of Team Leader/ Monitoring and Evaluation Specialist, Environment & Social Monitoring Specialist, Irrigation Agronomist, Agricultural Economist, and Social & Gender Specialist. There are also un-allocated man-months and other Supporting Technical and Non-Technical Staff. The total man months are 165 (Table 2.1).

Table-2.1. Core Team of the Project

Sr. No.	Position	Nos.	Man Months
Key Staff			
1.	Team Leader/ Monitoring and Evaluation Specialist	1	36
2.	Environment & Social Monitoring Specialist	1	10
3.	Irrigation Agronomist	1	10
4.	Agricultural Economist	1	6
5.	Social & Gender Specialist	1	8
Total Man-months			
Non-Key Staff			
6.	Un-allocated man-months	Misc.	30
7.	Other Supporting Technical and Non-Technical Staff	Various	65
Total Man-months			**165**

3 JOB DESCRIPTION AND QUALIFICATION OF CONSULTANT KEY STAFF

The job description of Team Leader/ M&E Specialist and other consultants are described in the following section.

3.1 TEAM LEADER/ MONITORING AND EVALUATION SPECIALIST

The Team Leader/ M&E Specialist will be responsible for providing guidance and direction to all the team members for providing assistance about the M&E assignment in accordance with scope of work and ensure the compliance and supervise the consultant core/field teams and coordination of consultant s' activities with relevant Government departments/agencies. He I She should possess a Ph.D. | Master's Degree in Agriculture Economics | Economics | having 30 years genera / experience and 20 years specific experience in setting up and managing project M & E systems with major experience in development sector particularly of the agriculture and water related projects including evaluation of modem water management interventions of multisectoral projects Working knowledge of water management, irrigated agriculture and community driven development would be desirable. The team leader must have excellent writing and communications skills in English.

Responsibilities of the Team Leader will be but not limited to the following:

- *Lead the M&E consultant's team for accomplishment of requisite assignment,*
- *Liaison with PO PIU, Project Supervision & Implementation Assistance Consultants, project Training Consultants, Field Teams and District Teams,*
- *Carry out monitoring and evaluation of improved water management practices and techniques for their performance assessment as well as propose measures,*
- *Attend all meetings as required and keep a record of such meetings,*
- *Ensure the submission of periodic reports and project completion report,*
- *Coordinate with PSIA & training consultants for getting/providing the information as and when required,*
- *Any other relevant duties assigned by the project management.*

3.2 ENVIRONMENT & SOCIAL MONITORING SPECIALIST

The Environment & Social Monitoring Specialist should possess M.Sc. Degree in Environmental Sciences, having 20 year experience working in the field of environmental and social impact assessment, monitoring and mitigation, with 15 year experience working in the development sector or with public sector entities and also to carry out environmental screening/ assessment of infrastructure projects in the development sector particularly in water sector projects and familiarity with GoP/ GoKP environmental regulations.

Responsibilities of the Environmental & Social Monitoring Specialist will be but not limited to the following:

- *Devise a comprehensive system for monitoring and reporting on implementation of EMP and SMP that also takes into account all elements of compliance with GoP Safeguards policies,*
- *Devise a reporting mechanism that ensures collection of accurate information from respective stakeholders and personnel at all stages of the intervention implementation and ensure the implementation of this mechanism through capacity building and training,*
- *Compile the information collected during intervention screening and implementation into environmental and social quarterly progress reports (ES-QPR) and submit the reports to the PIC. The ES-QPR should include summaries of monitoring and compliance on EMP and SA, repeated and salient non-compliances and plans for addressing and mitigating non-compliance and any environmental or social negative impacts,*
- *Producing Environmental and Social quarterly progress reports that includes summary of monitoring and compliance activities during every quarter the project implementation including non-compliance and plans for mitigating and addressing these. The report shall be due within 15 days of the end of each quarter starting date of project implementation.*

3.3 IRRIGATION AGRONOMIST (IA)

The Irrigation Agronomist will be responsible for analysis of the data pertaining to agriculture aspects, supervise the field staff for collection of related data and its compilation, provide agronomic supporting information to Team Leader and assist in preparation of M&E reports.

The Irrigation Agronomist should possess MSc Agronomy I Plant Breeding Degree preferably with specialization in Agronomy having 20 years general experience and 15 years work experience in agronomy and On Farm Water Management preferably adoption, promotion of modern water management interventions in irrigation technology with sound knowledge of crop production technologies particularly with improved and modern irrigation method s and having reasonable M&E Consultancy work experience specific experience. In addition, the IA would be required to have demonstrated ability to work with technical field staff, and farmers.

3.4 AGRICULTURAL ECONOMIST

The Agricultural Economist will be responsible for develop formats for preparing, reporting, collection and analysis of data pertaining to economic, and analysis of data related to cropping pattern, intensity, crop, and farm budget etc, and will also guide the field staff in collection of required data.

He/ She should possess M.Sc Degree in Agricultural Economics having 20 years general experience and 15 years specific experience in agriculture development/ On Farm Water Management projects including 5 years exclusive experience in project M&Es, baselines, economic analyses and impact assessments. In addition, he/ she would be required to have ability to work with government officials, technical field staff and farmers.

- *Prepare formats for baseline and periodic surveys for establishing pre-project dataset as well as for capturing temporal changes,*
- *Collect, compile, and analyze the data regarding different components/ activities against envisaged project objectives,*
- *Establish a framework for involving beneficiary communities in the M&E process and internalizing beneficiary feedback in project implementation path,*
- *Supervise M&E staff for inspection of field activities for ensuring adoption of specified standards and specifications.*

3.5 SOCIAL AND GENDER SPECIALIST

The Social and Gender Specialist will be responsible for monitoring social and institutional impact of the project and baseline survey as outlined in the scope of services including the project impact and poverty reduction tenants, landless harries.

He/ She should possess Master's Degree in sociology/ gender studies), having 20 years general experience and 15 years specific experience in social organization and gender mainstreaming with 5 years exclusive M&E work. In addition, the Social and Gender Specialist would be required to have demonstrated ability to work with technical field staff, and farmers. He/ she would require monitoring social aspects of the Project including information and communication activities, social mobilization process selection of beneficiaries against developed criteria implementation social management plan, Grievance Redressal Mechanism, and gender mainstreaming activities.

4 MOBILIZATION OF ME&IE CONSULTANT' TEAMS

The section described the mobilization of ME&IE at the head office of Peshawar and baseline, midline and impact monitoring and evaluations reports district level will also be mobilized accordingly. The ME&IE Consultant Offices is already established, the detail of it is also discusses in the section.

4.1 MOBILIZATION OF ME&IE CONSULTANTS' CORE TEAM

The ME&IE Consultants mobilized its specialists (core) team on November 20, 2020. The list of key specialists is shown in Table-4.1(a) & Table-4.1(b). It is also depicted in Figure-4.1 organogram. The non-specialist but supporting staff recruitment is in progress and soon they will be mobilized as well. Following specialist team members (Table-4.1) with planned time inputs have been mobilized.

Table-4.1(a): Core Team & Planned Time Input (Key Staff)

Sr. No.	Name	Position	Time Input (months)
1	Dr. Usman Mustafa	Team Leader / M&E Specialist	36
2	Environment & Social Monitoring Specialist	1	12
3	Irrigation Agronomist	1	12
4	Agricultural Economist	1	8
5	Social & Gender Specialist	1	8
Total Man-months			**70**

Table-4.1(b): Core Team & Planned Time Input (Non-Key Staff)

Sr. No.	Name	Position	Time Input (months)
1	Recruitment in progress	Un-allocated man-months	Misc.
2	Recruitment in progress	Other Supporting Technical and Non-Technical Staff	Various
Total Man-months			**165**

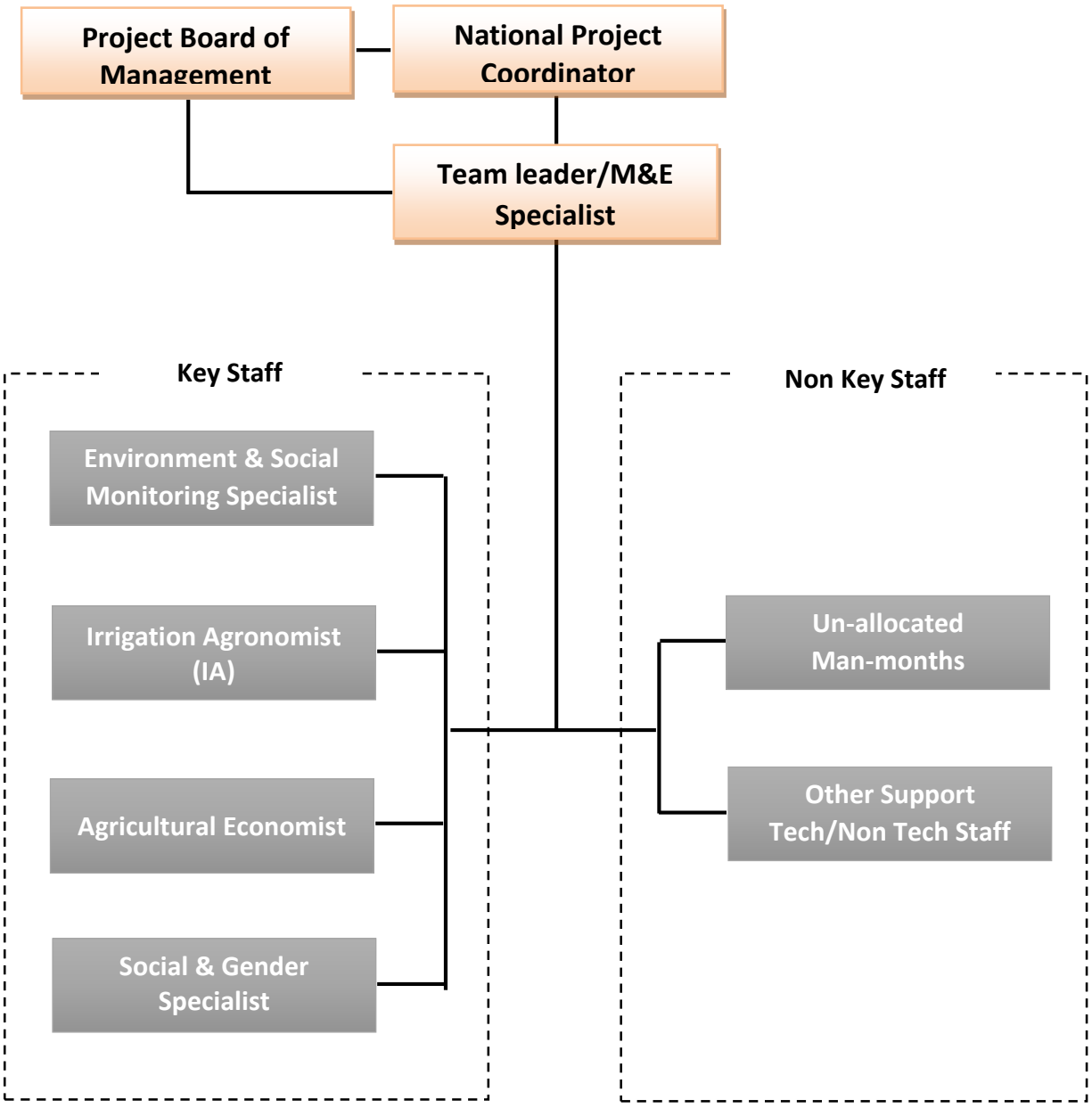


Figure-4.1. The Organogram of the Core Team

4.2 MOBILIZATION OF DISTRICT TEAMS

For conducting Baseline, Midline and End Line Survey field enumerators will be selected and moved to selected sample district for survey. Before field launching of the enumerators into field special training will be conducted. In this connection questionnaires will be prepared and pretested.

4.3 ESTABLISHMENT OF ME&IE CONSULTANT OFFICES

The building for the office is hired at University road, Peshawar. Following is the address of the office:

5 CONSULTANTS' APPROACH AND METHODOLOGY

The section briefly discusses the basic of ME&IE system.

5.1 BASICS OF ME&IE SYSTEM

The ME&IE at WC-KP Project is grounded in Results-Based Management (RBM), which is a management strategy focusing on the performance and achievement of results in terms of outputs, outcomes, and impacts. It is a tool used for strategic control. It uses feedback loops to help managers monitor and then (hopefully) achieve strategic goals. These goals may take the form of physical outputs, organizational or behavioral changes, workflow changes, or form contribution to some other higher-level goal. A key function of ME&IE is therefore to test and determine whether or not the project's objectives and causal analysis (i.e., the sequence of results expected based on certain inputs and activities) articulated in the project design holds true; and if not, why not, and what should be done to address this and learn lessons.

The ME&IE systems at WC-KP are formulated based upon the project's logical framework (log-frame), which is one type of program logic model. A log-frame is an important tool in project design and management, mapping the multiple levels of objectives and associated results (measured through indicators) in the short, medium, and long term. Indicators are units of measurement in the form of qualitative and quantitative that determine whether the objectives formulated in the log-frame have been achieved (draft log-frame developed WC-KP is placed at Annex-A.

The matrix in Table 5.1 summarizes standard log-frame objectives and results, and the types of indicators used to measure them, which form the basis of a project ME&IE system and plan.

Table-5. 1. Matrix for Levels of Log-frame Objectives and Indicators.

Log-frame objectives definitions		**Objectively verifiable indicators that measure objectives**	
Impact (Goal/Overall Objective)	Higher level project objectives in terms of long-term benefits to beneficiaries and the wider benefits to society. The goal will not be achieved by the project alone. The project aims to contribute to its goal.	**Project impact indicators**	Impact indicators measure this long-term change in conditions of the community (e.g., % change in household income, reduction in poverty, etc.)
Outcome (Purpose Specific Objective)	The short term and medium-term objectives in terms of benefits to the project beneficiaries due to the intervention's outputs; the project can only indirectly control achievement of outcomes; behavior change is often a key component.	**Outcome indicators**	Outcome indicators describe the medium-term effects of an intervention's outputs (e.g., % change in cropping pattern and intensities, crop yields etc.)
Output (Results)	The output produced by undertaking a series of activities. This is what will be achieved to the intended beneficiaries or target group, and it should be possible for project management to be held accountable for this delivery	**Output (indicators)**	Output indicators describe the immediate effects of an activity, tangible products, goods and services, and other immediate changes that lead to the achievement of outcomes (e.g., number of WSPs, Check dams, WR, SBS, Solar TW, etc.).
Activities	The tangible goods and services delivered by the project (e.g.,	**Process indicators**	Process indicators describe the activities undertaken (e.g., process

Log-frame objectives definitions		Objectively verifiable indicators that measure objectives	
	provision of material inputs, staff, etc.)		of WSPs, Check dams, WR, SBS, Solar TW, etc.)., process of delivering WSTs etc.
Inputs	The financial, human, and material resources used for the development intervention	**Input indicators**	Indicators used to measure the utilization of inputs (e.g., utilization of budget, and services of project staff, labour by the communities)

To minimize the complexities and make the MIS/GIS Database a useful tool for Input-output, process and result monitoring, the consultants will adopt the following key principles and guidelines during the development and implementation of WC-KP MIS/GIS Database:

i) Information needs and indicators to capture such information are identified in a participatory manner involving all key stakeholders of the project at all levels,
ii) The potential users of MIS/GIS Database are convinced and understand the usefulness of the MIS/GIS Database and their role in data collection, recording, transmission and use of information,
iii) The system provides a two-way flow of information, such that those who collect and transmit the information receive the feedback,
iv) The MIS/GIS Database does not impose a high workload at any level in PIU and other Implementing Agencies (IAs),
v) There is no information/data 'overload' at any level,
vi) The system will be flexible enough to accommodate internal learning changes in future,
vii) The system will provide user friendly interfaces to interact with.

The system's outputs are presented in formats that can be easily converted to other formats and data types without human intervention.

5.2 PARTICIPATORY DESIGN OF THE MIS/GIS ACTIVITIES

The proposed approach to design the MIS/GIS will be fully participative. Great efforts will be made to ensure that all key stakeholders are fully involved throughout the ME&IE design and implementation process.

Before launching the MIS/GIS database system, multiple feedback and validation sessions will be held with all the stakeholders. Finally, a restitution / validation workshop will be conducted to which the key partners would be invited in order to have real feedback on the proposals and achievements.

5.3 MONITORING, EVALUATION, AND IMPACT EVALUATION PLAN

The following section presents brief introduction about the ME&IE and Impact evaluation plan.

5.3.1 Introduction

The monitoring and evaluation functions are related but distinct. Monitoring is the provision of information, and the use of that information, to enable management to assess progress of implementation and take timely decisions to ensure that progress is maintained according to schedule. Monitoring assesses whether project inputs are being delivered, are being used as intended, and are having the initial effects as planned. It is an internal project activity, an essential part of good management practice and therefore an integral part of day-to-day management. Whereas, evaluation assesses the overall project effects, both intentional and unintentional and their impact. It involves comparisons requiring information from outside the project either in time, area, or population. The relative roles of monitoring and evaluation will vary with the type of project.

5.3.2 Framework for ME&IE System

The initial steps for designing monitoring and evaluation system are:

i) A review of the project objectives in order to systematize them in sequence,
ii) Identification of the users of both the monitoring and evaluation information. For monitoring, the users will be the hierarchy of project management. The type of information transmittal will be geared

to the needs of each level of project management. The users of evaluation analysis range from project management through the responsible directorate/ ministry, to the national planners.

Evaluation will draw on the data generated by the monitoring system to help explain the trends in effects and impact of the project. Monitoring data may reveal significant departure from expectations which may warrant the undertaking of an on-going evaluation exercise to examine the assumptions and premises on which the project design was based. Such a review, as also in the case of ex-post evaluation, can be of great value to sectoral management in its policy formulation role.

Monitoring has to be integrated within the project management structure but evaluation, with its wider horizons requiring comparative information, is not necessarily such an integral component. A central evaluation facility may be justified on the grounds that:

i) The demanding professional skills required to interpret evaluation data are either unavailable or uneconomic for each project individually,
ii) The data needed extend from before a project is initiated to a period long past its completion.

Although the design and analytical facility for evaluation may be centralized, the data collection resources within a project will be used to provide much of the required data. If the same unit is collecting data both for eventual evaluation and for quick, timely monitoring, the latter must not suffer due to the greater demands of the former.

5.3.3 Monitoring and Managing of Project Progress

The primary goal is to monitor project progress, given that the project has been carefully appraised, i.e., that there is a strong assumption towards certain stimuli and inputs will achieve specific outputs, effects, and its impact. The role of management in the initial implementation phase is to create the conditions that will allow this chain of events to be occurred.

In the early years of project implementation, the emphasis will be on monitoring of project progress and the delivery of the inputs to the intended recipients. The main source for this aspect of monitoring is properly organized in project records. The other concern of management, at this stage, to use these inputs and reaction of the recipients.

Adoption rates give management a strong inference whether the project is succeeding or not. Information on the recipients' attitudes and perception is important in order to explain any departure in response behavior to that postulated in the project design. Such unpredicted behavior may determine the success or failure of the project.

The information required for monitoring of project implementation does not require complex data systems. A monitoring system will exist even if it is merely a subjective accumulation of impressions by project staff. If common sense rules of good standard management practices are adhered to, the monitoring system can be limited to the minimum of parameters to be recorded regularly over time. The goal is to make the data collection as objective as possible, and to ensure, above all, that the means exist for fast collation, summarization, and presentation of the information to the decision makers.

Once management has satisfied itself that the delivery system is working, its attention should shift to the outputs generated, i.e., are they materializing according to expectation. Focus on output measurements must not, however, be at the expense of monitoring the input delivery system. The measurement of outputs is more properly a function of evaluation, for identifying trends is not an easy task in view of the exogenous influences at work and is often impossible without an extended time series.

The key to successful monitoring is the provision of regular, timely, decision-oriented information to the project management. This can be achieved if the necessary staff are in place early, are seen to be part of the management team, and are given guidance on the priority information needs of the management.

5.3.4 Project Progress Reporting Framework (PPRF)

The Project Progress Reporting Framework (PPRF) placed at Annex-I, is a format for reporting summary of physical and financial progress achieved during the period for various interventions. A regular flow of this data is expected from Clients'. Field Teams/Project Consultants. However, detailed data on the processes and beneficiaries' feedback will be gathered / transmitted through Android based application using smart phones.

5.3.5 Evaluation: An Assessment of Results

Evaluation aims to determine whether the project objectives set in the ME&IE of expected outputs, effects and impact are being, or will be, met. This leads to an assessment of the results achieved, and the lessons to be drawn for future improvements in a later phase or in similar projects elsewhere.

Output levels are a measure of the result of the input utilization by the beneficiaries. If the changes in outputs are considerable, they may be detected even during the implementation phase of a project. An evaluation system will require the development of a series of data commencing before the project is implemented and continuing well past the completion of the implementation period. Unlike a monitoring system with its emphasis on rapid assessment, an evaluation system requires a longer time span before even tentative conclusions can be drawn.

5.3.6 Impact: Quantification of Tangible Benefits and Assessment on Intangible Benefits of Project Interventions/Investment

In the ME&IE process, tangible benefits of agricultural projects can arise either from an increased value of production or from reduced costs. The specific forms, in which tangible benefits appear, however, are not always obvious, and valuing them may be quite difficult.

Increased physical production is the most common benefit of the agricultural sector. To maintain better water control so that farmers can obtain higher yields. The project makes resources available for farmers to increase both their operating expenditures for current production-for fertilizers, seeds, or pesticides-and their investment-for a Water conservation or Water Tanks. The benefit is the increased production from the farm. In a large proportion of agricultural projects, the increased production will be marketed through commercial channels. In many agricultural projects, however, the benefits may well include increased production consumed by the farm family itself. The home-consumed production from the projects increased the farm families' net benefit and the national income just as much as if it had been sold in the market. Indeed, we could think of the hypothetical case of a farmer selling his output and then buying it back. Since home-consumed production contributes to project objectives in the same way as marketed production, it is clearly part of the project benefits in both financial and economic analysis.

5.3.7 Design and Development of ME&IE GIS Based Information System

Management Information System (MIS) is the tools and techniques used in project management to deliver information. Project managers use the techniques and tools to collect, combine and distribute information through electronic and manual means. It is used by upper and lower management to communicate with each other.

The monitoring and evaluation functions are related but distinct. Monitoring is the provision of information, and the use of that information, to enable management to assess progress of implementation and take timely decisions to ensure that progress is maintained according to schedule. Monitoring assesses whether project inputs are being delivered, are being used as intended, and are having the initial effects as planned. It is an internal project activity, an essential part of good management practice and therefore an integral part of day-to-day management. Whereas, evaluation assesses the overall project effects, both intentional and unintentional and their impact. It involves comparisons requiring information from outside the project either in time, area, or population. The relative roles of monitoring and evaluation will vary with the type of project.

Based on the participatory approach, the Information System that we propose will be designed and developed as a permanent instrument for the planning, monitoring, evaluation, and adjustment of project management, based on common information tools made available to all stakeholders concerned by the implementation of the project. This approach aims at strengthening the overall results of the project, increasing the sustainability of activities, and improving resource utilization and management of risks and difficulties of the project implementation.

Design & development of ME&IE GIS based Information Management System will be based on Agile Methodology as Software Development Process. Under which requirements and solutions evolve through the collaborative effort of self-organizing and cross-functional teams and end user / field experiences. The adaptation of Agile development methodology will ensure the early completion of task and will keep evaluating it for better results as per the project requirement. It would be helpful to strategize the design

and development phase, successful implementation, on-going maintenance, and up-gradation of the GIS based Information System.

Our experience shows that data generated in the field by client, field staff and project consultant is not timely communicated to PMUs. As a result, the dashboard/ Information System remain behind the actual progress on the ground. Therefore, prompt, and real time data communication are essential to the Information System. For this purpose, one focal person in each province/ area will be required.

5.3.8 Regular Routine Monitoring

We understand that the regular routine monitoring activities will start as soon as the ME&IE Consultants are fully operational. This phase of the assignment will include (i) the monitoring of input-output and process as defined in the Annual Work Plan and Budget (AWPB) and (ii) the tracking of the outcome indicators. Regular routine monitoring will look at the extent to which the proposed project activities are being implemented as planned. We also understand that the consultant will be responsible for the regular routine monitoring and should work in close collaboration with FPMU-FWMC, PC, and respective KP Departments.

OFWM Depts., Directorate General Soil & Water Conservation & Directorate of Agricultural Engineering KP through their district/sub-offices &farmers/ SWCA., etc.

In order to track the indicators' values and measure the project performance, the ME&IE Consultancy will have to analyze the relevant ME&IE data and report every quarter, applying the agreed methodology, reporting format and content.

Periodic reports on routine monitoring shall contain, at least: (i) a brief analysis of the results; calculating achievement rates and establishing trends, (ii) a summary with any relevant findings that may help or constraint the future data collection activities in the established periods and, if appropriate (iv) propose specific solutions assessing the advantages and disadvantages of each.

As stated in the TOR, additional special reports are to be produced "as and when required." We propose that some of these special reports ought to be thematic studies and case studies that can be punctually required at different times of the project implementation as to create knowledge on the implementation and its results, to be shared and further implemented.

6 MONITORING PROJECT PROGRESS

The session describes brief introduction about monitoring project process of both components i.e., Component-A. Soil & Water Conservation Component and Component-B. Agricultural Engineering Component.

6.1 INTRODUCTION

The ME&IE Consultants understand that the program WC-KP Project will be implemented by the FMFSR in KP by FBMU, FWMC, MNFS&R, GoP, Islamabad in coordination with provincial DGs OFWM/ Agricultural Directorates of the areas. The project implementation will be assisted by Project Consultants (PCs).

The quantitative objectives of the project as listed earlier in the scope of work. It covers physical targets set for the project components, direct outcomes of the project interventions, project impact indicators and indirect impacts of the project. The ME&IE consultants, as per their scope of services, shall plan and monitor progress of the project components on sample basis. However, as soon as data flows to the MIS/GIS system and progress achieved in the field is communicated with minimum lag the process and progress of the project can be monitored at 100% basis.

The ME&IE consultants will focus on monitoring progress of project components and direct/tangible benefits of the project interventions. As regards indirect benefits and higher-level impacts, like reduction in poverty, etc., they will be assumed as achieved if the project achieves its physical targets and direct benefits and cost analysis renders the project as viable. The physical monitoring methodology is discussed in this section.

6.2 COMPONENT C1: SOIL & WATER CONSERVATION COMPONENT

There are 11 subcomponents under Component C1: Soil & Water Conservation Component which is discusses in the following section:

6.3 CONSTRUCTION OF 5,000 WATER STORAGE PONDS (WSPS)

A pond is a body of standing water that is usually smaller than a lake. It may be cemented or earthen, depending on the site and location. Water storage ponds serve as source of water, harvested from runoff or perennial springs. Typically, the water storage capacity of a pond is 5-to-10-acre feet.

The rain-fed areas of KP are solely depended on rainfall for their agriculture. The construction of small water ponds at local level will bring revolutionary changes in the lives of the inhabitants of these areas converting monoculture into multiple copping, helping in fish rearing, cattle drinking, groundwater recharge and associated purposes. Some of the areas have perennial springs where farmers use them for irrigating their fields, but they are only possible when a water storage pond is built to store the flowing water (Figure 6.1).

Figure-6.1. View of constructed water pond.

The average unit cost of a water pond is set to be Rs.0.600 million (project cost) and will range between Rs.0.300 million and Rs.1.500 million project share. An estimated 5,000 water ponds will be constructed under the said project for which an amount of Rs.3,000 million have been allocated in this project.

The project will mobilize 5,000 small farmers to construct water ponds; they will be motivated to contribute 20% of the cost. Furthermore, they will be agree to first construct the tank with his/her own funds and then received subsidy at 80%.

6.3.1 Output of WSP

Approximately 12,500 acres of agriculture land will be irrigated from these interventions.

6.3.1.1 ME&IE Procedures for WSP

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to WSPs.

The survey will determine:

- *Cropping pattern before and after the improvement,*
- *Cropping intensities before and after improvement,*
- *Before and after crop yields,*
- *Before and after employment,*
- *Fish production.*

The difference between before and after will be considered the result of the intervention after netting out the contribution of the growth pattern of the crop sector otherwise.

6.3.2 Check Dam

Check dams generally consist of a vertical barrier constructed on ditches, small streams, channels, and gullies that have often been formed by the erosive activity of water. These structures are commonly constructed using stone, gravel bags, sandbags or masonry etc. These can include productive dams for creating farmlands, flood control dams for preventing flood water and intercepting sediments, water-storage dams for irrigation, rock check dams for stabilizing vegetation or reducing bed gradient and gully check dams for controlling gully development.

Each check dam is expected to control a limited drainage area; however, a series of check dams can be constructed if the drainage area is large (Figure 6.2). The distance between check dams depends upon the length and width of the channel. There are various types of check dams depend on the available financial resources and the site where check dams are supposed to be constructed. Some of them are low cost while the others are high-cost check dams.
The average unit cost of a check dam is set to be Rs.0.700 million (project cost) and will range between Rs.0.300 million and Rs.1.500 million project share. An estimated 3,000 check dams will be constructed under the said project for which an amount of Rs.2,380 million have been allocated in this project.

Figure-6.2. Construction of a Check Dam

6.3.2.1 Output of Check Dam

Approximately 7,500 acres of the land will be reclaimed.

6.3.2.2 ME&IE Procedures for Check Dam

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.3 Water Reservoirs

A water reservoir is natural or artificial place where water is collected and stored for the use of a community or irrigating land, furnishing power etc. Water reservoir may be a small dam or a large dam. Directorate Generals Soil and Water Conservation KP is dealing with small/ mini dams (Figure 6.3). These

small dams are constructed in the areas where rainfall water is collected. The collected water can be used for livestock, irrigation and for drinking purpose also after purification. Many districts of KP have feasible sites for constructing thousands of small dams (Figure 6.3). These dams will not only fulfill the requirement of water but also recharge aquifers and increase in the esthetic value of the areas.

Figure-6.3. Construction of Mini Dam/Water Reservoir.

The average unit cost of a check dam is set to be Rs.2.500 million (project cost) and will range between Rs.1.000 million and Rs.6.000 million project share. An estimated 330 water reservoirs will be constructed under the said project for which an amount of Rs.825.000 million have been allocated in this project.

6.3.3.1 Output of Water Reservoirs

Approximately 9,900 acres of land will be irrigated from this intervention.

6.3.3.2 ME&IE Procedures for Water Reservoirs

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.4 Stream Bank Stabilization (SBS)

A vegetative, structural or combination treatment of streams designed to stabilize the stream and reduce erosion is called stream bank stabilization. Stream banks are more susceptible to erosion with running water. During rainy season, this process accelerates and hence loses precious land of the farmers. In KP, this happens too much due to its topography and climatic conditions (FIGURE 6.4). Directorate General Soil and Water Conservation KP is working in all districts of the province and is continuously working for conserving agriculture land of the farmers in different ways. In case of stream bank stabilization, we

Figure-6.4. Orakzai Tribal District #Orakzai stream bank stabilization plantation at Khanki #10BillionTreeTsunami

use both vegetation and engineering structures like protection bunds, spurs etc.

The average unit cost of a stream bank stabilization structures is set to be Rs.0.350 million (project cost) and will range between Rs.0.200 million and Rs.0.900 million project share. An estimated 2,500 stream bank stabilization structures will be constructed under the said project for which an amount of Rs.875.000 million have been allocated in this project.

6.3.4.1 Output of SBS

Protecting/ reclaiming about 6,250 acres of agricultural land from erosion with floods water.

6.3.4.2 ME&IE Procedures for SBS

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.5 Field spillways/ Gated Filled Inlet Outlets (GFIO/Spillway)

A field spillway is a structure used to provide the controlled release of excess flow of water from field to a downstream area. In the rod-kohi area of southern Districts of KP, the sailaba water from mountains is harvested in large tracts of land to allow it to percolate for crop production and improve ground water recharge. These are structures where soil is protected from being lost with excess of runoff water. Field spillways not only harvests flood water in fields but also trap soil sediments to increase soil fertility and enhance crop productivity (Figure 6.5).

Figure-6.5. Hydraulic Steel Structures of GFIO/Spillway

The average unit cost of inlet outlet/field spillway is set to be Rs.0.200 million (project cost) and will range between Rs.0.050 million and Rs.0.400 million project share. An estimated 1000 inlet outlet/field spillway will be constructed under the said project for which amounts of Rs.200 million have been allocated in this project.

6.3.5.1 Output of GFIO/Spillway

Construction of 1,500 field inlets outlet/spillways.

6.3.5.2 ME&IE Procedures for GFIO/Spillway

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.6 Terracing

In agriculture, a terrace is a piece of sloped plane that has been cut into a series of successively receding flat surfaces or platforms, which resemble steps, for the purposes of more effective farming. This method of farming uses "steps" that is built into the side of a mountain or hill. On each level, various crops are planted. When it rains, instead of washing away all the nutrients in the soil, the nutrients are carried down to the next level. Additionally, these steps prevent land sliding that would take plants with it and destroy all the crops on the hillside. This type of landscaping is therefore called terracing. Most of the area of KP is mountainous type and here.

Figure-6.6. Terracing: A double-edged solution for farming difficult landscapes.

this method of farming is very suitable for agriculture and for controlling erosion of fertile soil (Figure 6.6).

The average unit cost of one acre of terracing is set to be Rs.0.300 million (project cost) and will range between Rs.0.150 million and Rs.0.500 million project share. An estimated 370 acres of terracing will be constructed under the said project for which an amount of Rs.111 million have been allocated in this project.

6.3.6.1 Output of Terracing

500 acres of land will be saved via terracing.

6.3.6.2 ME&IE Procedures for Terracing

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.7 Micro Watershed Development (MWD)

Watershed is defined as any surface area from which runoff resulting from rainfall is collected and drained through a common point. It is synonymous with a drainage basin or catchment area. Some watersheds are very small (less than one acre) while other watersheds are very large and may cover thousands of square miles. Any place where you stand can be part of many watersheds of varying sizes (Figure 6.7).

Figure-6.7. Watershed Development Diagram.

For the development of a micro watershed, two things are very important to be conserved, namely: soil conservation and water conservation. In KP, there are some feasible sites where we can develop micro watersheds. Each micro watershed will consist of water conservation interventions like water ponds, mini dams, check dams and soil conservation interventions like protection bunds, spurs, contour ploughing etc. For the livelihood of the local community, fields and gardens will be developed which will be irrigated from the water ponds, mini dams etc.

The average unit cost of one micro-watershed development is set to be Rs.5.000 million (project cost) and will range between Rs.2.000 million and Rs.9.000 million project share. An estimated 70 watersheds will be established under the said project for which an amount of Rs.490 million have been allocated in this project.

6.3.7.1 Output of Micro Watershed Development (MWD)

500 acres of land will be saved via terracing.

6.3.7.2 ME&IE Procedures for Micro Watershed Development (MWD)

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.8 Water Seepage Harvesting Galleries (WSHG)

Water seepage harvesting galleries are sub-surface groundwater collection system (tank) with perforated pipes, typically shallow in depth, constructed in a sloppy area. These underground water collecting tanks can be built alone in a gully or inside a check dam. These tanks will receive seepage water from the adjacent wet soil. The tanks are connected with external pipes from where water continuously discharges by the force of gravity. The discharged water can be used for both irrigation and drinking purposes. This is a low-cost intervention where we can get pure and continuous supply of water (Figure 6.8).

Figure-6.8. Water seepage harvesting galleries.

The average unit cost of Water seepage harvesting galleries is set to be Rs.0.800 million (project cost) and will range between Rs.0.400 million and Rs.1.200 million project share. An estimated 370 water seepage harvesting galleries will be constructed under the said project for which an amount of Rs.296.000 million have been allocated in this project.

6.3.8.1 Output of WSHG

15 water seepage galleries will be established.

6.3.8.2 ME&IE Procedures for WSHG

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.9 Low-cost intervention

By low-cost intervention, we mean those interventions of soil and water conservation which are locally available and applicable with low cost. Some of them are biological while others are engineered structured which are constructed with very low cost.

The average unit cost of various low-cost interventions is set to be Rs.0.125 million (project cost) and will range between Rs.0.020 million and Rs.0.300 million project share. An estimated 800 low-cost interventions will be undertaken under the said project for which an amount of Rs.100.000 million have been allocated in this project. The intervention may consist of any combination of below mentioned interventions.

6.3.9.1 Agronomic low-cost intervention

Agronomic low-cost interventions include cover crops like gram, peanuts etc. These crops are locally available and have the ability to cover soil surface, thus protecting the soil from the direct effect of rain drops which ultimately help in controlling soil erosion. We will include such type of intervention in our activities which will improve livelihood of farmers and conserve soil and water (Figure 6.9.1).

Figure-6.9.1. Cover Crop: Reducing Farm Runoff While Soil.

6.3.9.1.1 Output of ALCI

2000 various low-cost small interventions.

6.3.9.1.2 ME&IE Procedures for ALCI

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.9.2 Low-Cost Brush Wood Check Dam

Brushwood check dams made of posts and brush are placed across the gully. This type of soil conservation activity is highly economical where plenty of the bushes, trees etc. are locally available (Figure 6.9.2). The main objective of brushwood check dams is to hold fine material carried by flowing water in the gully. Small gully heads, no deeper than one meter, can also be stabilized by brushwood check dams.

Figure-6.9.2. An Initiative to Stabilize Mountain Slopes Gives Himalayan Farmers and Business Owners A More Secure Future.

6.3.9.3 Loose Stone Check Dams (LSCD)

Loose stone check dams made of relatively small rocks are placed across the gully. The main objectives for these dams are to control channel erosion along the gully bed and to stop waterfall erosion by stabilizing gully heads. Loose stone check dams are used to stabilize the incipient (initial) and small gullies or gully network. The length of the gully channel is not more than 100 meters and the gully catchment area are two hectares or less. These dams can be used in all regions of KP (Figure 6.9.3).

Figure-6.9.3. Check Dams in A Steep Stream.

6.3.10 Sand Dunes Stabilization (SDS)

Sand dune is a ridge of sand created by the wind, found in deserts or near lakes and oceans. Sand dunes can be stabilized by a number of methods in which herbaceous plantation method is the best one in which these plants are grown at a distance for effective control of sand dunes. Few distracts of KP Karak, D. I. Khan, Lakki Marwat have sand dunes. Kana (Saccharum Mujga L.) plantation etc. will be done in these districts to stabilize sand dunes (Figure 6.10 a & b). These plants require less water and care. These plants not only help in stabilization of sand dunes but also a source of income for the local community by making house made items from the stems Kana plants.

Figure-6.10 a & b. Sand Dunes in a Desert.

The average unit cost of one acre of sand dunes stabilization is set to be Rs.0.025 million (project cost) and will range between Rs.0.010 million and Rs.0.050 million project share. An estimated 230 acres of sand dunes will be stabilized under the said project for which an amount of Rs.5.750 million have been allocated in this project.

6.3.10.1 Output of Sand Dunes

200 acres Sand dunes effects stabilized.

6.3.10.2 ME&IE Procedures for Sand Dunes

Adopting the Sampling formula/ sample of water ponds farmer will be surveyed to see the impact of activities. A data collection form will be designed to measure water saving due to check dams. The forms

used for baseline and impact surveys in case of Water conservation will also be used for check dams.

Same data analysis will be carried out here as in WSPs (1) excluding the fish farming/production.

6.3.10.3 Capacity Building

Capacity building or capacity development is the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently or to a greater capacity.

Figure-6.11. Tunnel Farming Training of Farmers.

An estimated 500 trainings/exposure visits will be conducted for improving the capacity of the stakeholders. Trainings will be designed for farmers as well as the officers and officials of the Directorate General Soil and Water Conservation KP. Exposure visits to other countries having proven experience in soil and water conservation techniques like highway water harvesting, ground water recharging wells, subsurface check dams, series mini dams etc. will be arranged for selected regular officer of Directorate General SWC from own resources of KP component. Whereas federal share mentioned under capacity building head will be utilized for arranging exchange visits of farmers to the project intervention sites for knowledge dissemination. Annual Plan Review meetings will also be organized between the stakeholders.

6.3.10.4 Output of Capacity building

2000 Capacity building trainings conducted.

6.3.10.5 ME&IE Procedures for Capacity building

Pre training and post training evaluation will be conducted from all farmers to estimate the enhancement in their knowledge and skill. In this connection same Performa will be used before the conduct of the training after the completion of the training.

6.4 COMPONENT II: AGRICULTURAL ENGINEERING COMPONENT

A brief detail of various interventions which will be provided by Agricultural Engineering Department is given below:

6.4.1 Tube Wells

A Tube Well is a device which is constructed to draw ground water contained in an aquifer. Its design varies with the geological conditions of the formation and the purpose for which ground water is to be used. Tube wells are installed to supply water for irrigation and water supply. The required depth of Tube Well depends upon the depth. Solar powered wells also bring clean water f the water table. (Figure 6.12).

Figure-6.12. Solar Powered Wells Also Bring Clean Water

The main components of the Tube Well are as follows:

i) The top housing or suction pipe,
ii) Blank or blind pipe to cut off low water yielding zones.
iii) A bail plug or sand trap fixed at the bottom end of a tube well,
iv) The strainer or the screen to receive inflow from the formation,
v) A filter pack comprising of graded gravel and sand installed around the strainer or the blind pipe.

Development of water resources is the major means for increasing agricultural production. Installation of Tube wells in one of the means for development of water resources. Agricultural Engineering Department has got vast experience in the installation of Tube wells. Since fifties it has installed over 6,500 irrigation Tube wells bringing over 160,000 hectares (395,200 Acres) of land under irrigation in whole of KP.

Unit cost of a Tube well depends upon its depth. Under the project, average unit cost of a Tube Well is set to be Rs.0.632 million and will range between Rs.0.464 million and Rs.0.742 million project share. An estimated 300 Tube Wells will be installed under the said project for which an amount of Rs.189.660 million have been allocated in this project.

6.4.2 Solar Pumping System

A Solar-powered pump is a pump running on electricity generated by photovoltaic panels or the radiated thermal energy available from collected sunlight as opposed to grid electricity or diesel run water pumps. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs and has less environmental impact than pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable/expensive and alternative sources (in particular wind) do not provide sufficient energy.

Working of solar pumps

Following are the specific features and working of solar system pumps:

- *The solar system consists of PV array, inverter, controller, submersible / centrifugal pump, and water tank at ground surface,*
- *When light falls on the active surface of the PV (photovoltaic) panel containing silicon cells, the electrons in a solar cell become energized and Photo voltaic array converts solar energy directly into electricity as DC and inverter converts it into AC. The AC water pump needs AC current, which is supplied from inverter,*
- *Water is pumped from the well and stored in an appropriate size Water tank constructed at ground surface and Irrigation is done from the Tank water whenever required,*
- *The power from a solar system and the volume of water pumped varies with the amount of solar radiation,*
- *The pump will have its own optimum discharge depending on the type and size of panel/motor.*

There are significant variations in depth of water-table within the KP. It varies from 50' in some parts to even beyond 90' in other parts. In some areas, it is estimated that further drilling of 100 ft to 320 ft within water bearing strata produce enough water to fulfill the irrigation requirement of 10 to 40 hectares of land. To be covered under the purview of the activities of the project, the diameter of the Tube well (Filter/ Blind Pipe) should be minimum of 8 inches. Solar pumping system does not require any specific arrangements except there should be enough secured space available for placement/installation of silicon cells (Solar) panels fully exposed to sun light. Water should preferably be initially pumped in a small reservoir and from where irrigation water shall be provided to the land through water courses whenever required.

Up-till now, Agricultural Engineering Department has installed over 650 Solar Pumping System on Tube Wells/Open Wells bringing over 16,250 hectares (40,138 acres) of land under irrigation.

Under the Project, average unit cost of a Solar Pumping System is set to be Rs.1.771 million and will range between Rs.1.280 million and Rs.2.000 million project share. An estimated 700 Solar Pumping System will be installed on Tube Wells under the said project for which an amount of Rs.1,266.340 million have been allocated in this project.

6.4.3 Methodology for Execution of Soil Conservation Works

The soil and water conservation interventions will be carried out on 80:20 cost sharing basis between the Government and the beneficiaries. A detailed term of partnership (ToP, as per sample provided in the PC-I) will be signed with the beneficiary. The beneficiary will be assisted by soil conservation staff of the concerned district in financial and technical aspects for reclaiming their eroded lands and water harvesting. The field staff (skilled and technical) will survey the problem areas and will identify sites for their suitability. The project will be need driven and priorities will be fixed based on suitability of sites and the extent of soil erosion. Detailed Cost Estimates (DCEs), site plan and sketch plans will be prepared for approval. Prevailing MRS 2017 (or latest) issued by Finance Department, Government of KP will be used for cost calculations. After validation of project parameters by the consultant and approval by the competent authority, the soil and water conservation interventions will be executed under the close supervision of the field staff by the beneficiaries.

6.4.3.1 Criteria for site selection

The landowners applying for soil and water conservation interventions shall produce "fard" of the land adjacent to the site of work along with

application form. In case of "fard" of land is not available, the revenue department will verify the ownership of land. In case of communal lands, small Soil & Water Conservation Associations will be established and registered with the concerned District Office of Soil & Water Conservation.

On receipt of application asking for intervention, the technical staff will carry out preliminary feasibility survey of each site. Priority will be fixed on the need of the area and potentially expected benefits. The site will be judged in terms of potential for harvesting water and the transformation of land into a productive one. The detailed cost estimate will be prepared by the district staff and sent to the competent authority. Technical sanction of the schemes will be accorded by the Project Director/Director General soil and water conservation KP up to Rs.9.000 million.

After the approval of the estimate by the competent authority, work order will be conveyed to the concerned beneficiary to start the execution of work on his land according to the specification and drawings approved in the estimate. The beneficiary will be responsible for satisfactory completion of the work. If deemed necessary for the execution of the scheme, approval will be taken from the competent forum/ Project Director/DG SWC in consultation with the administrative department to alter the district-wise target distribution of the project.

It will be ensured that the soil and water conservation works are executed for the betterment of agriculture lands or potential agriculture lands development. No works shall be executed for non-agriculture purposes such as to benefit housing/ municipality etc.

6.4.3.2 Role of Local Government

The project will be executed through the devolved setup of Directorate General Soil & Water Conservation KP. The devolved District Offices of Soil & Water Conservation which are a part of the Local Government setup existing in the districts. The soil and water conservation work under this project will also be executed in consultation with the public representative at district/tehsil level. A database of the recommendations of the public representative shall be prepared and the District director/District Officer Soil and Water Conservation of the concerned district shall consider priority in terms of best suitable site for execution of work so as to ensure that maximum benefit is achieved from the invested precious national money.

6.4.3.3 Cost Sharing

The project will contribute all construction materials etc. that will be about 80% of the total scheme cost while the beneficiary will provide his/her share in the form of skilled and unskilled labor/ materials (20% of the cost of physical activities). Hence the cost sharing between the Government and the beneficiary will be in the ratio of 80:20.

6.4.3.4 Exemption of Sales and Income Tax on Interventions

The project is proposed to benefit low-income farmers of the province to improve their agriculture income. Since agriculture income is a non-taxable commodity, it is very important that the subsidy given on small water harvesting interventions proposed in this project is exempted for any kind of government taxes. It also needs a mention that no contractor will be involved in the execution of soil & water conservation interventions. Furthermore, the projected will be implemented on 80:20 cost-sharing between the government and the beneficiary and the total cost of each intervention will have 20% financial share of the beneficiary.

6.4.3.5 Mode of Payment

The government share of 80% of the total cost will be made by the department to the farmer through cross-cheque, after due endorsement of TPV Consultants, issued from the project account in the name of the beneficiary/SWCA according to the sanctioned estimate after the successful completion of the construction work according to specification and design. An assignment account will be opened out of which payment will be made in two installments. Out of the total cost sanctioned in the detailed cost estimate, 40% cost of the total cost of the scheme (100%) will be made to the beneficiary after 50% work is carried out in the field, owing to the high cost of inputs and low financial status of the farming community. While the remaining 40% (of the 100% cost) will be made after satisfactory completion of the work, totaling onto 80% which will be the project share out of the total cost of the activity. The remaining 20% of the total cost will be borne by the beneficiary/SWCA.

6.4.3.6 Repair and Maintenance

The Soil & Water Conservation Associations/farmer will be responsible for the maintenance and repair of the completed structures.

7 BASELINE STUDY FOR COMPONENT I – SOIL & WATER CONSERVATION COMPONENT

7.1 INTRODUCTION

A baseline survey is a study that is done at the beginning of a project to get knowledge of the current status of an item of study before a project commences. It is a descriptive cross-sectional survey that mostly provides quantitative information on the current status of a particular situation – on whatever study topic – in a given population. It aims at quantifying the distribution of certain variables in a study population at one point in time.

Baselines surveys are important to any project for they are the starting point for a project. A recommended way of starting a project is to carry out a baseline study. Through its results, a baseline serves as a benchmark for all future activities, where project managers can refer to for the purposes of making project management decisions.

Baseline studies are important in establishing priority areas for a project. This is especially true when a project has several objectives. The results of a baseline study can show some aspects of a project need more focus than other while others may only need to be given little focus.

7.2 OBJECTIVES OF THE SURVEY

The main objective of this survey is to establish baseline levels of cropping intensities, crop yields, farm incomes and employment. Farmers' opinion will also be asked about the level of soil and water conservation situation, ground water availability, environment status, etc. These baseline values will help in estimating the net impact of the intervention from impact survey data.

7.3 SAMPLING METHODOLOGY

In statistics and quantitative research methodology, a sample is a set of individuals or objects collected or selected from a statistical population by a defined procedure. The elements of a sample are known as sample points, sampling units or observations. Samples are used to make inferences about populations. Samples are easier to collect data from because they are practical, cost-effective, convenient, and manageable.

In this Baseline study Cochran's Sample Size Formula appears to be a better option for sampling. The Cochran formula allows calculating an ideal sample size at a given desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population. The present project Barani Area ME&IE purposes, the target number of benefitted households constitutes the population. Keeping in view the description of the project interventions, time and financial constraints and human resources for data collection, we will use this formula. Cochran's formula is considered especially appropriate in situations with large populations. A sample of any given size provides more information about a smaller population than a larger one, so there is a 'correction' through which the number given by Cochran's formula can be reduced if the whole population is relatively small.

The Cochran formula is:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

- ***e*** is the desired level of precision (i.e., the margin of error),
- ***p*** is the (estimated) proportion of the population which has the attribute in question,
- ***q*** is 1-***p,***
- ***Z*** square is a numerical measurement that describe a value's relationship to the mean of a group of values. A level of reliability.

Modification for the Cochran Formula for Sample size determination is used where Smaller Population exist as in our case.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where:

- n_0 is Cochran's sample size?
- ***N*** is the population size, and
- ***n***is the new, adjusted sample size.

Keeping in view the ground realities of Water conservation in Pakistan and their relationship with the farmers, Multistage and purposive sampling methodology is used in drawing the sample. At the first stage predetermined number of Water conservation is drawn. The sample size will be 2 to 5 percent of total number of Water conservation. This will be divided proportionally in each province/unit

and then district. While selecting Water conservation for baseline survey, due diligence will be used to ensure that various types, lengths, and capacity of the Water conservation are represented. Efforts will also be made to adequately represent all areas in the sample.

In the second stage the sample will be drawn from the beneficiaries of the concerned Water Conservation selected. These beneficiaries are the farmers using the water for farming purposes. The beneficiaries consist of two types of farmers:

i) The owners of a piece of land on this Water Conservation and members of the "Water Users Associations",
ii) The farmers use the water of the same Water Conservation but not the owners of the land. They are the tenants, cultivating land on leasing on share basis.

Figure-7.1: A view of Baseline Survey

Monitoring Template 10 (MT10)	Village Profile
Monitoring Template 11 (MT11)	List of Shareholder (Owner beneficiaries)
Monitoring Template 12 (MT12)	List of other beneficiaries
Monitoring Template 13 (MT13)	Profile of selected water and soil conservatives
Monitoring Template 14 (MT14)	Basic data for selected water and soil conservatives (from client)
Monitoring Template 15 (MT15)	Baseline data of selected farming household

Out of this population of beneficiaries a sample of 6 beneficiaries will be purposively drawn, 2 from nearest, 2 from middle and 2 from the far or away from the water and soil conservation component reaches. However, due consideration will also be given to represent the farm size and tenurial status of the beneficiaries in the sample.

7.4 DATA COLLECTION TOOLS

Different types of data / information are to be collected from various stakeholders to conduct the baseline survey. It starts from the formation / organization of Water and Soil Conservation Beneficiaries. The data collection will be through TABs / smart phones using an android based application. The collected from the field will be uploaded to MIS/GIS system online for review and analysis. The instruments / tools to be used in the baseline survey.

Figure-7.2: Another view of Baseline Survey

7.5 BASELINE DATA COLLECTION THROUGH TABS / ANDROID-BASED SYSTEM

As indicated before, the data collected from the field on various relevant Performa / questionnaires will be programmed in android form so that it may be transmitted immediately to the Management

Information System, directly from the field. It will ensure the quality of data.

7.6 MAJOR COMPONENTS OF THE BASELINE DATA

Following are major components / variables on which baseline data will be collected and analyzed:

i) Family profile of the selected farmers / beneficiaries,
ii) Farm size in acres,
iii) Area irrigated,
iv) Cropped area under each crop grown by the sample farmers,
v) Crop operations and quantities and value of various farm inputs,
vi) Crop yields and biproducts,
vii) Marketing, output prices and farm income,
viii) Labour utilization and employment,
ix) The project Beneficiaries feedback on various components of,
x) Farmers' opinion about extent of water logging and salinity,
xi) Farmers' opinion about time taken by one irrigation before and after Water Conservation improvement,
xii) Any other.

7.7 DATA ANALYSIS USING SPSS

The accumulated data particularly input – output of crop will be analyzed using SPSS. However, the complete sets of data will also be available in Excel format and online in MIS/GIS. The client will be served if he/she requires data in any other formats that mentioned above.

7.8 BASELINE REPORT IN PHASES / AGGREGATE (WATER & SOIL CONSERVATION)

Since the Water & Soil Conservation area to be improved are not pre-selected, the baseline sample cannot be selected in one go, and obviously, the baseline cannot be done in one go. As a result, the baseline sample will be based on issuance of Technical section (TS), which is the stage when it is sure that the project area has been selected for improvement. The consultants will be watchful about the number of TS issued. When the number reaches a level that adequate baseline sample (say 150 to 200) is possible, then a sample will be drawn from the list of the TS and a survey will be conducted. In this way it is expected that the baseline will be completed in 3 or 4 phases. All the baseline report of component 1 consists of number of activities separate reports will be prepared for the following Water & Soil Conservation activities:

Component A. Soil & Water Conservation Component

i) Water Ponds (WSPs),
ii) Check Dams,
iii) Water Reservoir (WR),
iv) Stream Bank Stabilization (SBS),
v) Gated Field Inlet Outlet/Spillway,
vi) Land for Terracing (LT),
vii) Micro-Watershed Areas (MWA),
viii) Water Seepage Harvesting Galleries (WSHG),
ix) Agronomic Low-Cost Interventions (ALCI),
x) Sand Dunes Stabilization (SDS),
xi) Capacity Building (CB) – Pre and post training evaluation will be conducted.

Component B Agricultural Engineering Component

i) Solar Pumping System and Tube Wells (SPS &TW),
ii) Adaptation of New Techniques for Pumping Sub-surface Water.

Data collection and analysis will be carried out independently for each phase and component the project of the baseline. A separate baseline report will be prepared and submitted for each phase. When the total baseline sample is completed an aggregate baseline report will be submitted.

8 DEVELOPMENT OF WEBSITE FOR THE PROJECT

8.1 INTRODUCTION

A website is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. All publicly accessible websites collectively constitute the World Wide Web. Nowadays, the website is the primary communication tool as well as the front face of organization. In development projects, the prime purpose of the website is to communicate the project activities, outcome, impact reports and the publication of the notices like; tenders and bid evaluation reports for the transparent procurement processes. To develop the project website, Content Management System (CMS) will be used. By the implementation of CMS based website it will ensure the interactivity at website and easy update page content, images, documents, and integration with analytical systems to track pages and site performance. There are number of types of websites, the project website is for better communication with the stakeholders (Figure 8.1).

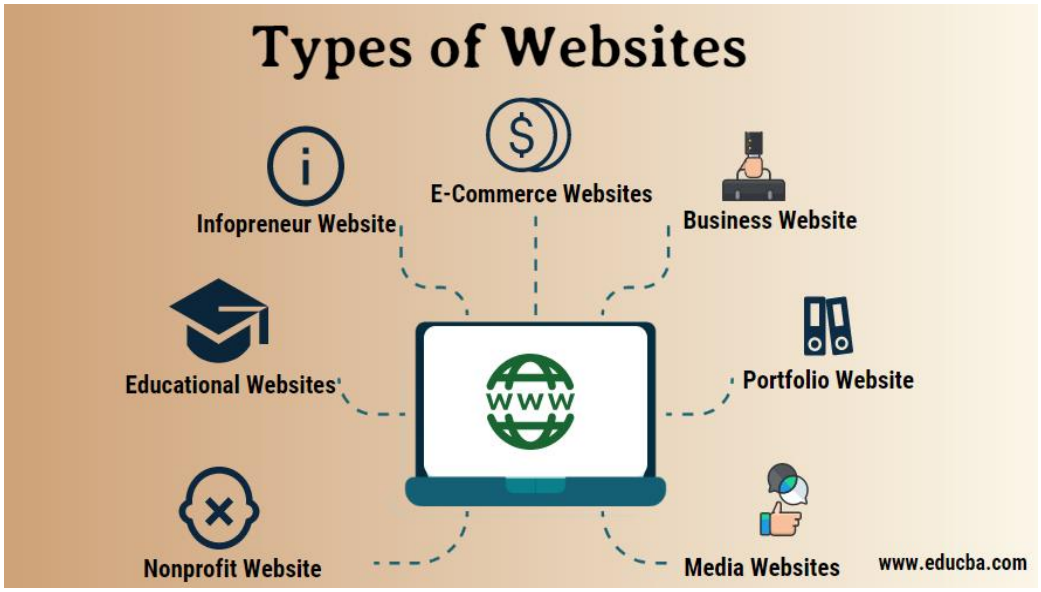


Figure-8.1. Types of Websites

8.2 WEBSITE STRUCTURE

Website structure is the main content planning phase. To finalize the structure of website a close consultation with key stakeholders is required. A preliminary structure of the website will have the following pages:

i) Homepage (Landing page),
ii) Project Introduction,
iii) Project Components,
iv) Water conservation Improvements,
v) Water Storage Tanks,
vi) Progress Reports,
vii) Monitoring Reports,
viii) Impact Reports,
ix) Project Progress,
x) Procurement,
xi) Procurement of Goods, Services & works,
xii) Evaluations and Results,
xiii) Career,
xiv) Media Gallery,
xv) Contact,
xvi) FAQs (Frequently Asked Questions).

8.3 RESPONSIVE WEB DESIGN

Responsive Web Design (RWD) is an approach to web design that makes web pages render well on a variety of devices and window or screen sizes. WC-KP website will be developed on the responsive web design approach. This will be supportive for end users to browse the website on multiple devices like Screens, Tablets and Mobile devices. The planning of website content optimization will be held to define the device-based content priority and optimization.

9 PROVISION OF TECHNICAL SUPPORT IN DEVELOPMENT OF CUSTOM DESIGNED MOBILE APPLICATION (ANDROID BASED SYSTEM)

9.1 INTRODUCTION

Android is a mobile operating system based on a modified version of the Linux kernel and other open-source software, designed primarily for touch screen mobile devices such as smart phones and tablets (Figure 9.1). A customized android based (Mobile & Tablet) Data Collection application will be developed as per the project requirement. Data collection android application would have following features:

Figure-9.1. Screen Picture of an Android

i) Well optimized application for better work in online/offline environment User friendly interface,
ii) Consume less internet bandwidth for better connectivity at low internet/remote areas,
iii) Data is automatically uploaded when a connection is detected,
iv) Data immediately available right after it is collected,
v) Capture GPS, error validation, logic, repeats, signatures, photos and much more,
vi) Strong safeguards against data loss,
vii) Synchronize data via SSL, ensures data cannot be read by a third party,
viii) Encrypted data will be saved at device and server.

All interventions progress monitoring forms and baseline in subsequent impact/ evaluation surveys will be programmed in android-based tab application. The data will be collected through tabs, transmitted to the Information System directly from the field through tabs.

9.2 DATA COLLECTION

Data sources refer to the origins of the performance and context monitoring data used to learn, adapt, and make decisions. There are generally three main sources of data: data collected by OFWM field teams, data collected by PMUs, and data collected by Project Consultant. Improving transparency & accountability in development organizations and government agencies, though technology-enabled M&E for better monitoring, sharing and application of data. Enabling organizations, donors, and citizens to use M&E data for real-time decision-making, better implementation and delivery of projects and services Data Input and Validation Process.

Processes for entering and validating data in the system (who does what, when, through what kind of forms) is to be established during the first assessments. Those processes are linked to the user profiles.

In the following sections "Conventional Data Collection and Management" and "Mobile Data Collection and Management" are highlighted.

9.2.1 Conventional Data Collection and Management

Following are some questions related to conventional data collection and management:

i) Data reliability (will we get the same data, when collected again?),
ii) Data validity (Are we measuring what we say we are measuring?),
iii) Data integrity (Is the data free of manipulation?),
iv) Data accuracy/precision (Is the data measuring the "indicator" accurately?),
v) Data timelines (Are you getting the data in time?),
vi) Data security/confidentiality (Loss of data / loss of privacy).

9.2.2 Mobile Data Collection and Management

Features of mobile data collection and management:

i) Real-time data from the point of collection,
ii) Built-in logical flow and validation checks improve data quality,
iii) Ability to collect new types of data – Location (GIS), media (pictures, audio),
iv) Cost effective over time- involves one-time hardware costs and ongoing maintenance. No paper, printing costs,
v) Increased Accuracy of data, validity, reliability, precision, integrity, and timelines,
vi) Easy to manage and analyze large amounts of data,
vii) Reduces intermediate levels of data transmission.

10 DEVELOPMENT OF MIS/GIS SYSTEM

A Geographic Information System (GIS) is a computer-based system including software, hardware, people, and geographic information. A GIS can create, edit, query, analyze, and display map information on the compute.

10.1 INTRODUCTION

The development of MIS/GIS system followed the software engineering methods. Thus, user requirements elicitation, requirements analysis, system design, system implementation and maintenance were done in a circular fashion (Figure 10.1). Thereafter, evaluation will be done to test the efficacy, effectiveness, and efficiency of the management information system in the real environment. In the system development, structured system analysis, design, object-oriented analysis, and design approaches will be used.

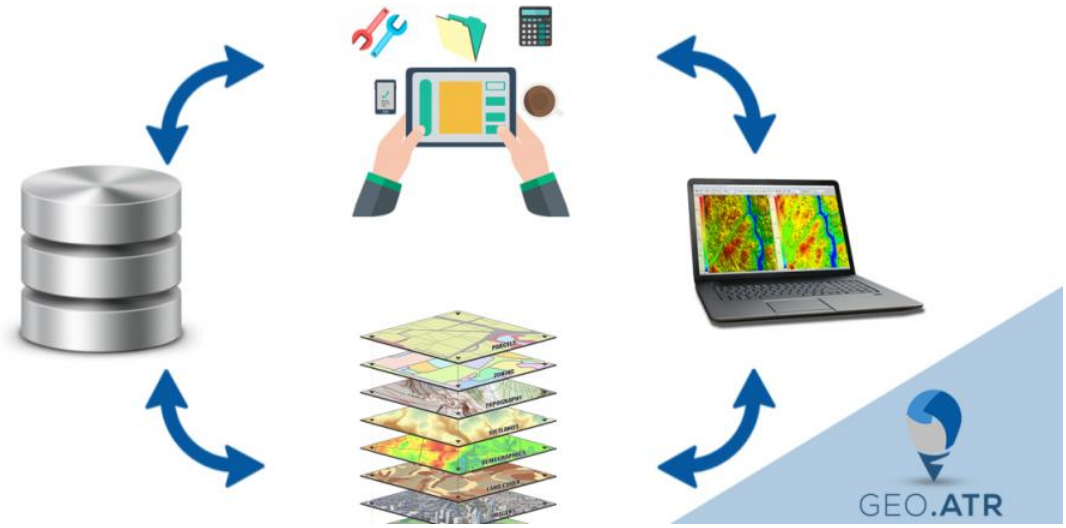


Figure-10.1. Integrating MIS and GIS systems.

An established Management Information System will enable Federal and Provincial PMUs to demonstrate to key stakeholders whether the project is achieving the stated goals, outcomes, and outputs in accordance with targeted timeframe. Therefore, the GIS based Management Information System will provide the means of:

i) Comprehensively tracking the project inputs and outputs using mainly the set of key performance indicators outlined under each component at frequent intervals,
ii) Monitoring of project outcome indicators,
iii) Robustly analyzing the relevant ME&IE data,
iv) Reporting progress on an open-access and regular basis, to support knowledge sharing, greater transparency, and improved project governance.

Based on our experience from previous assignments, the basic functions of the MIS in WC-KP should be:

i) Enable the Federal & Provincial PMUs and Project Consultants to track the outcome indicators and assess progress in implementation against timescales and targets, and resource use against budgets, based on agreed annual work plans and budgets,
ii) Describe the factors and reasons triggering variations,
iii) Record and reflect new targets whenever it is required,
iv) Draw important lessons to guide the decision-making,
v) Enable forecasting for project accomplishment in comparison to the currently reported progress,
vi) Enable the Information System to generate reports to Federal and Provincial Governments, project beneficiaries and other stakeholders on the status and progress of the project implementation,
vii) Integrate GIS components to the MIS to complement field-level surveys and measurements.

In addition to overall project reviews and ME&IE activities, we understand that the system should be geared to provide ample information on implementation support and supervision activities as well on technical assistance and training.

10.2 REGULAR ACTIVITIES MONITORING

The regular routine monitoring activities will start as soon as the MIS is fully operational. This phase of the assignment will include (i) the monitoring of input-output and process as defined in the Annual Work Plan and Budget (AWPB) and (ii) the tracking of the outcome indicators. Regular routine monitoring will look at the extent to which the proposed project activities are being implemented as planned. To track the indicators' values and measure the project performance, the ME&IE Consultants will analyze the relevant data and report every quarter, applying the agreed methodology, reporting format and content.

Through the data analysis process of the Information System, the formulation of UAs will be monitored and reported to the PMUs. The progress on the formation of the UAs will be monitored through a format to be developed and agreed with the client before the start of data collection on this activity. Based on this agreed timeframe, all activities i.e. Water Ponds (WSPs); Check Dams; Water Reservoir (WR); Stream Bank Stabilization (SBS); Gated Field Inlet Outlet/Spillway, Land for Terracing (LT); Micro-Watershed Areas (MWA); Water Seepage Harvesting Galleries (WSHG); Agronomic Low-Cost Interventions (ALCI); Sand Dunes Stabilization (SDS); Capacity Building (CB); Solar Pumping System and Tube Wells (SPS &TW), and Adaptation of New Techniques for Pumping Sub-surface Water will be monitored. Regular data will be collected and fed to MIS on this time frame of the activities. Any delays, state of stuck-up activity, if any, will be reported regularly for corrective measures at project management level. For this proposal, a format will be developed and agreed with the client. The process of financial disbursement will also be monitored keeping in view above criteria.

Planning and input-output process monitoring, as well as the tracking of result indicators, assume a critical role in the management of development projects. A customized Web Based GIS integrated Management Information System (MIS) useful for:

i) Monitor the progress of project implementation and provide timely feedback to the Project Management Units and implementing partners,
ii) Monitor, assess, and summarize achievement (outputs and outcomes),
iii) Analyze factors affecting the project's implementation and achievement.

The MIS will be accessible online and provide query-based data analysis to users and will also provide alerts to control the data quality.

10.3 FUNCTIONAL REQUIREMENTS

The following presents a general overview of the features for the system:

i) Planning,
ii) Narrative description for planned activities (yearly),
iii) Budget for activities,
iv) Planned activity schedule,
v) Monitoring,
vi) Quantitative data for outcome indicators and output indicators,
vii) Narrative information for outcomes and outputs,
viii) Implementation status for activities (real schedule and status tag),
ix) Expenditures for activities,
x) Reporting tools,
xi) Customizable data visualization tools (Tables, graphs, maps),
xii) Data export functionalities (excel, pdf, jpeg, spss).

10.4 INFORMATION MODEL

The below diagram illustrates the different entities of the MIS. This shows how information will be aggregated in the system and how it flows (Figure 10.2).

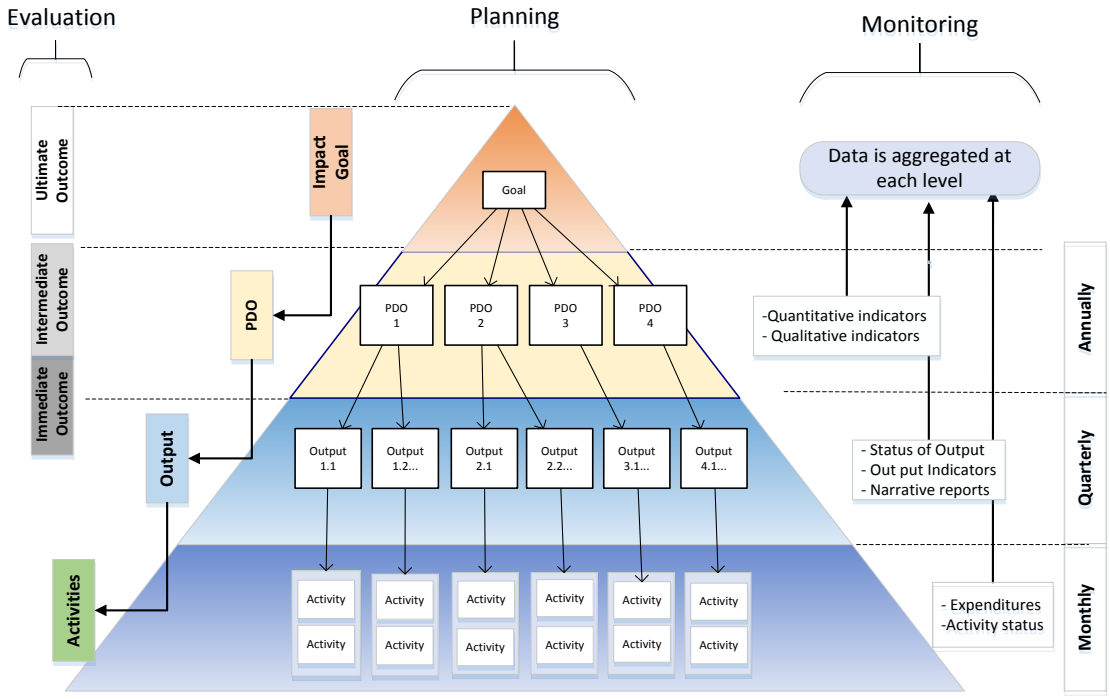


Figure-10.2. Information Model Flow Diagram

10.4.1 Results Hierarchy and Information Flow

The information below will be available in the Information Management System (Table 10.1):

Table-10.1. Type of Information for Activities, Outputs, Outcomes

Level	Information available
Impact Goals	Code (number), description
Project Development Objectives (PDO)	Code, description, baseline date, baseline value, target date, target value, unit of measurement, means of verification, frequency, flags
Outputs	Code, description, risks and assumptions, key partners, Indicative budget by year
Output indicators	Code, description, baseline date, baseline value, target date, target value, means of verification, frequency, flags
Activities	Code, description, planned dates, status

i) Type of information for activities, outputs, outcomes,
ii) Level Information available,
iii) Impact Goals Code (number), description,
iv) Project Development Objectives (PDO) Code, description, baseline date, baseline value, target date, target value, unit of measurement, means of verification, frequency, flags,
v) Outputs Code, description, risks and assumptions, key partners, Indicative budget by Type of information for activities, outputs, outcomes,
vi) Level Information available,
vii) Impact Goals Code (number), description,
viii) Project Development Objectives (PDO) Code, description, baseline date, baseline value, target date, target value, unit of measurement, means of verification, frequency, flags Outputs Code, description, risks and assumptions, key partners, Indicative budget by year Output indicators Code, description, baseline date, baseline value, target date, target value, means of verification, frequency, flags Activities Code, description, planned dates, status.

The first level of the pyramid (Activities) will be planned each year with a different set of activities. The updated information will be available in the system each year.

10.5 DATA FLOW DIAGRAM

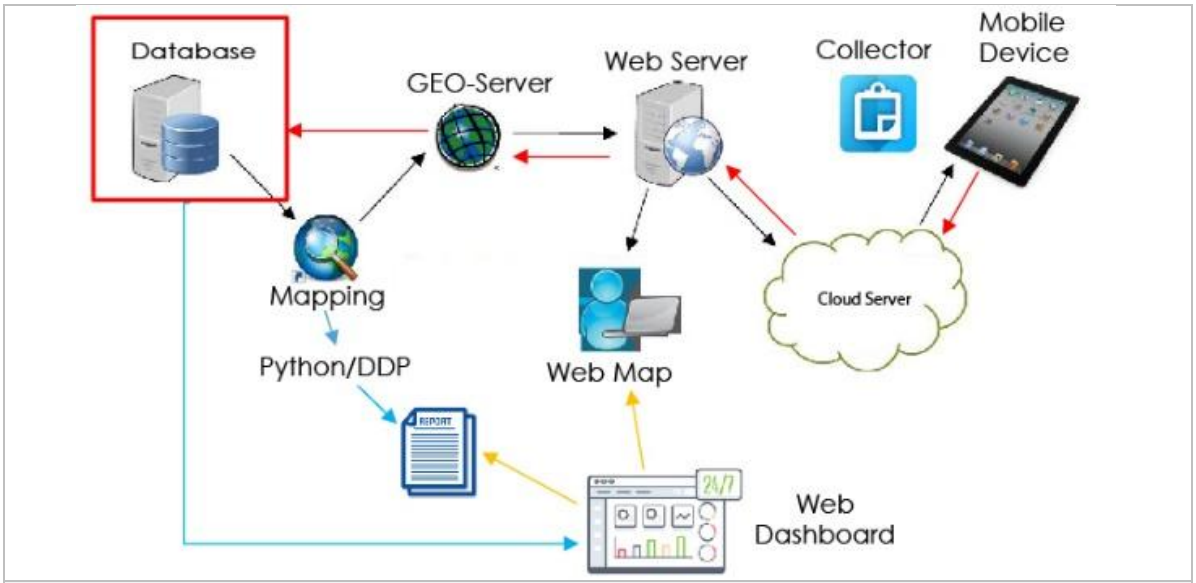


Figure-10.3.Data Flow Diagram

10.5.1 Aggregate Server

From the data collection application, collected data synchronize with Aggregate Server and submit all records over there. Secured hosted under SSL encryption a robust aggregation and data storage application server also designed and customized as per the project requirement. Aggregation Server has following features (Figure 10.4):

i) It supports a wide range of data types. It hosts blank designed data collection form and on any update in form it synchronizes with mobile application and updates the blank form,
ii) Store and manage submission data,
iii) Visualize collected data using maps and simple graphs,
iv) Create summary reports with graphs and tables and fine-tune your report's charts, colors, and questions,
v) Visualize collected data on a map,
vi) Disaggregate data in reports and maps,
vii) Export and publish data in a variety of formats.

Previous **Watercourse Certifications & FCR Information (L)** Next

starttime	endtime	username	district	distt_label	taluka	taluka_label	watercourses_id	selected_submission_section	wc_certif_info_and_ selected_certif_info
Tue Mar 17 12:29:26 UTC 2020	Tue Mar 17 16:24:57 UTC 2020	OEQ-04-0145	sujawal	Sujawal	jati	Jati	1092041	wc_certif_info_and_imgs wc_fcr_info	date_of_folio_verific date_of_earthnwork_c date_of_fcr_issu
Tue Mar 17 13:05:01 UTC 2020	Tue Mar 17 16:01:44 UTC 2020	OEQ-04-0145	badin	Badin	tando_bago	Tando Bago	1015072	wc_certif_info_and_imgs wc_fcr_info	date_of_folio_verific date_of_earthnwork_c date_of_fcr_issu
Wed May 08 03:21:11 UTC 2019	Wed May 08 03:34:14 UTC 2019	OEQ-04-0145	sujawal	Sujawal	mirpur_bathoro	Mirpur Bathoro	1094065	wc_certif_info_and_imgs wc_fcr_info	date_of_folio_verific date_of_earthnwork_c date_of_certif_for_2nd_ date_of_fcr_issu
Sat Apr 20 09:37:13 UTC 2019	Sat Apr 20 09:44:26 UTC 2019	OEQ-04-0141	dadu	Dadu	dadu	Dadu	1021045	wc_certif_info_and_imgs wc_fcr_info	date_of_folio_verific date_of_earthnwork_c date_of_certif_for_2nd_ date_of_fcr_issu
Fri Mar 08 05:27:23 UTC 2019	Fri Mar 08 05:38:00 UTC 2019	OEQ-04-0141	dadu	Dadu	dadu	Dadu	1021062	wc_certif_info_and_imgs wc_fcr_info	date_of_folio_verific date_of_earthnwork_c date_of_certif_for_2nd_ date_of_fcr_issu

Figure-10.4. Aggregate Dashboard Template (Example from Sindh)

10.5.2 Data Aggregate Server for Data Cleaning and Validation GIS Integrated Dashboard / Database

The dashboard is a "real-time" user interface, showing graphical and tabular information of multiple data sets. Dashboards allow users to appreciate a situation at a glance and aids in making informed decisions. The way in which data are presented directly affects how they are understood and interpreted, and consequently the decisions that are made because of the data.

The dashboard is a composition of tables, graphs and maps revealing information that is useful for the user. All GIS data will be stored in a GIS specific database. The GIS database will store the data categorically as Spatial Layers of each activity. GIS dashboard will allow the Spatial Analysis for in depth analysis and will generate custom reports, it will also facilitate to downloading the spatial data in multiple formats for further analysis.

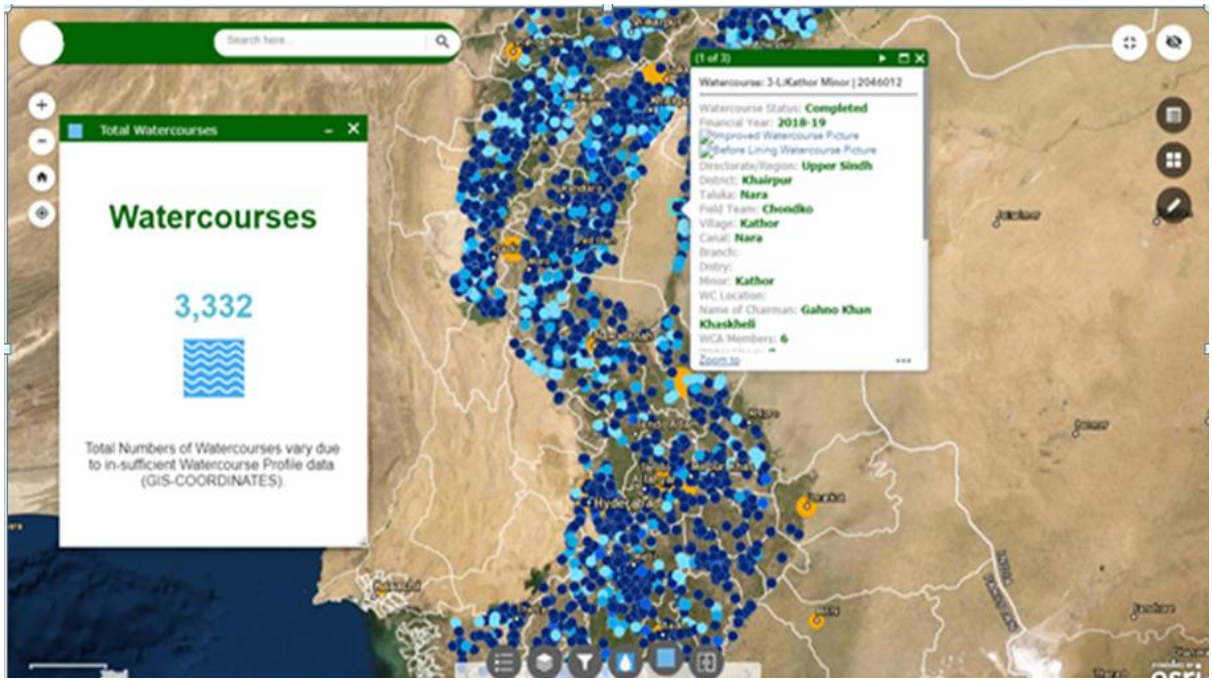


Figure-10.5. GIS Progress Analytical Dashboard Template

10.5.3 Example of a GIS dashboard

Following are the two GIS type of Dashboard:

a) Custom Query based Statistical Analysis from GIS dashboard
b) Actors / Users

There are different types of actors intervening in the project. The system will provide the ability to create or modify user profiles at any time. Potential user profiles could be the following:

i) Concerned Ministries
ii) NPC – FPMU-FWMC
iii) Provincial DGs (OFWM)
iv) Project Consultants
v) ME&IE Consultants

All users of the system will be associated with one or many profiles. A user profile defines what a user can view, add, edit, and validate in the system (also called "user rights"). For example, some users will be able to create/edit quarterly reports, others will validate the information contained in those reports while some viewers will only be able to consult the validated reports. The system will provide the ability to create or modify user profiles at any time. Administrators will oversee creating user profiles and adding user contacts. The System Administrator will be the only one able to change security access for other users.

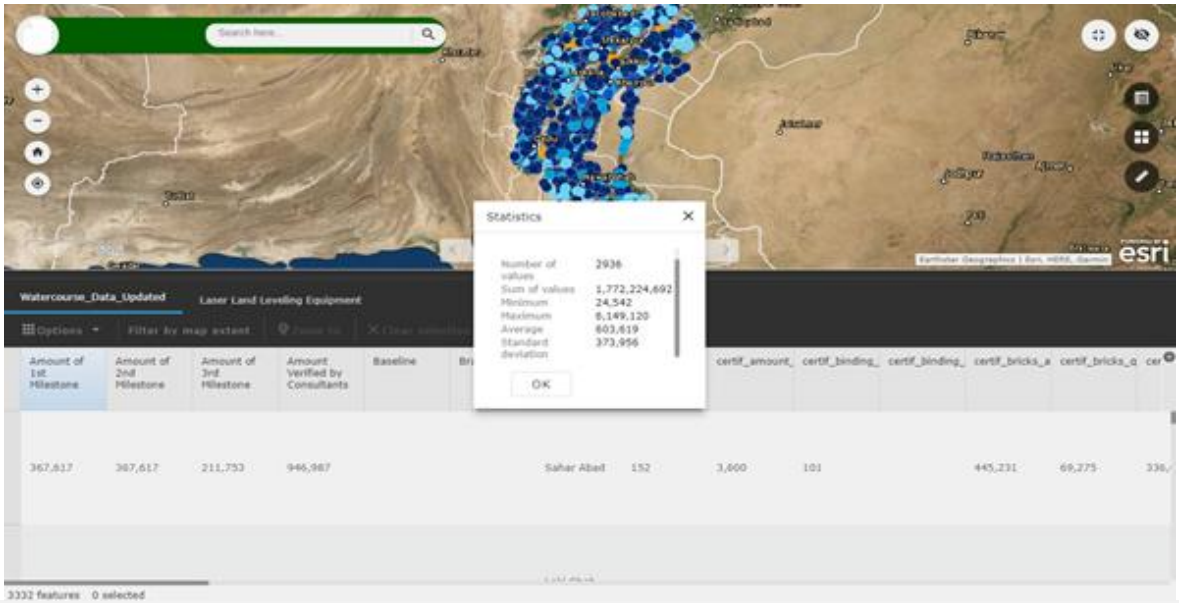


Figure-10.6. Query Based Statistical Analysis GIS dashboard Template

10.6 FEATURES

Following are the features of GIS System:

10.6.1 Planning

This feature will allow the project to define the Annual Work Plan and Budget (AWPB) into the MIS to allow process monitoring. This interface should allow the user to:

i) Create activities for the current year and go back in previous years,
ii) Submit the AWPB to the validation team,
iii) Validate the AWPB,
iv) The following project information will also be always accessible,
v) Project description,
vi) Description of project's objectives,
vii) Implementation partners Locations of implementation,
viii) Timelines,
ix) Project activities (and % of accomplishments),
x) Budgets (percentage of spending).

10.6.2 Monitoring

The project's Results Framework Matrix will be accessible in the MIS. The system allows the creation of a wide range of indicator types (qualitative and quantitative, aggregated, etc.) and defines mode of calculation for each indicator value (average, sums, means, etc.).

The MIS will allow the project to access information essential to the monitoring or processes and results. Some users will be charged with entering data into the system (data found in monthly or quarterly reports, for example), while others will validate to ensure proper data quality.

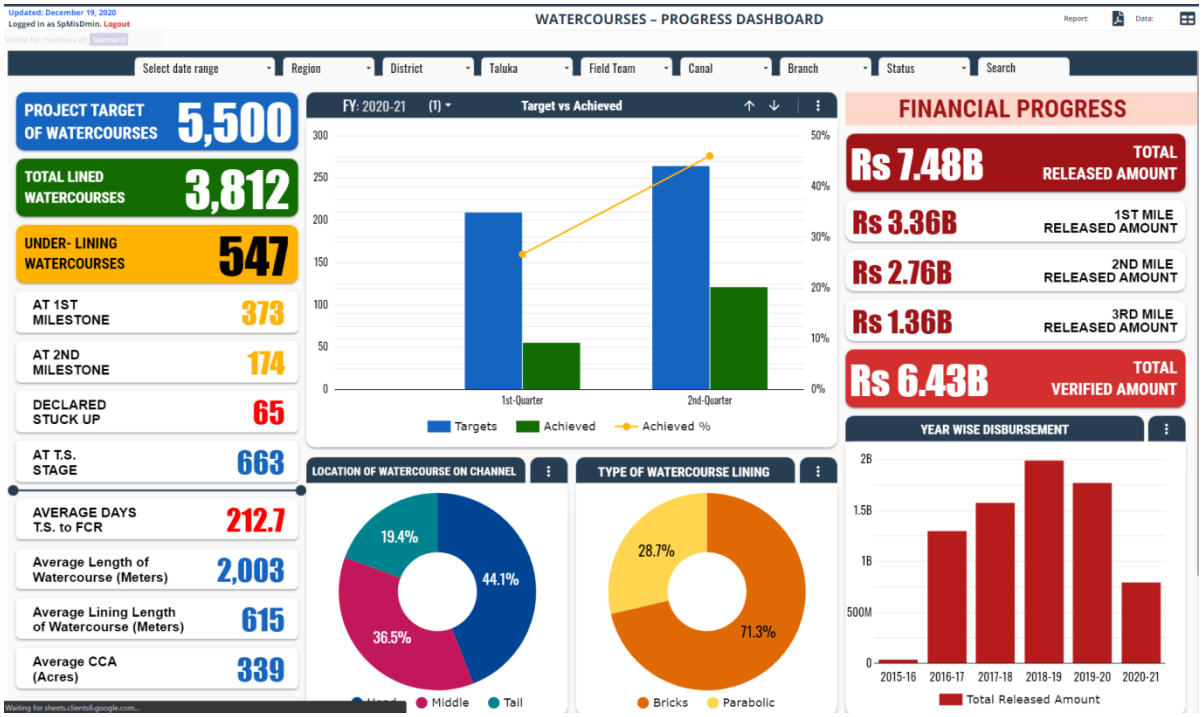


Figure-10.7. Progress Analytical Dashboard Template

10.6.3 Notifications / Alerts

For each type of events (e.g.: incoming deadline, new data input, requests, etc.) the user will receive notification of said events within the MIS or via e-mail either or through mobile application notifications:

i) Milestone Deadlines,
ii) Daily/weekly updates,
iii) Activity based Alerts.

The system will send notifications to users on the critical dates for the reports they are expected to contribute to. The system will also send notifications when a document is waiting for approval or submitted for review.

10.6.4 Non-Functional Requirements

Following are the non-functional requirements:

a) Look, Feel and Use Requirement:

The system will be user friendly, customizable, and manageable by non-computer specialists. To be easy to use, the development of system interfaces that will look like tools that are already used by the Project teams (forms, excel sheets, etc.). Therefore, it will be easy to adapt, and to learn how to use the MIS system quickly.

The system should be pleasant to use taking into consideration all ergonomic concepts for interface conception. To achieve this, the system needs to favor using easy interactive controls (menus, grids, etc.) from a rich control library to replicate controls of conventional desktop software.

b) Key Principles:

Following are the key principles:

i) The System provides Excel-like functionality including filtering/sorting columns (reducing data-entry and increasing ease-of-use),
ii) The data entry and validation of plans and different reports are linked to user profiles,
iii) The system displays an error message when not able to save the data,
iv) For all operations, the system keeps an audit trail with the user, date, and time of the operation.

c) User Interface Requirements:

Following are the user interface requirements:

i) The MIS's user interface shall provide a logical organization, which supports a user's ability to navigate to their intended destination,
ii) The MIS's navigation style shall be flat enough to allow users to quickly navigate through features,

iii) The MIS shall enable users to download available files in their intended format,
iv) Specifically, the web application shall allow users to download available files in all corporate,
v) Allowable formats (Office Files, PDF, Pictures),
vi) The MIS shall enable users to open available files through their intended native applications. Specifically, the web application shall enable available files to be opened through their proper native application,
vii) The MIS shall support users with data entry to reduce errors,
viii) The MIS shall provide peripheral instructions to support data entry,
ix) The MIS shall elicit a feeling of trustworthiness by its users,
x) The MIS shall evoke in its users the feeling that its output is trustworthy,
xi) The informational part of the MIS shall evoke in its users the feeling that its content is authoritative,
xii) The MIS shall evoke in its users the feeling of trust.

d) Ease-Of-Use and Learning Requirements:

i) The MIS shall use appropriate terminology,
ii) The MIS's user interface shall be intuitive because it relates to the user understanding of the project,
iii) The MIS's help facilities shall provide logically organized information that is clear and precise enough, so it satisfies the users' need for additional information,
iv) The MIS's user-oriented error messages shall contain human-readable language and not place blame on the user,
v) The MIS's feedback shall clearly show users what they are doing, its effect and the options available to them. Specifically, the feedback must be immediate, consistent, informative, and appropriate. Furthermore, the feedback must not impose unnecessary delays in the progression of a user's task,
vi) The MIS shall be easy for its users to use,
vii) The MIS shall make the main tasks easy for its users to perform,
viii) The MIS shall make it easy for its users to perform their tasks without errors,
ix) The MIS shall make it easy for its users to perform tasks in the order they were intended to achieve a clear objective,
x) The MIS shall be easy for its users to remember how to use,
xi) The MIS shall not require the user to unnecessarily remember previously entered data,
xii) The MIS shall be easy for its users to learn how to perform their tasks,
xiii) The MIS shall not require users to take significant training to learn how to use it to perform their tasks,
xiv) The MIS shall be easy for its users to locate,
xv) The MIS's help facilities shall be easy to locate.

e) Performance Requirements:

i) **Availability**

- *Transactional components of the MIS shall have an availability of 99.5%,*
- *Account functionality shall have an availability of 99.5%,*
- *User access to persistent data shall have an availability of 99.5%,*
- *The MIS shall not have more than 3 consecutive hours of scheduled downtime per month and not more than 1 hour of unscheduled downtime per month,*
- *Availability of web application components is calculated in the assumption that the underlying infrastructure maintains a 99.9% availability.*

ii) **Reliability**

- *The MIS non-transactional components' mean time between failures shall less than 1 month,*
- *The MIS transactional components' mean time between failures shall be less than 3 months,*
- *The MIS's components shall not fail more than an average of 3 times per year,*
- *The web application should be available 24/7/365.*

iii) **Security, General:**

- *Login page is encrypted,*
- *Data validation is done server-side,*
- *Access to secure resources is done using encrypted protocols,*
- *Strong password authentication is used to identify authorized users,*
- *No anonymous access is permitted into the transactional sections of the web application,*
- *Security administration is set up to differentiate permissions for accessing content,*

- *Redundancy is used to protect web application (include backups and fail-over),*
- *Web application runs behind a firewall,*
- *Coding of the web application is done following best practices to guard against malicious user input and against denial-of-service threats,*
- *Error messages do not divulge system information which may be used for malicious intent,*
- *The web application retains information on who has used it,*
- *The web application does not accept anonymous accounts.*

iv) **System Confidentiality Requirements**

- *Data does not need to be encrypted,*
- *Access granted by WC-KP,*
- *The MIS shall retain transaction logs stored in a permanent data storage.*

v) **Other Requirements**

- *Malleability and Extensibility,*
- *The MIS will support "n-tier" architecture separating the different layers of presentation, business logic and data to easily modify one layer if there is a need. By using a programming framework, that allows the creation of models, views and controllers who respectively represent the data layer, the visualization layer and processing layer,*
- *Quality Control / Assurance Plan,*
- *The purpose of quality control and quality assurance for the services of ME&IE is to ensure that:*

- All works carried in the field are done as per plan, design, and agreed/ approved time frame,
- Data communicated to MIS is correct and verified. Adequate logical checks and alerts are built-in the MIS design and operation routines,
- Only authorized personnel are allowed to edit, alter, feed or delete data from the MIS.
- Only authorized persons/ staff have access to data in MIS,
- Data of MIS is stored and managed on a secure server and will be safe against accidental loss and illegal intruders,
- Field / primary data will be collected by ME&IE teams for baseline and end line studies, additional water flow measurements, water made available by WSTs. In all the survey data quality will be assured through close and intensive monitoring of the team while collecting data in the field. The data will be edited for quality first in the field and then electronically through logical checks,
- Appointment and experienced staff with relevant software will be deputed for quality data analysis,
- All the ME&IE reports (monthly, quarterly, annual, baseline, end line, special, etc.) will be produced in strict control and edited thoroughly before submission,
- Will be taken all other steps to ensure / assure quality in any other activity not mentioned above.

11 DELIVERABLES AND SCHEDULE

The schedule for various reports the consultants is likely to prepare is given below. Additional, reports must be prepared as needed. The consultants will supply the deliverables as per schedule given below (Table 11.1):

Table-11.1. Schedule for the Submission of Various Reports the Consultants

Sr. No.	Document	Copies	Due
1.	Draft Inception Report	5	45 days after the effectiveness of the Consulting Services Agreement.
2.	Final Inception Report	15	One week after the issuance of comments by the Client on Draft Inception Report
3.	Monthly Progress Report (Physical & Financial)	10	10th of the following month
4.	Baseline, Midline and End Line Survey Reports	10	With different timelines
5.	Quarterly Progress Report (Physical & Financial)	10	10th of the first month of following quarter
6.	Annual Progress Report (Physical & Financial)	10	During first month of the following year
7.	Draft Assignment Completion Report	5	At completion of physical works/ activities
8.	Establishment of First Phase of PMIS	1	1 months after start of the assignment
9.	Establishment of Second Phase of PMIS	1	3 months after the start of the assignment
10.	Establishment of Final Phase of PMIS	1	4 months after the start of the assignment
11.	Maintenance of the PMIS	1	Throughout the project
12.	Final Assignment Completion Report	25	At completion of works as well as financial transactions
13.	Special Reports	10	As and when required.

ANNEXES A to L

Note: All Templates included in this inception Report are used as draft. Depict the data collection required to populate the Management Information System (MIS) to be developed by the ME&IE consultants. These templates will be shared with all stakeholders and will be finalized with mutual consultation of all stakeholders i.e., GoP, GoKP (Department of agriculture and agricultural Engineers), technical support component, ME&IE, and farmers. Furthermore, the Phase 1 Template will also be considered, and necessary improvement will be incorporated. This will help the Managements to review and compare both projects.

ANNEX-A: MONITORING LOG-FRAME

ANNEX-A: Monitoring Log-frame

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
Component A. Soil & Water Conservation Component							
1.	- Construction of 5,000 water ponds (WSPs)	a) 5,000 small farmers mobilized to construct water ponds, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Approximately 12,500 acres of agriculture land will be irrigated from these interventions.	2,000 water ponds	Crop production per unit area will increase by conserving runoff water/ water from perennial springs. Livestock will be increased; ultimately farmer's living standards will improve.	Approximately 12,500 acres of the land will be changed into crop fields and fruits orchids, which will increase farmer's income. More than 25,000 farmers will permanently engage in agriculture sector. These will provide short term employment to approximately 40,000 labors during the construction period of the interventions.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The survey will determine: • Cropping pattern before and after the improvement, • Cropping intensities before and after improvement, • Before and after crop yields, • Before and after employment, d) The difference between before and after will be considered the result of the intervention after netting out the contribution of the growth pattern of the crop sector otherwise.

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
2.	Construction of 3,000 Check dams	a) In each Check dam village, (small farmers mobilized will be to construct check dams, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Approximately 7,500 acres of the land will be reclaimed.	2,500 check dams	Approximately 7500 acres of the land will conserve; ground water table of the nearby wells will rise.	Land value of the project area will increase; more than 7,500 acres of the land will bring under cultivation. Climatic condition of the area will improve, and livestock will be benefited. More than 15,000 people will permanently engage in agriculture activities in the project area. More than 24,000 labors will be provided with short term employment during the construction period of the intervention.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WSTs, d) Same data analysis will be carried out here as in WSPs (1).
3.	Construction of 330 Water Reservoir (WR)	a) In each Water Reservoir village, (small farmers will be mobilized will be to construct It, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at	Approximately 9,900 acres of land will be irrigated from this intervention.	250 mini dams	Ground water table will be improved; farmer's income will be increased. Livestock will be benefited.	Culturable wasteland will be developed by supplying stored water. Ground water table will rise. Fish farming, livestock and forestry will be improved. Overall livelihood of the farmer community will improve. Approximately 19,800 people will permanently engage in agriculture, livestock, and fish raring etc. More than 2,640 labors will	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
		80% on issuance of FCR.				be benefited from the scheme.	
4.	Construction of 2,500 Stream bank stabilization (SBS)	a) In each SBS village, small farmers will be mobilized, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Protecting/ reclaiming about 6,250 acres of agricultural land from erosion with floods water.	15,000 stream bank stabilization structures.	Per unit area of crop production will be saved.	Approximately 6,250 acres of agriculture land will be saved directly from floods water. This will further enhance the life of precious dams and reservoirs. This may engage approximately 12,500 farmers for long time in agriculture sector.20,000 labors will work during construction period of these intervention	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).
5.	Construction of 1,000 Gated field Inlet Outlet/Spillway (GFIO/S)	a) In each GFIO/Spillway village, small farmers will be mobilized, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then	Sufficient amount of water will be provided to about 2,500 acres of land for irrigation in rod kohi areas of the province.	1,500 field inlets and spillways.	Farmer's income will increase; fertile land degradation will be minimized.	Approximately 2,500 acres of agriculture land will be benefited directly from this intervention. Approximately 5,000 farmers will permanently engage in agriculture sector for long period of time. These interventions will provide short term employment to about 5,000 labors.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
		received subsidy at 80% on issuance of FCR*.					
6.	Development of 370 acres land for terracing (LT)	a) In each LT village, small farmers will be mobilized, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Farmer's income will be increased by increasing agricultural land due to terraces development.	500 acres	Per unit production of farmers will increase by converting approximately 370 acres of non-culturable waste land into culturable.	Crop production will increase; land sliding will reduce due to terraces formation; rainwater infiltration will increase. Approximately 740 farmers will permanently engage in agriculture. Approximately 1,850 labors will be benefited from these interventions.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSPs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).
7.	Development of 70 numbers of micro-watershed areas (MWA)	a) In each MWA small farmers mobilized to construct MWA, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at	Approx 7,000 acres of the area will be converted into agriculture/ forest land which will improve the aesthetic value of the area.	02 micro watershed developed	Culturable wasteland will be converted into an agricultural productive land. Farmer's income will be increased through agriculture, livestock,	Developing micro-watersheds will improve climatic condition of the area; floods chances will be minimizing by harvesting rainwater in water harvesting interventions; land sliding and soil erosion will be minimized. Moreover, aesthetic value of the land will be improved.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to MWAs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
		80% on issuance of FCR*.			fisheries and forestry etc.	Approximately 14,000 people will engage in agriculture sector permanently. Approximately 14,000 labors will be directly benefited during the process of micro-watersheds development.	
8.	Constructing 370 numbers of water Seepage harvesting Galleries (WSHG)	a) In each WSHG farmers will be mobilized to construct water ponds, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Approx 925 acres of land will be irrigated from this intervention.	15 water seepage galleries	More area will bring under cultivation by establishing crop fields and fruits gardens in the project area. Livestock will increase and more people will engage in agriculture sector.	Continuous supply of clean water for agriculture, livestock and human beings will be ensured. Water crises will be minimized in the project area. More than 1,850 number of people will engage in agriculture activities for long period of time. About 1,850 labors will be directly benefited during the construction process.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to WSHGs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).
9.	800 numbers of Agronomic low-cost	a) In each ALCI village small farmers mobilized to ALCI,	Approx. 2000 acres of land will be protected	2000 various low-cost small interventions	More area will bring under cultivation; economic	Land will be protected from erosion; infiltration will be improved during rainfall; livestock will be benefited.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed,

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
	interventions (ALCI)	b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	from erosion by these interventions.		condition of the local community will be improved.	Approximately 2400 farmers will permanently engage in agriculture. These will also provide short term employment to about 2400 labors.	b) A data collection form will be designed to measure water saving due to ALCIs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).
10.	230 acres of Sand Dunes Stabilization (SDS)	a) In each SDS locality small farmers mobilized to construct water ponds, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Approx 230 acres land of sand dunes will be stabilized by growing kana plants.	200 acres Sand dunes effects stabilized.	Non-culturable sand dunes will be converted into an economically productive piece of land.	Sand dunes stabilization through plantation will be a direct source of income generation for the local community by making homemade items from the stems of the kana plants. These will also help in improving climatic condition of the project area. Meanwhile about 460 numbers of labor will be benefited.	a) Adopting the Sampling formula/ sample of water ponds farmer will be surveyed, b) A data collection form will be designed to measure water saving due to SDSs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for WRs, d) Same data analysis will be carried out here as in WSPs (1).
11.	500 Nos Capacity Building (CB)	5,00 small farmers capacity will be built on different traits.	An estimated 500 trainings will be	2000 Capacity building	Enhanced capacity for better	Soil and water resources of the province will better be managed with better	a) Pre training and post training evaluation will be conducted from all farmers to estimate the

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
			conducted for stakeholders including farmers and departmental staff.	trainings conducted.	management of soil and water resources.	management practices. The capacity of the stake holder will be enhanced in better management of soil and water resources of the country in general and Khyber Pakhtunkhwa in particular.	enhancement in their knowledge and skill, b) In this connection same Performa will be used before the conduct of the training after the completion of the training.
Component B Agricultural Engineering Component							
12	Procurement and installation of 700 Solar, pumping System and 300 Tube Wells (SPS&TW).	a) Solar Pumping small farmers mobilized to install SPS & TW, b) They agree to contribute 20% of the cost, c) Agree to first construct SPS&TW with his/her own funds and then received subsidy at 80% on issuance of FCR*.	Irrigation of 17,500 hectares (43,225 acres) of land.	> 650 SPS&TW installed.	Conversion of rain fed land into irrigated land will add more value to the land and the enhance production from crops/Orchard will help in improving the socio-economic condition of the farming community.	Provision of irrigation water will lead to increase Agriculture production and self-sufficiency in food grain.	a) Adopting the Sampling formula/ sample of SPS&TW farmers will be surveyed, b) A data collection form will be designed to measure water saving due to SPS&TWs, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for SPS&TWs, Same data analysis will be carried out here as in WSPs (1).
13	700 on-site training of farmers in adaptation of	a) 5,000 small farmers mobilized to	Irrigation water Pumping cost will be	> 2,000 trainings conducted.	The cropping intensity will be enhanced.	Farmers of the project area will be educated in the modern techniques being adopted in Agriculture and	a) Adopting the Sampling formula/ sample of trained farmer will be surveyed,

Project Sub-component	Target	Activities	Outputs	Outcome		Goal/ impact	Methodology for Measuring Results
				Baseline indicator	Target after completion of Project		
	new techniques for pumping sub-surface water.	construct water ponds, b) They agree to contribute 20% of the cost, c) Agree to first construct the tank with his/her own funds and then received subsidy at 80% on issuance of FCR*.	reduced by adopting solar technology.			therefore, pay more attention to increase crop yield and Farm income.	b) A data collection form will be designed to measure water saving due to trainings, c) The forms used for baseline and impact surveys in case of Water conservation will also be used for trainees. Same data analysis will be carried out here as in WSPs (1).

ANNEX-B: MONITORING TEMPLATE -1 (MT1)

MONITORING WATER CONSERVATION ASSOCIATIONS (WCA)/ FEEDBACK

Monitoring Template -1

Water Conservation Activity ID _____

NAME OF SURVEY AND DATE _____

MONITORING WATER CONSERVATION ASSOCIATIONS (WCA)/ FEEDBACK*

1. Identification of the Water Conservation Activity _____

1.1	WCA Name_____	1.2	Village Name_____
1.3	Name of WCA Chairman _____	1.4	Name of WCA Secretary_____
1.5	Total No (Attached list) _____	1.6	Female Member (No) _____
1.7	Owner of Land_____	1.8	Province / Area _____
1.9	District _____	1.10	Teshil _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of Water Conservation Activity		
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

2. Process of WUA Establishment

2.1	Date of Application for Registration	Day	Month	Year
2.2	Date of registration under OFWM / WUA Ordinance (AC) 1981 as amended in 2001	Day	Month	Year
2.3	Date of opening an account in the ban	Day	Month	Year
2.4	Date of submission as application for Water Conservation improvements	Day	Month	Year
2.5	Date of signing an agreement for Water Conservation improvement	Day	Month	Year

3. Carryout WCA improvement work

3.1	Arranged skilled and unskilled labour for earthen improvement of the WCA	Yes	No	DK

3.2	Arranged skilled and unskilled labour for WCA lining	Yes	No	DK
3.3	Arranged alternate channel for WCA construction	Yes	No	NA
3.4	Arranged to carry out civil works	Yes	No	DK
3.5	Resolve disputes arising during construction the WCA	Yes	No	NA

4. Maintaining of project interventions

4.1	The improved WCA is properly maintained	Yes	No	NA
4.2	Resolves disputes arising during WCA distribution	Yes	No	NA
4.3	Is the WCA properly maintained, which was delivered by the project	Yes	No	NA
4.4	Does the WUA assists the owner of WCA unit(s) in this regard	Yes	No	DK
4.5	Is the WCA operational and properly maintained, which was delivered by the project	Yes	No	DK
4.6	Does the WUA assists the owner of WCA(s) in this regard	Yes	No	DK

5. Functional Status of the WUA

5.1	The WUA holds regular meetings of the association	Yes	No	DK
5.2	Decisions are made democratically	Yes	No	DK
5.3	Majority of the shareholders participate in the meetings	Yes	No	DK
5.4	The WUA maintains an account in the bank	Yes	No	DK

6. Enumerator's comments

Name & Signature **Date** _____

***** For each WCA separate form will be filled.

ANNEX-C: MONITORING TEMPLATE 2 (MT2)

SPOT CHECKS FORM

Monitoring Template -2

WCA ID _____

NAME OF SURVEY AND DAE _____

SPOT CHECK FORM

IDENTIFICATION

1.1	WCA Number_____	1.2	Size _____
1.3	Khasra No _____	1.4	Village Name_____
1.5	Owner of land _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WCA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of WCA		_____
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

WCA Type

1	Removal of vegetation from WCA properly			**1-YES**	**2-NO**
2	Actual discharge (as per Irrigation Department)		1-Adequate		2-Not adequate
3	Is additional discharge (via. Tube Well / lift machine) at WCA			**1-YES**	**2-NO**
4	Proportion of Total cultural commanded area of the WCA irrigated		1-Up to 35%	2-36 to 70%	3-70% plus
5	Type of outlet	1-Open type	2-Closed	3-Closed-pipe	4-Closed-pump
6	Lining length is as per design?			1-YES	2-NO
7	Thickness of wall is as per design?			1-YES	2-NO
8	Depth of WCA is as per design?			1-YES	2-NO
9	Width of WCA is as per design?			1-YES	2-NO

10	Thickness of plaster at wall is adequate?		1-YES	2-NO
11	Thickness of bed is adequate?		1-YES	2-NO
12	Thickness of mortar at wall is adequate		1-YES	2-NO
13	Free board height is as per design?		1-YES	2-NO
14	Back collar mortar is adequate?		1-YES	2-NO
15	Quality of Plaster (tick one)	1-Good	2-Satisfactory	3-Not Satisfactory
16	Back filling of the lining portion	1-Good	2-Satisfactory	3-Not Satisfactory
17	Rehabilitation of Ketcha / earthen portion of WCA	1-Full length improved	2-Only lined portion	

COMMENTS

Name and Signature _____ **Date** _____

ANNEX-D: MONITORING TEMPLATE 3 (MT3)

SPOT CHECKS FORM

Monitoring Template -3

Water Conservation ID _____

SURVEY NAME AND DATE _____

PROCESS MONITORING FOR WCA IMPROVEMENT

2. Identification of the WCA

1.1	WCA Number_____	1.2	Size _____
1.3	Khasra No _____	1.4	Village Name_____
1.5	Owner of land _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WCA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of WCA		_____
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Sr.#	WCA ID	Province	Region	District	Teshil	Admin-Region (Which Constructed)	Admin-District (Which Constructed	Admin-Teshil (Which Constructed	Field Team	UC	Village	Regular/ Additional/ Reconstruction
	1	2	3	4	5	6	7	8	9	10	11	12

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Name of WCA	Type of Lining	Type of Construction	Ground Water Level	Coordinate Latitude	Coordinate Longitude	Picture of WCA before	Picture of WCA after	WCA location in Village	CCA	Total Length of WCA	Total Wirth of WCA	Name of WUA Chairman
13	14	15	16	17	18	19	20	21	22	23	24	25

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Total No. of WUA	Total No. of Beneficiary	Male WUA	Female WUA	No. of Small Farmer	No. of Medium Farmer	No. of Large Farmer	Sanction Amount of TS (Rs)	Issuing Date of TS	Sanction Amount of Revised TS (Rs)	Issuing Date of Revised TS	Amount of 1st Revised TS Released (Rs)	Date of 1st Revised TS Released (Rs)
26	27	28	29	30	31	32	33	34	35	36	37	38

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Date of 2nd Revised T.S Released (Rs)	Amount of 2nd Revised T.S Released (Rs)	Amount of Final Milestone Released (Rs)	Date of Final Milestone Released	Date of Folio Verification by PC	Date of Earth work Checking Certificate	Date of Certificate for 1st Milestone	Date of Certification For 2nd Milestone	WCA Commencement Date	WCA Completion Date	Date of Verification of WCA	Date of FCR Issued by PC
39	40	41	42	43	44	45	46	47	48	49	50

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Picture of Improved WCA	WUA Registration Number	Design Discharge (LPS)	Executed Bed Wirth	Executed Bed Length	Executed Lining Length (M)	Executed Lining %	Executed Earthen Improved Bed Wirth	Executed Earthen Improved Bed Length (M)	Certified Bricks Quantity	Certified Bricks Amount (Rs)
51	52	53	54	55	56	56	57	58	59	60

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Certified PCB Quantity (Length)	Certified PCP Amount (Rs.)	Certified Cement Quantity (Bag)	Certified Cement Amount (Rs.)	Certified Sand Quantity (Cubic Feet)	Certified Sand Amount (Rs.)	Certified Gravel Quantity (Cubic Feet)	Certified Gravel Amount (Rs.)	Certified Iron Bar Quantity (Kgs)	Certified Iron Bar Quantity (Kgs)	Certified Iron Bar Amount (Rs.)
61	62	63	64	65	66	67	68	69	70	71

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (WC-KP) Continue…

Water Conservation Activity (WCA) _____ Improvement - Process Monitoring Template MT3

Certified Binding Wire Quantity (Length)	Certified Binding Wire Amount (Rs.)	Sign Board Painting Cost (Rs.)	Total Verification Amount (Rs.)	Remaining Amount to be Delivered to WUA (Rs.)	Improvement status	Curtailed	Any Other Observations
72	73	63	64	65	66	67	68

ANNEX-E: MONITORING TEMPLATE 4 (MT4)

WATER CONSERVATION BENIFICIARIES' FEEDBACK

Monitoring Template-4.1
WCA ID _____

SURVEY NAME AND DATE _____

BENEFICIARY FEEDBACK FORM-1

Use this template if the WCA has been formed and TS is issued, but work on WCA has not yet been started at the time of survey

Identification

1.1	WCA Number_____	1.2	Size _____
1.3	Khasra No _____	1.4	Village Name_____
1.5	Owner of land _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WCA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of WCA		_____
1.14	Directorate of Agri. Eng. Agriculture Department		_____

Beneficiary Feedback: Part-A

1	Are you a member of the Water Users Associations (WUAs)? *(If the answer is "NO" or "NA" then skip to Question 8)*	1-YES	2-NO	3-NA (*)
2	If 'Yes' in question 1, was your participation voluntary?	1-YES	2-NO	3-NA
3	If 'Yes' in question 2 above, then who motivated you to be a member?	Fellow farmers		1
		Big Landlord		2
		Project Field Staff		3
		Any other specify _____		4

(*) NA=No answer / not applicable

4	Did you pay your membership fee (if any)?	1-Yes	2-NO	3-NA

5	What is the frequency of WCA meetings?	Every month	1
		Quarterly	2
		Once a year	3
		Never	4
6	*(If the answer in question 5 is 1, 2 or3)* Do you participate in the meetings?	Always	1
		Occasionally	2
		Never	3
7	*(If the answer in question 5 is 1, 2 or3)* Do you know that the minutes are recorded and got approved in next meeting?	Always	1
		Occasionally	2
		Never	3
8	Do you think WCA helps in solving your farming problems?	Always	1
		To some extent	2
		Never	3

Part-B: Beneficiary Feedback: Part-B (if already member, skip to 11)		YES	NO	NA
9	Do you know about Water Users Association?	1	2	3
10	Were you approached to be member of Water Users Association?	1	2	3
11	Do you know that your Water Conservation is going to be newly lined / additionally line / reconstructed	1	2	3
12	If the answer is '1' in 'q11 above, do you know that the lining will be up to 50% of the Water Conservation length?	1	2	3
13	Would you like to be a member of Water Users Association?	1	2	3
14	Do you think that Water Conservation lining up to 50% will benefit	1	2	3
15	Do you think that if the Water Conservation is reconstructed, trees will be	1	2	3
16	If "YES" in Q12 above, then how many trees will be cut down?			

COMMENTS

Name and Signature _____ Date _____

Monitoring Template-4.2

WCA ID _____

NAME AND DATE OF SURVEY _____

BENEFICIARY FEEDBACK FORM-2

Use this template if the WCA is under construction at the time of survey

1. Identification

1.1	WCA Number _____	1.2	Size _____
1.3	Khasra No _____	1.4	Village Name_____
1.5	Owner of land _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WCA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of WCA		_____
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

2. Beneficiary Feedback: Part-A

1	Are you a member of the Water Users Association (WCA)? *If "NO" or "NA" then skip to question 8)*	1-YES	2-NO	3-NA (*)
2	If 'Yes' in question 1 above, then indicate was your participation voluntary?	1-YES	2-NO	3-NA
3	If 'Yes' in question 2 above, then indicate who motivated you to be a member?	Fellow farmers		1
		Big Landlord		2
		Project Field Staff		3
		Any other (Specify)_____		4

(*) NA=No answer / not applicable

4	Did you pay your membership fee (if any)?	1-Yes	2-NO	3-NA

5	What is the frequency of WCA meetings?	Every month	1
		Quarterly	2
		Once a year	3
		Never	4
6	*(If the answer in question 5 is 1, 2 or3)* Do you participate in the meetings?	Always	1
		Occasionally	2
		Never	3
7	*(If the answer in question 5 is 1, 2 or3)* Do you know that the minutes are recorded and got approved in next meeting?	Always	1
		Occasionally	2
		Never	3
8	Do you think WCA helps in solving your farming problems?	Always	1
		To some extent	2
		Never	3

Part-B: Beneficiary Feedback: Part-B (if already member, skip to 11)		YES	NO	NA
9	Do you know about Water Users Association?	1	2	3
10	Were you approached to be member of Water Users Association?	1	2	3
11	Do you know that your Water Conservation is going to be newly lined / additionally line / reconstructed	1	2	3
12	If the answer is '1' in 'q11 above, do you know that the lining will be up to 50% of the Water Conservation length?	1	2	3
13	Would you like to be a member of Water Users Association?	1	2	3
14	Do you think that Water Conservation lining up to 50% will benefit you?	1	2	3
15	Do you think that if the Water Conservation is reconstructed, trees will be cut down?	1	2	3
16	If "YES" in Q12 above, then how many trees will be cut down?			

Beneficiary Feedback: Part-C

17	Have you ever visited WCA site as it is being improved	1-YES	2-NO	3-NA
18	If 'No' have you heard about the quality of work	1-YES	2-NO	3-NA
19	If 'Yes' do you think work quality is:	Good		1
		Average		2
		Not good		3
		No comments		4
20	If not good how?	Bricks are not of good quality		1
		Cement mix is not proper		2
		Workmanship is not good		3
		Any other (Specify)_____		4
21	Do you know that before lining work was started the Water Conservation was earthen	1-YES	2-NO	3.NA
22	If 'Yes', how much in your view Water Conservation length was earthen improved / renovated?	Entire length		1
		Only lining part		2
		Do not know		3
23	Did you participate in earthen improvement activity?	1-YES	2-NO	3.NA
24	If 'Yes' in what form?	Contributed labour		1
		Contributed in-kind		2
		Paid money		3
		Did not take part		4
		No Comments		5

COMMENTS

Name and Signature _____ **Date** _____

Monitoring Template -4.3

WCA ID _____

NAME AND DATE OF SURVEY _____

BENEFICIARY FEEDBACK FORM-3

Use this template if the Water Conservation has already been improved at the time of survey

1. Identification

1.1	WCA Number_____	1.2	Size _____
1.3	Khasra No _____	1.4	Village Name_____
1.5	Owner of land _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WCA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of WCA		_____
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

2. Beneficiary Feedback: Part-A

1	Are you a member of the Water Users Association (WCA)? (If answer is "NO" or "NA" then skip to question 8)	1-YES	2-NO	3-NA (*)
2	If 'Yes' in question 1 above then, was your participation voluntary?	1-YES	2-NO	3-NA
3	If 'Yes' in question 2 above, then indicate who motivated you to be a member?	Fellow farmers		1
		Big Landlord		2
		Project Field Staff		3
		Any other (Specify)_____		4

(*) NA=No answer / Not applicable

4	Did you pay your membership fee (if any)?	1-Yes	2-NO	3-NA
5	What is the frequency of WCA meetings?	Every month		1
		Quarterly		2
		Once a year		3
		Never		4
6	*(If the answer in question 5 is 1, 2 or3)* Do you participate in the meetings?	Always		1
		Occasionally		2
		Never		3
7	*(If the answer in question 5 is 1, 2 or3)* Do you know that the minutes are recorded and got approved in next meeting?	Always		1
		Occasionally		2
		Never		3
8	Do you think WCA helps in solving your farming problems?	Always		1
		To some extent		2
		Never		3

Part-B: Beneficiary Feedback: Part-B (if already member, skip to 11)		YES	NO	NA
9	Do you know about Water Users Association?	1	2	3
10	Were you approached to be member of Water Users Association?	1	2	3
11	Do you know that your Water Conservation is going to be newly lined / additionally line / reconstructed	1	2	3
12	If the answer is '1' in 'q11 above, do you know that the lining will be up to 50% of the Water Conservation length?	1	2	3
13	Would you like to be a member of Water Users Association?	1	2	3
14	Do you think that Water Conservation lining up to 50% will benefit you?	1	2	3
15	Do you think that if the Water Conservation is reconstructed, trees will be cut down?	1	2	3
16	If "YES" in Q12 above, then how many trees will be cut down?			

4. Beneficiary Feedback: Part-C

15	Did you ever visit WCA site as it was being improved?	1-YES	2-NO	3-NA
16	If 'No' have you heard about the quality of work?	1-YES	2-NO	3-NA

17	If 'Yes' do you think work quality was	Good	1
		Average	2
		Not good	3
		No comments	4
17	If not good how?	Bricks are not of good quality	1
		Cement mix is not proper	2
		Workmanship is not good	3
		Any other (Specify)_____	4
18	Do you know that before lining work was started the Water Conservation was earthen improved/renovated?	1-YES	2-NO / 3-NA
19	If 'Yes' how much in your view Water Conservation length was earthen improved / renovated?	Entire length	1
		Only lining part	2
		Do not know	3
20	Did you participate in earthen improvement activity?	1-YES	2-NO / 3-NA
21	If 'Yes' in what form?	Contributed labour	1
		Contributed in-kind	2
		Paid money	3
		Did not take part	4
		No Comments	5

5. Beneficiary Feedback: Part-D

22	Do you think that irrigation water availability has increased for your farm after the Water Conservation	1-YES	2-NO / 3-NA
23	If 'Yes' how much? (Please guess keeping in view difference in acreage irrigated before and after WC improvement)	Less than 5%	1
		5%	2
		10%	3
		20%	4
		50%	5
		More than 50%	6
24	Are you satisfied with the quality of Water Conservation lining?	1-YES	2-NO / 3-NA
25	What arrangements are made by the WCA for maintenance of the Water Conservation?	Members' contribution	1
		None	2
		I do not know	3

		No comments	4

COMMENTS

Name and signatures of the interviewer _____

Date _____

ANNEX-F: MONITORING TEMPLATE 5 (MT5)

WATER STORAGE TANK (WST) SPOT CHECK

Monitoring Template -5

WST ID _____

NAME OF SURVEY AND DATE _____

WATER STORAGE TANK (WST) SPOT CHECK

3. Identification of the Location

1.1 WST Number _____ 1.2 Size _____

1.3 Khasra No _____ 1.4 Village Name_____

1.5 Owner of land _____ 1.6 Tehsil _____

1.7 District _____ 1.8 Province / Area _____

1.9 Name of WCA Chairman _____ 1.10 Field Team _____

1.11 District Team _____ 1.12 Date of Interview _____

1.13 Location of water storage tank _____

1.14 Directorate of Agri. Eng. / Agriculture Department _____

2. SPOT CHECKS

2.1. Shape of the Water Storage Tank _____

2.2. Dimensions (Feet) Length _____ Width _____ Depth _____

S.#	Spot Check Items	Yes	No
1	The farmer completed the WST using his/her own funds before asking for subsidy		
2	The WST was completed as per approved standards and specifications		
3	Excavation was done as per standard engineering practices		

4	The PC inspected the excavation and quality of geo-membrane and certified as satisfactory		
5	Before filling the WST, the DoAE/Agri. Dept. staff prepared the completion report		
6	Any variations in specifications and material used		
7	If yes in above, the subsidy was paid as per cost estimates based on geo-membrane design		

COMMENTS OF ENUMERATOR

Name and signatures _____

ANNEX-G: MONITORING TEMPLATE 6 (MT6)

PROCESS MONITORING FOR WATER STORAGE TANKS

Monitoring Template -6
WST ID _____

SURVEY NAME AND DATE _____

PROCESS MONITORING FOR WATER STORAGE TANK (WST)

4. Identification of the WST

1.1	WST Number_____	1.2	Size _____
1.3	Khasra No_____	1.4	Village Name_____
1.5	Owner of land_____	1.6	Tehsil _____
1.7	District_____	1.8	Province / Area _____
1.9	Name of WUA Chairman _____	1.10	Field Team _____
1.11	District Team_____	1.12	Date of Interview _____
1.13	Location of water storage tank		_____
1.14	Directorate of Agri. Eng. / Agriculture Department		_____

2. Process Monitoring

Name and signature of Interviewer _____

Process Moniotoring of Water Storage Tanks MT6										
Sr.#	WST ID	Province	Region	District	Taluka / Tehsil	Admin-Region (Which Constructed)	Admin-District (Which Constructed)	Admin-Taluka / Tehsil (Which Constructed)	Farmer Name	Farmer's CNIC
	1	2	3	4	5	6	7	8	9	10

Process Moniotoring of Water Storage Tanks MT6								
Picture of CNIC (Front Side)	Picture of CNIC (Back Side)	Deh/vilage	UC	Farm Size in acres	Type of Crop (row, orchards)	Area of Row Crop	Name of Row Crop	Other Name of Row Crop
11	12	13	14	15	16	17	18	19

Process Moniotoring of Water Storage Tanks MT6							
Area of Orchard Crop	Name of Orchard Crop	Other Name of Orchard Crop	Issuance Date of Technical Sanction	Picture of Technical Sanction (T.S) Document	Issuance Date of Work Order	Picture of Work Order Document	Type of the WST
20	21	22	23	24	25	26	27

Process Moniotoring of Water Storage Tanks MT6							
Size of the WST: Length (Feet)	Size of the WST: Width (Feet)	Size of the WST: Depth (Feet)	Size of the WST: Free Board (Feet)	Source of irrigation wagter (Canal, Rain, TW, Well, Spring, Stream)	Total Project Cost	Project Share	Farmer Share
28	29	30	31	32	33	34	35

Process Moniotoring of Water Storage Tanks MT6						
Revised Issuance Date of Technical Sanction	Picture of Revised Technical Sanction (T.S) Document	Revised Issuance Date of Work Order	Picture of Revised Work Order Document	Total Revised Project Cost	Revised Project Share	Revised Farmer Share
36	37	38	39	40	41	42

Process Moniotoring of Water Storage Tanks MT6							
Date of certification of PC for digging and quality of geo-membrane	**Date of Verification of completion of WST**	**Picture of WST completion verification**	**Date of FCR issued by PC**	**Picture of FCR issued**	**Request of farmer for payment of subsidy**	**Approval date for payment of subsidy**	**Date of check issued for payment of subsidy**
43	44	45	46	47	48	49	50

ANNEX-H: MONITORING TEMPLATE 7 (MT7)

BENEFICIARIES' FEEDBACK FOR WATER STORAGE TANKS

Monitoring Template -
WST ID _____

SURVEY NAME AND DATE

BENEFICIARIES' FEEDBACK FOR WATER STORAGE TANKS

Identification

1.1	WST Number_____	1.2	Size _____
1.3	Khasra No_____	1.4	Village Name_____
1.5	Owner of land_____	1.6	Tehsil _____
1.7	District_____	1.8	Province / Area _____
1.9	Name of WUA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of water storage tank _____		
1.14	Directorate of Agri. Eng. / Agriculture Department _____		

Beneficiary Feedback

1	How your application was attended by OFWM staff	Promptly	Took lot of time	No Comment
2	How you assess survey and design process	Fast Track	Lengthy	No comment
3	Quality of OFWM staff behavior	Friendly / supportive	Indifferent	No comment
4	The subsidy was paid	Within reasonable time	Required lot of efforts	No comment
5	How you feel maintenance of WST	Easy	Difficult	No comment
6	Do you think cropping intensity increased on your farm after WST	Yes	No	No comment

7	Do you think your crops / orchards yield increased after WST	Yes	No	No comment
8	Do you think WST encourages mosquito population	Yes	No	No comments
9	If yes, what measures you take to control it	Sprays	None	No comment

Name and signature of enumerator _____

Monitoring Template -15

WCA ID _____

NAME AND DATE OF THE SURVEY _____

QUESTIONNAIRE FOR FARMING HOUSEHOLDS

1. IDENTIFICATION

1.1	Water Conservation Number	1.2	Minor _____
1.3	Distributary _____	1.4	Branch_____
1.5	Canal _____	1.6	Tehsil _____
1.7	District _____	1.8	Province / Area _____
1.9	Name of WUA Chairman _____	1.10	Field Team _____
1.11	District Team _____	1.12	Date of Interview _____
1.13	Location of Water Conservation on the canal		Head Middle Tail
1.14	Director OFWM / Agriculture Department		_____

2. FAMILY PROFILE

S.#	Family Relation with Respondent	Gender Male=1 Female=2	Age (Years)	Education (Years) If "0" go to 6.	Literacy Literate=1 Illiterate=2	Occupation (insert code)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Occupation codes:

Occupation	Code	Occupation	Code	Occupation	Code	Occupation	Code
Farming	1	Govt. Service	2	Labour	3	Shopkeeper	4
Artisan	5	Business	6	Household Work	7	Other	8

3. FARM SIZE (Acres)

	Acreage		Acreage
Area Owned		Area not cultivated	
Area Rented-In		Fallow land	
Area Rented-Out			

4.1. CROP ACREAGE AND INPUTS (Rabi Year_____ and Kharif Year_____)

Name of Crop	Crop Area (acres)	Land Preparation with tractor		Deep Ripping		Use of Seed	
		Acres	Hr./Ac.	Acres	Hr./Ac.	Kg/acre	Rs. /Kg
Wheat							
Rice							
Cotton							
Sugarcane (Ratoon)							
Sugarcane (New)							
Sunflower							
Rapeseed, mustard, canola							
Mango Orchard (Old)							
Mango Orchard (New)							
Dates Orchard (Old)							
Dates Orchard (New)							
Banana Orchard (Old)							
Banana Orchard (New)							
Lemon Orchard (Old)							
Lemon Orchard (New)							
Henna Plantation (Old)							
Henna Plantation (New)							
Tomato							
Chili							
Okra							
Onion							
Rabi Fodder							
Kharif Fodder							
Other Orchard (New)							
Other Orchard (Old)							
Other Field Crop							
Other Vegetable							

4.2. CROP INPUTS (Rabi Year_____ and Kharif Year_____)

Name of Crop	Seedling Cost Total (Rs.)		Total Cost of plants for orchards /henna plantation Rs.	Use of Chemical Fertilizers (Bags)					Use of Chemicals	
	Home Grown	Bought		Urea	DAP	Potash (SOP)	NP (23-23)	Other	Area treated (Acres)	Cost (Rs. /Acre)
Wheat										
Rice										
Cotton										
Sugarcane (Ratoon)										
Sugarcane (new)										
Sunflower										
Rapeseed, mustard,										
Mango Orchard (Old)										
Mango Orchard (New)										
Dates Orchard (Old)										
Dates Orchard (New)										
Banana Orchard (Old)										
Banana Orchard (New)										
Lemon Orchard (Old)										
Lemon Orchard (New)										
Henna Plantations (Old)										
Henna Plantations (new)										
Tomato										
Chili										
Okra										
Onion										
Rabi Fodder										
Kharif Fodder										
Other Orchard Old										
Other Orchard New										
Other Field Crop										
Other Vegetable										

4.3. CROP INPUTS (Rabi Year_____ and Kharif Year_____)

Name of Crop	Use of FYM			Tube-well Irrigation		Stalking		Mulching		Picking by family and permanent hire labour	
	Area treated (Acres)	Ton/Trolley per acre	Rs./ trolley	Area treated (Acres)	Hours/Acre	Area Treated (Acres)	Material Cost per acre (Rs.)	Area Treated (Acres)	Material Cost per acre (Rs.)	Area picked (Acres)	Number of picking per acre
Wheat											
Rice											
Cotton											
Sugarcane (Ratoon)											
Sugarcane (new)											
Sunflower											
Rapeseed, mustard,											
Mango Orchard (Old)											
Mango Orchard (New)											
Dates Orchard (Old)											
Dates Orchard (New)											
Banana Orchard (Old)											
Banana Orchard (New)											
Lemon Orchard (Old)											
Lemon Orchard (New)											
Henna Plantations (Old)											
Henna Plantations (new)											
Tomato											
Chili											
Okra											
Onion											
Rabi Fodder											
Kharif Fodder											
Other Orchard Old											
Other Orchard New											
Other Field Crop											
Other Vegetable											

4.4. CROP INPUTS (Rabi Year_____ and Kharif Year_____)

Name of Crop	Contractual Picking			Material cost for packing (Rs. Per Kg)	Material cost for Sacking (Rs. Per 40 Kg)	Harvesting by Family and permanent hired labour (Acres)	Harvesting by contractual labour		Threshing by own tractor and thresher (Acres)	Threshing through contractor	
	Area picked by pickers (Acres)	Number of picking per acre	Share of pickers in output (%)				Acres harvested	Share of harvesters in		Acres threshed	Share of contractor in the
Wheat											
Rice											
Cotton											
Sugarcane (Ratoon)											
Sugarcane (new)											
Sunflower											
Rapeseed, mustard, Canola											
Mango Orchard (Old)											
Mango Orchard (New)											
Dates Orchard (Old)											
Dates Orchard (New)											
Banana Orchard (Old)											
Banana Orchard (New)											
Lemon Orchard (Old)											
Lemon Orchard (New)											
Henna Plantations (Old)											
Henna Plantations (new)											
Tomato											
Chili											
Okra											
Onion											
Rabi Fodder											
Kharif Fodder											
Other Orchard Old											
Other Orchard New											
Other Field Crop											
Other Vegetable											

5.1. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Deep Ripping				Land Preparation			
	Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)	
	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)
Wheat								
Rice								
Cotton								
Sugarcane (Ratoon)								
Sugarcane (new)								
Sunflower								
Rapeseed, mustard, Canola								
Mango Orchard (Old)								
Mango Orchard (New)								
Dates Orchard (Old)								
Dates Orchard (New)								
Banana Orchard (Old)								
Banana Orchard (New)								
Lemon Orchard (Old)								
Lemon Orchard (New)								
Henna Plantations (Old)								
Henna Plantations (new)								
Tomato								
Chili								
Okra								
Onion								
Rabi Fodder								
Kharif Fodder								
Other Orchard Old								
Other Orchard New								
Other Field Crop								
Other Vegetable								

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.2. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Seed Treatment				Sowing				Transplantation			
	Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)	
	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)
Wheat												
Rice												
Cotton												
Sugarcane (Ratoon)												
Sugarcane (new)												
Sunflower												
Rapeseed, mustard, Canola												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Henna Plantations (Old)												
Henna Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old												
Other Orchard New												
Other Field Crop												
Other Vegetable												

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.3. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Plantation				Fertilizer Application				FYM Application			
	Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)	
	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)
Wheat												
Rice												
Cotton												
Sugarcane (Ratoon)												
Sugarcane (new)												
Sunflower												
Rapeseed, mustard, Canola												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Henna Plantations (Old)												
Henna Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old												
Other Orchard New												
Other Field Crop												
Other Vegetable												

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.4. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Hoeing					Thinning					Irrigations (tube-well and canal)				
	Acres treated	Family +PHL (1)		CHL (2)		Acres treated	Family +PHL (1)		CHL (2)		No. of irrigations per acre	Family +PHL (1)		CHL (2)	
		M (3)	F (3)	M (3)	F (3)		M (3)	F (3)	M (3)	F (3)		M (3)	F (3)	M (3)	F (3)
Wheat															
Rice															
Cotton															
Sugarcane (Ratoon)															
Sugarcane (new)															
Sunflower															
Rapeseed, mustard,															
Mango Orchard (Old)															
Mango Orchard (New)															
Dates Orchard (Old)															
Dates Orchard (New)															
Banana Orchard (Old)															
Banana Orchard (New)															
Lemon Orchard (Old)															
Lemon Orchard (New)															
Henna Plantations (Old)															
Henna Plantations (new)															
Tomato															
Chili															
Okra															
Onion															
Rabi Fodder															
Kharif Fodder															
Other Orchard Old															
Other Orchard New															
Other Field Crop															
Other Vegetable															

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.5. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Sprays					Pruning					Pollination				
	Acres treated	Family +PHL (1)		CHL (2)		Acres treated	Family +PHL (1)		CHL (2)		Acres Treated	Family +PHL (1)		CHL (2)	
		M (3)	F (3)	M (3)	F (3)		M (3)	F (3)	M (3)	F (3)		M (3)	F (3)	M (3)	F (3)
Wheat															
Rice															
Cotton															
Sugarcane (Ratoon)															
Sugarcane (new)															
Sunflower															
Rapeseed, mustard,															
Mango Orchard (Old)															
Mango Orchard (New)															
Dates Orchard (Old)															
Dates Orchard (New)															
Banana Orchard (Old)															
Banana Orchard (New)															
Lemon Orchard (Old)															
Lemon Orchard (New)															
Henna Plantations (Old)															
Henna Plantations (new)															
Tomato															
Chili															
Okra															
Onion															
Rabi Fodder															
Kharif Fodder															
Other Orchard Old															
Other Orchard New															
Other Field Crop															
Other Vegetable															

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.6. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Picking				Harvesting				Thrashing			
	Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)	
	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)
Wheat												
Rice												
Cotton												
Sugarcane (Ratoon)												
Sugarcane (new)												
Sunflower												
Rapeseed, mustard, Canola												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Henna Plantations (Old)												
Henna Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old												
Other Orchard New												
Other Field Crop												
Other Vegetable												

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.7. Labour Input in Man-Days per Acre (Rabi Year_____ and Kharif Year_____)

Name of Crop	Packing / Sacking				Loading				Marketing			
	Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)		Family +PHL (1)		CHL (2)	
	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)	M (3)	F (3)
Wheat												
Rice												
Cotton												
Sugarcane (Ratoon)												
Sugarcane (new)												
Sunflower												
Rapeseed, mustard, Canola												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Henna Plantations (Old)												
Henna Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old												
Other Orchard New												
Other Field Crop												
Other Vegetable												

(1) Permanent Hired Labour (PHL)
(2) Casual Hired Labour (CHL)
(3) M=Male; and F=Female

5.8. Labour Input

Name of Crop	Any other Activity			
	Family + PHL [1]		CHL [2]	
	M [3]	F [3]	M [3]	F [3]
Wheat				
Rice				
Cotton				
Sugarcane (Ratoon)				
Sugarcane (new)				
Sunflower				
Rapeseed, mustard, Canola				
Mango Orchard (Old)				
Mango Orchard (New)				
Dates Orchard (Old)				
Dates Orchard (New)				
Banana Orchard (Old)				
Banana Orchard (New)				
Lemon Orchard (Old)				
Lemon Orchard (New)				
Henna Plantations (Old)				
Henna Plantations (new)				
Tomato				
Chili				
Okra				
Onion				
Rabi Fodder				
Kharif Fodder				
Other Orchard Old				
Other Orchard New				
Other Field Crop				
Other Vegetable				

1. **Permanent Hired Labour (PHL)**
2. **Casual Hired Labour (CHL)**
3. **M=Male; and F=Female**

6.1. Crop Yield (Maund /Acre)

Name of crop	Product	By-Product
	Maund (40 Kg) per acre	
Wheat		
Rice		
Cotton		
Sugarcane		
Sunflower		
Rapeseed		
Mango		
Dates		
Banana		
Lemon		
Henna		
Tomato		
Chili		
Okra		
Onion		
Fodder		
Other Orchard		
Other Crop		
Other vegetable		

3.2. Input prices including transportation charges.

Commodity	Unit	Unit Price (Rs.)	Commodity	Unit	Unit Price Rs
Urea			Tractor Hours		
DAP			Tube Well Water		
POTASH			Wheat Threshing		
SSP			Rice Threshing		
FYM (Ton)			Deep Ripping		
Seed of wheat			Any Other		
Seed of Rice			Tube Well Water per hour		
Seed of cotton			Abyana per acre		
Seed of Sugarcane (per KG)			Lift Pump per hour		
Seed of Rapeseed			Thresher Rs. Per hour		
Seed of Tomato			Permanent hired labour-Male		
Seed of Chili			Permanent hired labour-Female		
Seed of Okra					
Seed of Onion					

3.3. Prices of Agriculture Products

Name of Crop	Product (Rs./Maund)	Bi-Product (Rs./Maund)	Name of Crop	Product (Rs./Maund)	Bi-Product (Rs./Maund)
Wheat			**Tomato**		
Rice			**Chili**		
Cotton			**Okra**		
Sugarcane			**Onion**		
Sunflower			**Fodder**		
Rapeseed					
Mango					
Dates					
Banana					

4. Respondent's Perception about Water Saving

7.1	Do you think waterlogging has reduced after Water Conservation lining?	**Yes**	**No**
7.2	Do you think salinity has reduced after Water Conservation lining	**Yes**	**No**

COMMENTS

Name and Signatures: _____

ANNEX-I: PROJECT PROGRESS REPORTING FRAMEWORK (PPRF)

Project Title……

Report Name and Period…….

Area Name ……

Sr. No.	STRATEGY /ACTIVITIES	Reporting Quarter								Year to Quarter (Cumulative)							
		Physical Progress				Financial Progress				Physical Progress				Financial Progress			
		Unit of Measure	Target/Planned	Actual/Achievement	Variance%	Committed Liability of Previous Year	Budget Allotted (PC-1)	Actual Expenditure	Variance%	Unit of Measure	Target/Planned	Actual/Achievement	Variance%	Committed Liability of Previous Year	Budget Allotted (PC-1)	Actual Expenditure	Variance%
		(1)	(2)	(3)	(4	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)
Area details……..?																	
1	Activity details ……?																
Sub Totals																	
Area details……..?																	
2	Activity details ……?																
Sub Totals																	
Total(s)																	

Note:1-Report Summary will be Prepared Separately from the data consolidated Area wise and Components Wise……?

2- More columns will be added as per requirements….?

ANNEX-J: MATRIX OF RESPONSIBILITY

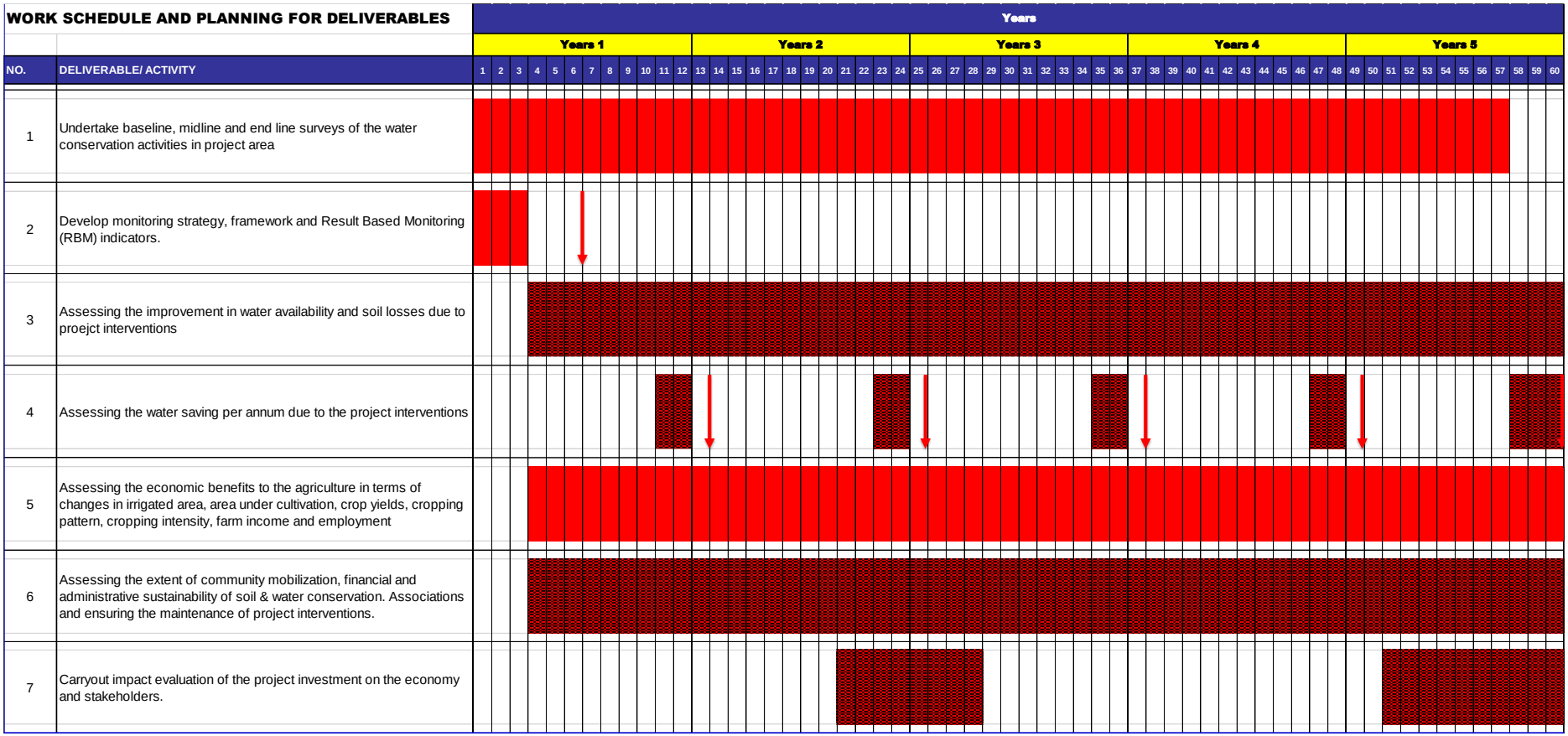
MATRIX OF RESPONSIBILITIES

LEGEND	
●	Primery Responsibility
ʘ	Secondry Responsibility
O	Assistance

SR. NO.	DELIVERABLE / ACTIVITIES	NPC-FPMU	Agriculture Dept. (OFWM)	Project Consultants	ME&IE Consultants
1	**Provision of Pre-requisite data of project components for starting of Field Activities:**	O	●	-	-
2	**Certification of operational documents of the project,** • Design, cost estimates, completion reports	O	ʘ	●	-
3	Undertake baseline, midline and end line surveys of the project activities/interventions in all the project areas.	-	-	-	●
4	Preparation of Monthly, Quarterly and Annual Monitoring and Evaluation of the project activities.	-	-	-	●
5	Develop monitoring strategy, framework and Result Based Monitoring (RBM) indicators.	-	-	-	●
6	Assessing the improvement in water availability and soil losses due to project interventions.	-	-	-	●
7	Assessing the water saving per annum due to the project interventions.	-	-	-	●
8	Assessing the economic benefits to the agriculture in terms of changes in irrigated area, area under cultivation, crop yields, cropping pattern, cropping intensity, farm income and employment.	-	-	-	●
9	Assessing the extent of community mobilization, financial and administrative sustainability of Soil & Water Conservation Associations (SWCAs) and ensuring the maintenance of project interventions.	-	-	-	●
10	Carryout impact evaluation of the project investment on the economy and stakeholders.	-	-	-	●

ANNEX-K: ACTIVITY SCHEDULE (TECH-5)

WORK SCHEDULE AND PLANNING FOR DELIVERABLES



NO.	DELIVERABLE/ ACTIVITY
1	Undertake baseline, midline and end line surveys of the water conservation activities in project area
2	Develop monitoring strategy, framework and Result Based Monitoring (RBM) indicators.
3	Assessing the improvement in water availability and soil losses due to proejct interventions
4	Assessing the water saving per annum due to the project interventions
5	Assessing the economic benefits to the agriculture in terms of changes in irrigated area, area under cultivation, crop yields, cropping pattern, cropping intensity, farm income and employment
6	Assessing the extent of community mobilization, financial and administrative sustainability of soil & water conservation. Associations and ensuring the maintenance of project interventions.
7	Carryout impact evaluation of the project investment on the economy and stakeholders.

WORK SCHEDULE AND PLANNING FOR DELIVERABLES

Years

NO.	DELIVERABLE/ ACTIVITY	Years 1											
		1	2	3	4	5	6	7	8	9	10	11	12
	DELIVERABLES												
1	Draft Inception Report		↓										
2	Final Inception Report		↓										
3	Monthly Monitoring Report	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	Baseline Survey Report [1]				↓								
5	Midline Survey Report												
6	End Line Survey Report												
7	Quarterly Monitoring and Evaluation Report			↓			↓			↓			↓
8	Annual Monitoring and Evaluation Report												↓
9	Draft Assignment Completion Report												
10	Final Assignment Completion Report												
11	Special Reports (As and when required)												

NO.	DELIVERABLE/ ACTIVITY	Years 2											
		13	14	15	16	17	18	19	20	21	22	23	24
	DELIVERABLES												
1	Draft Inception Report												
2	Final Inception Report												
3	Monthly Monitoring Report	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	Baseline Survey Report [1]												
5	Midline Survey Report												
6	End Line Survey Report												
7	Quarterly Monitoring and Evaluation Report			↓			↓			↓			↓
8	Annual Monitoring and Evaluation Report												↓
9	Draft Assignment Completion Report												
10	Final Assignment Completion Report												
11	Special Reports (As and when required)												

NO.	DELIVERABLE/ ACTIVITY	Years 3											
		25	26	27	28	29	30	31	32	33	34	35	36
	DELIVERABLES												
1	Draft Inception Report												
2	Final Inception Report												
3	Monthly Monitoring Report	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	Baseline Survey Report [1]												
5	Midline Survey Report						↓						
6	End Line Survey Report												
7	Quarterly Monitoring and Evaluation Report			↓			↓			↓			↓
8	Annual Monitoring and Evaluation Report												↓
9	Draft Assignment Completion Report												
10	Final Assignment Completion Report												
11	Special Reports (As and when required)												

NO.	DELIVERABLE/ ACTIVITY	Years 4											
		37	38	39	40	41	42	43	44	45	46	47	48
	DELIVERABLES												
1	Draft Inception Report												
2	Final Inception Report												
3	Monthly Monitoring Report	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	Baseline Survey Report [1]												
5	Midline Survey Report												
6	End Line Survey Report												
7	Quarterly Monitoring and Evaluation Report			↓			↓			↓			↓
8	Annual Monitoring and Evaluation Report												↓
9	Draft Assignment Completion Report												
10	Final Assignment Completion Report												
11	Special Reports (As and when required)												

NO.	DELIVERABLE/ ACTIVITY	Years 5											
		49	50	51	52	53	54	55	56	57	58	59	60
	DELIVERABLES												
1	Draft Inception Report												
2	Final Inception Report												
3	Monthly Monitoring Report	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	Baseline Survey Report [1]												
5	Midline Survey Report												
6	End Line Survey Report									↓			
7	Quarterly Monitoring and Evaluation Report			↓			↓			↓			↓
8	Annual Monitoring and Evaluation Report												↓
9	Draft Assignment Completion Report											↓	
10	Final Assignment Completion Report												↓
11	Special Reports (As and when required)												

ANNEX-L: TEAM COMPOSITION (TECH-6)

TEAM COMPOSITION, ASSIGNMENT, AND KEY EXPERTS INPUTS

NO.	NAME OF EXPERT	POSITION		Expert's Input (In person/ month) per each deliverable (listed in TECH-5)							Total Time in Months		
				1	2	3	4	5	6	7	Home	Field	Total MM
1. CONSULTANT CORE TEAM													
A. Key Staff													
1	Dr. Usman Mustafa	Team Leader / Monitoring and Evaluation Specialist	Home	5.0	3.0	3.0	4.0	3.0	3.0	3.0	24	6	30
			Field	1.0	1.0	1.0	1.0	1.0	0.5	0.5			
2	Dr. Ghulam Rasool Keerio	Environment & Social Monitoring Specialist	Home	2.0	2.0	1.0	1.0		2.0	2.0	10	2	12
			Field	0.50	0.50	0.25	0.25		0.25	0.25			
3	Dr. Mansab Ali	Irrigation Agronomist (IA)	Home	2.0	2.0	1.0	1.0		2.0	2.0	10	2	12
			Field	0.50	0.50	0.25	0.25		0.25	0.25			
4	Muhammad Akram Khan	Agricultural Economist	Home	3.0	1.0	1.0	1.0	0.5	1.0	0.5	8	0	8
			Field										
5	Afzal Hayat Khan	Social and Gender Specialist	Home	2.0	1.0	1.0	1.0		1.0		6	2	8
			Field	0.5	0.50		0.5		0.5				
												Total Core Team Key Staff	70
B. Non-Key Staff													
1	TBN	ICT Manager	Home	5.0	4.0	4.0	5.0	4.0	4.0	4.0	30	0	30
			Field										
2	TBN	Supporting Technical & Non-Technical Staff	Home	5.0	4.0	4.0	5.0	4.0	4.0	4.0	30	0	30
			Field										
3	TBN	Supporting Technical & Non-Technical Staff	Home	5.0	4.0	4.0	5.0	4.0	4.0	4.0	30	0	30
			Field										
4	TBN	Unallocated man-months JV MOB	Home	1.0	1.0	0.5	0.5	1.0	0.25	0.75	5	0	5
			Field										
												Sub Total National Non-Key Staff	95