



FEDERAL PROJECT MANAGEMENT UNIT
FEDERAL WATER MANAGEMENT CELL
MINISTRY OF NATIONAL
FOOD SECURITY & RESEARCH
ISLAMABAD - PAKISTAN

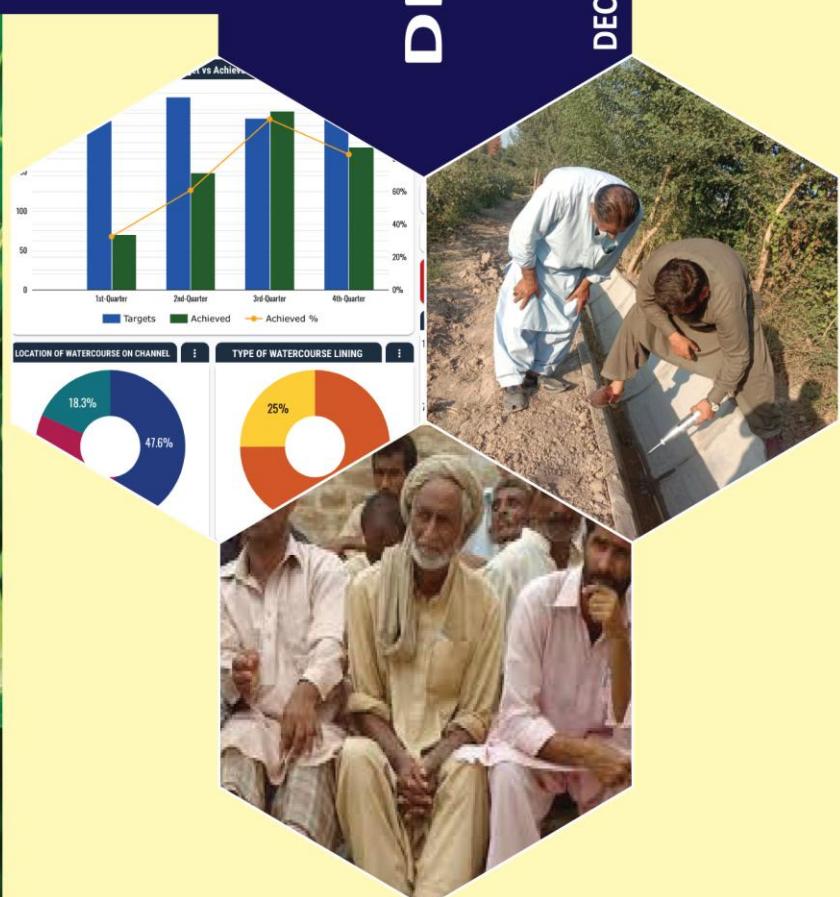
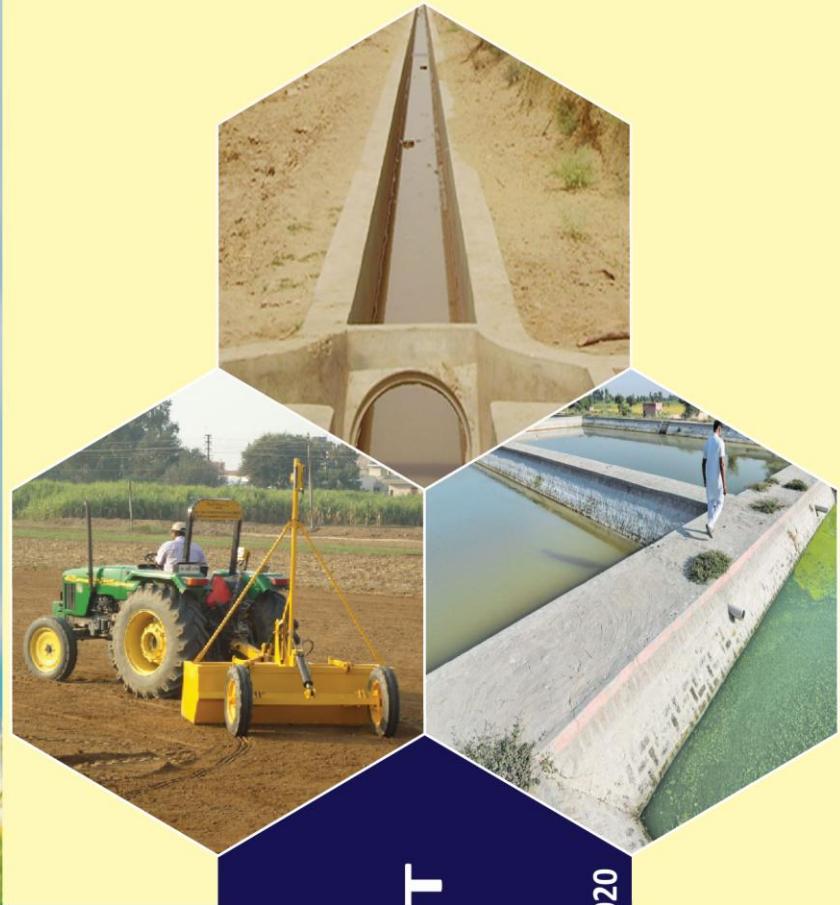
NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II: (NPIWC-II)

MONITORING, EVALUATION AND IMPACT EVALUATION CONSULTANTS

INCEPTION REPORT

DRAFT

DECEMBER 2020



A Joint Venture of
 G3 Engineering Consultants (Pvt) Ltd.





**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
National Program for Improvement of Watercourses in Pakistan Phase-II (NPIWC-II)**

DRAFT INCEPTION REPORT

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ACRONYMS

ADA Consultants	ADA Incorporated, Canada
ADA	Assistant Director Agriculture
AF	Acre-Feet
AJK	Azad Jammu & Kashmir
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
GB	Gilgit Baltistan
GIS	Geographic Information System
HEIS	High Efficiency Irrigation system
IAs	Implementing Agencies
ICR	Intermediate Completion Report
ICT	Islamabad Capital Territory
IRR	Internal Rate of Return
ICT	Information & Communication Technology
KPK	Khyber Pakhtunkhwa
LLL	Laser Land Leveler
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
NPIWC	National Program for Improvement of Watercourses
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
TABs	Tablets
TOR	Terms of Reference
TPV	Third Party Validation
TWRD	Tail-Water Recovery Ditch
WG	Women Group
WST	Water Storage Tank
WUAs	Water Users Associations

EXECUTIVE SUMMARY

The Government of Pakistan is implementing a project entitled “National Program for Improvement of Watercourses in Pakistan Phase-II (NPIWC-II) at a total cost of Rs. 179,705 million over a period of 05 years. This project will cover Punjab, KPK, Balochistan and Gilgit Baltistan, Azad Jammu & Kashmir as well as Islamabad Capital Territory (ICT). The proposed project Phase-II will be beneficial for the country, as highlighted under:

• Water saving per Watercourse per annum:	123 AF
• Watercourse to be Improved:	47,278
• Estimated Water to be saved per annum:	5.82 MAF
• Estimated Economic Value per MAF:	\$400 Million
• Total Economic benefit due to water saving:	\$2.328 Billion
• Total Saving (PKR):	372.5 Billion

A Joint Venture of G3 Engineering Consultants (Pvt.) Ltd., Ease-Pak Engineering services (Pvt.) Ltd., Center for Social Research and Development (CSRD) and ADA Consultants Incorporated Canada has been selected through a competitive bidding process as ME&IE Consultants. An Agreement was signed by the Joint Venture and the FPMU-FWMC NPIWC-II on 26th October, 2020. The consultants were mobilized on 20th November, 2020.

The NPIWC-II comprises four components to be implemented in Punjab, KPK, Balochistan, GB, AJK, and ICT:

- i) **C1: ORGANIZATION OF WATER USERS ASSOCIATIONS:** Establishment/ reactivation of Water Users Associations (WUAs) through community driven implementation approach.
- ii) **C2: WATERCOURSE IMPROVEMENTS:** 47,278 Watercourses are planned to be improved /reconstructed and lined.
- iii) **C3: CONSTRUCTION OF WATER STORAGE TANKS:** Construction of 14,932 Water Storage Tanks (WSTs).
- iv) **C4: PROVISION OF LASER LAND LEVELING UNITS:** Provision of 11,610 Laser Land Leveling units to the farmers.

All the project activities are planned to be implemented on a cost sharing basis.

The progress towards the Project Development Objectives (PDO) will be measured through the following key performance indicators:

- i) Social mobilization through capacity building of Water Users Association
- ii) Watercourses with an increase in conveyance efficiency at least 15% points,
- iii) Reduction in water logging and salinity
- iv) Reduction in water application losses at 33%,
- v) Reduction in water disputes / thefts / litigation
- vi) Increase in cropping intensity at 24% in Barani areas and 5% in irrigated areas,
- vii) Increase in crop yield / sufficiency in food
- viii) Increase in agriculture output per unit of water at 25%.
- ix) Poverty reduction through employment generation.

In addition, a large population and related industries will benefit indirectly due to increased activities of construction, manufacturing, installation and supply of materials, etc.

The general scope of the ME&IE Consultants services is to:

- i) Assist the FPMU-FWMC NPIWC-II in Monitoring, Evaluation and impact evaluation of the project performance during operation of the project.
- ii) Monitoring of physical activities,
- iii) Carrying out ME&IE studies to evaluate the impact of the interventions for meeting the project objectives,
- iv) Assessing physical, hydrological, and economic impact of the project,
- v) Design, develop and maintain a project Management Information System (MIS) for ME&IE including establishment of a Spatial Database. All the data collection will be done through tabs / smart phones with the help of an android based application developed by ME&IE Consultants.

In order to minimize the complexities and make the MIS/GIS database a useful tool for input-output process and results-based monitoring. The consultants will adopt the following key principles and guidelines during the development and implementation of NPIWC-II MIS:

- i) Information needed and indicators to be captured are identified in a participatory manner involving all key stakeholders of the project at all levels,

- ii) The potential users of MIS are convinced and understand the usefulness of the MIS 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 receives the feedback,
- iv) The MIS will not impose a high workload at any level in FPMU-FWMC and other Implementing Agencies (IAs),
- v) There is no information/data overloaded at any level,
- vi) The system will be flexible enough to accommodate internal learning and changes in future,
- vii) The system will have user friendly interfaces to interact with,
- viii) The system's outputs are presented in formats that can be easily converted into other formats and data types without human intervention.

The consultants plan to carry out ME&IE assignments in two parts:

First, monitoring through field visits and surveys. For this purpose, a 2% to 5% sample of all the activities (watercourses, Water Storage Tanks, and Laser Land Leveling Units will be taken. The processes, timelines and physical progress against targets set in the Annual Work Plans (AWPs) will be marked. The monitoring activities including baseline, midline and endline surveys. The water saving assessment will be simultaneously carried out with the improvement activities of watercourses construction of water storage tanks and the use of laser land levelers. The economic benefits to the agriculture sector will also be estimated in addition to the impact evaluation on the stakeholders and economy as a whole. For each monitoring activity one or more checklist(s) will be developed based on planned SOPs (Modus Operandi) and timelines. The activities will be monitored according to the checklists.

All the checklists will get approved from the client before executing in the field. Additional checklists will be devised if required. The outcome of the monitoring activities is expected in three states, i.e., the progress is on track, lagging behind or faster than planned. Reasons for lagging progress will be identified with possible solutions. In case of faster progress, good practices will be identified to replicate in the project. All the physical progress will be monitored for quality as well.

The second part of the ME&IE assignment will be the development, operation, maintenance and handing-over the Management Information System (MIS) to the client at the end of the project. Main features of the MIS are briefly presented as under:

- a) Planning and input-output process monitoring, as well as the tracking of results indicators, assume a critical role in the management of development projects. We propose to develop, set up and implement a Web Based Monitoring Information System (MIS) useful for:
 - Monitor the progress of project implementation and provide timely feedback to all project stakeholders,
 - Monitor, assess, and summarize achievements (outputs and outcomes),
 - Analyze factors affecting the project's implementation and achievements.
- b) The basic functions of the NPIWC-II MIS will be to:
 - Enable the FPMU-FWMC and PC to track the outcome indicators and assess progress in implementation against timescales and targets, and resources used against budgets, based on agreed annual work plans.
 - Describe the factors and reasons triggering variations,
 - Record and reflect new targets, whenever it is required,
 - Draw important lessons to guide the decision-making,
 - Enable forecasting for project accomplishment in comparison to the currently reported progress,
 - Enable the project management to generate reports to funding partners, project beneficiaries and other stakeholders on the status and progress of the project implementation,
 - Integrate GIS components to the MIS to complement field-level surveys and measurements.
- c) Potential users' profiles could be the following:
 - Federal Ministries
 - Project Coordinators/FPMU-FWMC
 - Project Consultants
 - ME&IE Consultants
 - Provincial concerned departments / maintaining system administrators.
- d) The MIS will allow the project to enter the Annual Work Plan and Budget (AWPB) to enable



- process monitoring. This interface should facilitate the user to create activities for the current year and go back in previous years.
- e) The following project information will be accessible at all times.
- Project description
 - Project's objectives
 - Implementation partners
 - Locations of implementation
 - Timelines
 - Project activities (and % of accomplishments)
 - Budgets (% of spending)
 - 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 / consequently the decisions that are made as a result of the data.
- f) The kind of data that can be represented in the dashboard includes:
- Activity/indicator completion rates
 - Budget expenditures
 - Information disaggregated by localities (map views)
 - Timelines, etc.
- g) Notifications/Alerts
- For each type of events (e.g., incoming deadlines, new data input, requests, etc.) the user will receive notifications/alerts of said events within the MIS and via e-mail either:
- As the event is created
 - Daily / Weekly/ Monthly/Quarterly updates.
- When an alert generated and in what form and frequency will be decided in consultation with users /clients.
- h) Change Tracking
- The system records actions of users such as creating data, removing data, data entry, data validation, etc. (e.g., latest update to an open quarterly report). The system records the name of the user, the date and time of change, actions made, code of items altered. This function is crucial to monitor the ME&IE processes.
- i) Key Principles
- The system provides Excel-like functionality including filtering/sorting columns (reducing data-entry and increasing ease-of-use).
 - The data entry and validation of plans and different reports are linked to user profiles
 - The system displays an error message when not able to save the data.
 - For all operations, the system keeps an audit trail with the user, date and time of the operation.

1. INTRODUCTION TO NPIWC-II

1.1 BACKGROUND

The Government of Pakistan is implementing a five year National Program for Improvement of Watercourses in Pakistan Phase-II (NPIWC-II), funded by the Ministry of National Food Security and Research (MNSFR), Islamabad. The executing agencies (EAs) are Federal Water Management Cell (FWMC), all provincial departments of agriculture (Provincial Directorates of OFWM) and respective departments of AJK, GB and ICT, District Governments and Farmers' Organizations (FOs) / Water Users Associations (WUAs). The coordination rests with FPMU-FWMC Islamabad.

There was a requirement of the project implementation to hire expert services of consultants for Monitoring, Evaluation and Impact Evaluation. For this purpose, a joint venture of G3 Engineering Consultants Pvt. Ltd., Ease-Pak Engineering Services (Pvt.) Ltd., Center for Social Research and Development (CSRD) and ADA Incorporated, Canada has been selected through competitive bidding process as ME&IE Consultants. An Agreement was signed by the Joint Venture and the National Project Coordinator (NPC) on behalf of the Client dated 26th October 2020. The ME&IE Consultants team was mobilized on 20th November, 2020. This Draft Inception Report of ME&IE Consultants explains understanding to carry out and completion of the assignment within stipulated time frame.

Since the ME&IE Consultants are going to monitor implementation of all criteria set, procedures defined and timeline agreed for implementation of various components, all these are reproduced in this report as ready reference to devise / design M&E strategy, methodology, procedures for monitoring and impact assessments of the project interventions.

1.2 BRIEF DESCRIPTION OF THE PROJECT

1.2.1. Project Development Objectives

The Project Development Objectives (PDO) is to improve irrigation water management at tertiary and field levels in Pakistan.

1.2.2. Project Objectives - General

The Project aims to replicate the success achieved

during the NPIWC Phase-I and further improve the findings of the Project Impact Evaluation Study (PIES). The broad objectives of the project are as under:

- i) Social mobilization through capacity building of WUAs/ FOs
- ii) Minimization of conveyance and field application losses
- iii) Reduction in Water Logging and salinity
- iv) Equity in water distribution
- v) Reduction in water disputes/thefts/litigation
- vi) Motivation/participation of farmers
- vii) Poverty reduction through employment generation
- viii) Increase in crops yield/sufficiency in food

1.2.3. Project Objectives – Quantitative

The quantitative objectives of the Project are as under:

Project outputs

- i) Mobilization through capacity building of Water Users Associations /Farmers Organizations in improved water management techniques and their registration under On-Farm Water Management and Water User Associations Ordinance [Act] 1981 and organization of 47,278 WUAs.
- ii) Reconstruction/renovation and remodeling of 47,278 watercourses, involving complete earthen renovation, partial lining of critical reaches (50% of the total watercourse length as decided in the high-level meeting), and installation of water control structures. It is expected to save around 5.82 MAF per annum (approx. saving of 123 acre-feet (AF) per watercourse/annum).
- iii) Construction of 14,932 water storage tanks with 60% subsidy.
- iv) Provision of 11,610 Laser Land Levelers at 50% cost sharing, with the expectation to save about 50% irrigation water for wheat and about 68% of irrigation water for paddy.

Project impacts

- v) Reduction in Water Logging and salinity in project areas to the extent of 10%.
- vi) Cropping intensity is expected to increase by 5-20%
- vii) Crops yield is estimated to increase by 10-15%.
- viii) Equity in water distribution increased by about 30%.
- ix) Reduction in water disputes/thefts and litigation amongst the Farmers over water distribution by about 80%.

- x) Help poverty reduction through generation of employment.
- xi) Self-sufficiency in food through utilization of water saved for edible oil seed production.
- xiii) Motivating farmers through an awareness campaign for watercourse improvement.
- xiv) Providing technical material to farmers for optimal utilization of water resources in the shape of technical manual and operational guidelines.

Project indirect benefits to industry/economic activities

- xii) Cement industry, bricks Killen, Precast Structures Industry and other related industries' production will pick up.

Awareness support to farmers

1.3 PROJECT TARGETS

Project aims at achieving the targets (Table-1.1) for 5 years starting from year 2019-20 to 2023-24. The targets for each province/Unit (excluding Sindh) are given in Table-1.2(a) to Table-1.2(c).

Table-1.1: Project Targets (in numbers)

Sr. No.	Intervention	Punjab	KPK	Balochistan	GB	AJK	ICT	Total
1	Reconstruction of Watercourses (more than 20 years old/Additional lining)	7,500	3,000	3,589	-	-	-	14,089
	New Watercourses (Unimproved)	2,500	10,000	16,800	1,165	2,500	224	33,189
	Total Watercourses	10,000	13,000	20,389	2.500	1.165	224	47,278
2	Water Storage Tanks	3,000	5,000	5,507	825	600	-	14,932
3	Laser Land Leveling Units	9,500	600	1,500	5	5	-	11,610

Table-1.2(a): Province-wise year-wise watercourses targets

Sr. No.	Province / Unit	Watercourses (Numbers)					
		Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Punjab	1,000	1,100	2,700	2,800	2,400	10,000
2	Khyber Pakhtunkhwa	1,600	3,200	3,200	3,200	1,800	13,000
3	Balochistan	2,020	5,250	5,530	4,800	2,789	20,389
4	Gilgit Baltistan	496	496	500	504	502	2,500
5	AJK	190	227	244	278	226	1,165
6	ICT	24	45	47	57	51	224
Total		5,330	10,320	12,221	11,639	7,768	47,278

Table-1.2(b): Province-wise year-wise water storage tanks targets

Sr. No	Province / Unit	Water Storage Tanks (Numbers)					
		Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Punjab	400	400	800	700	700	3,000
2	Khyber Pakhtunkhwa	550	1,300	1,300	1,300	550	5,000
3	Balochistan	360	1,000	1,510	1,500	1,137	5,507
4	Gilgit Baltistan	163	164	165	165	168	825
5	AJK	120	120	120	120	120	600
6	ICT	-	-	-	-	-	-
Total		1,593	2,984	3,895	3,785	2,675	14,932

Table-1.2(c): Province-wise year-wise Laser Land Leveling Unit targets

Sr. No.	Province / Unit	Laser Land Leveling (Numbers)					
		Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Punjab	1,700	2,200	2,200	2,000	1,400	9,500
2	Khyber Pakhtunkhwa	-	200	200	200	-	600
3	Balochistan	200	350	400	400	150	1,500
4	Gilgit Baltistan	-	2	3	-	-	5
5	AJK	-	2	3	-	-	5
6	ICT	-	-	-	-	-	-
Total		1,900	2,754	2,806	2,600	1,550	11,610

1.4 PROJECT BENEFICIARIES

Majority of the direct project beneficiaries constitute the number of farmers (owners as well as tenants) growing crops and orchards on the watercourses improved under NPIWC-II. Assuming 35 farmers on each watercourse, the total number of the farmers benefiting from the activity comes to 1.655 million. The same number will benefit due to Water Users' Associations (WUAs) in terms of cooperative management of irrigation water. Moreover, 14,932 will directly benefit from Water Storage Tanks and 11,620 as recipients of Laser Land Leveling Units. Thus, total gross direct beneficiaries are expected to be around 3.336 million households. However, net beneficiaries are expected to be 1.668 million.

Taking family size at 5, total net population benefitting is expected to be 8.34 million people.

1.5 PROJECT COMPONENTS

The project comprises four components, detailed as under:

1.5.1. Component C1: Organization of Water Users' Associations

The Effective involvement and participation of the shareholders act as a catalyst for successful implementation of any development undertaking. The key to success of OFWM program in Pakistan is farmers' participation in execution of envisaged interventions through a community driven implementation approach.

The proposed works will also be carried out through the WUAs to be registered under "On Farm Water Management & Water Users Associations Ordinance [Act]-1981 (Amended 2001)" with following key responsibilities.

- i) Provide right of way for constructing watercourse.
- ii) Arrange skilled and unskilled labour required for reconstruction / maintenance of earthen water channel, installation of water control structures, and lining of critical reaches.
- iii) Procure construction materials for carrying out civil works.
- iv) Settle matters of disputes amongst the water users in respect of channel alignment, fixation of Nakkas, distribution of work, etc.
- v) Make alternate arrangements for conveyance of water during execution of improvement works.
- vi) Carry out civil works in accordance with standards and specifications under the supervision of OFWM field staff.
- vii) Regularly undertake O&M of improved watercourses after its construction.

1.5.2. Component C2: Watercourse Improvements

Total 47,278 watercourses are planned to be improved under NPIWC-II. The share of various provinces / areas is Punjab 10,000, KPK 13,000, Balochistan 20,389, Gilgit Baltistan 2,500, AJK 1,165 and ICT 224. The project will consider three categories of the watercourses to be taken for improvement:

- i) New watercourses that are not yet improved under earlier programs / projects;
- ii) Reconstruction of more than 20 years old watercourses that outlived their economic / useful life;
- iii) Additional lining up to 50% of already improved watercourses.

1.5.3. Component C3: Construction of Water Storage Tanks

An on-farm water storage tank is a structural best management practice that enables to capture and store canal water, surface water runoff during the rainy season, tailwater from furrow irrigation etc., so that it may be used subsequently at required time of irrigation. These systems may be constructed with a water storage tank and an enlarged tailwater Recovery Ditch (TWRD).

The purpose of providing water storage tanks includes the followings:

- i) Store water during the rainy season and times of no use in the commands of perennial / non-perennial canals for subsequent irrigations at the critical crop growth stages.
- ii) Provide flexibility for storage of plentiful canal and rainfall runoff water for its more expedient use subsequently.
- iii) Collect, store and filter water from:
 - *Small Dams, Springs, Streams, Nallas etc.*
 - *Rainfall runoff over agricultural catchment during rainy season*
 - *Tube Wells and dug-wells of low flows*
 - *Tail-waters from agricultural fields*
- iv) Regulate the flows so that it can be used efficiently when needed in large flow rates.

It is planned that 14,932 On Farm Water Storage Tanks will be constructed during Project period to supply supplemental irrigation.

1.5.4. Component C4: Provision of Laser Land Leveling Units

Enhancement of water productivity at farm level is the most appropriate solution to redress water scarcity. Laser land leveling is the best option for improving water productivity through minimizing water application losses. Precision land leveling has been promoted in the country since inception of OFWM program. Use of Laser technology for the purpose is the latest development, which was introduced in the country during 1985. On average Laser Land Leveler has the capacity of doing precision land leveling of about 300 acres per annum.

Laser Land leveling technology is highly popular amongst farming communities in the country especially in the Punjab because of its quick returns. Keeping in view huge demand for the technology and massive economic returns, it has been planned to provide 11,610 Laser Land Leveling Units to the farmers/service providers under NPIWC-II. The component will strengthen LASER land leveling services in the country through provision of Laser Land Leveling Units to farmers/service providers on 50% subsidized rates (one-time financial assistance of Rs. 250,000/-, while the beneficiary farmer would contribute the entire remaining cost of the equipment).

1.6 PROJECT COVERAGE AND LOCATION

1.6.1. Project Coverage

The work will be undertaken in the Province of Punjab, Khyber Pakhtunkhwa (KPK), Balochistan, Gilgit Baltistan excluding Sindh. It also covers Gilgit Baltistan (GB), Azad Jammu & Kashmir (AJK) and Islamabad Capital Territory (ICT). The location maps with total targets are shown in Figure-1.1 & 1.2.

1.6.2. Project Location

Pakistan Total Targets:

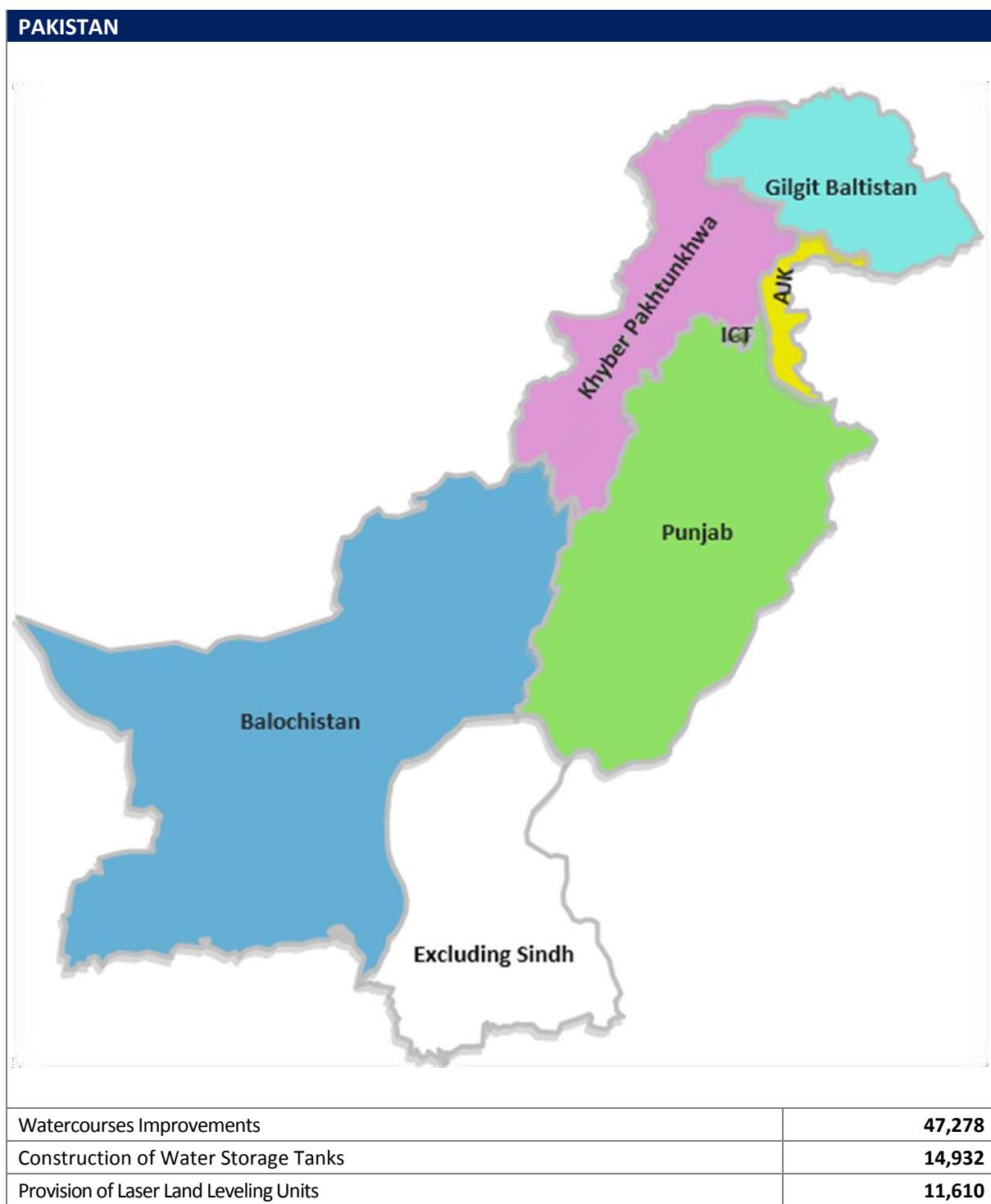


Figure-1.1: Location Map & Pakistan Targets

Zonal Targets:

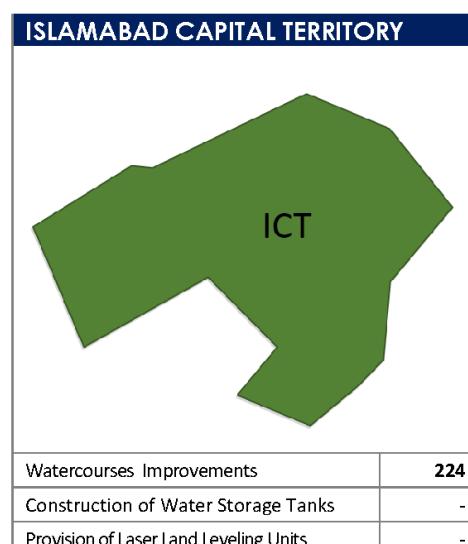
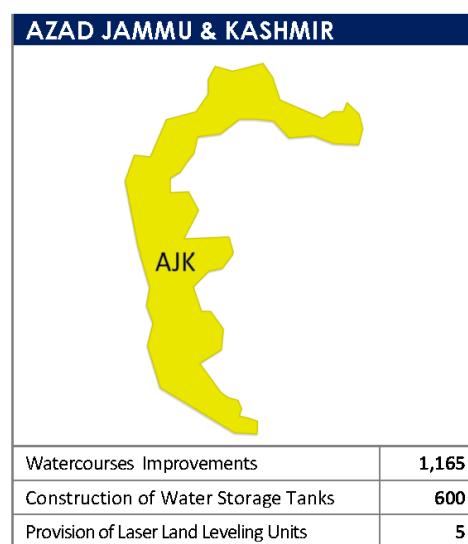
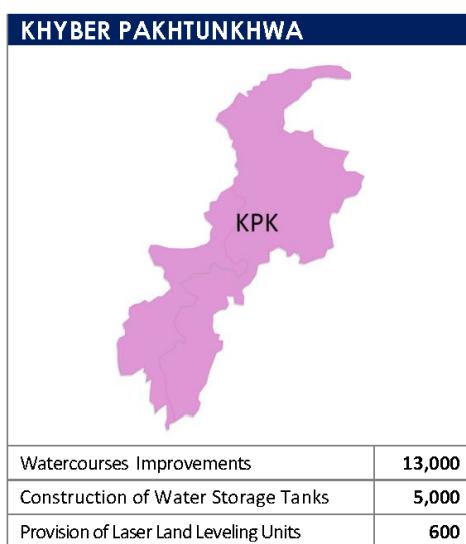
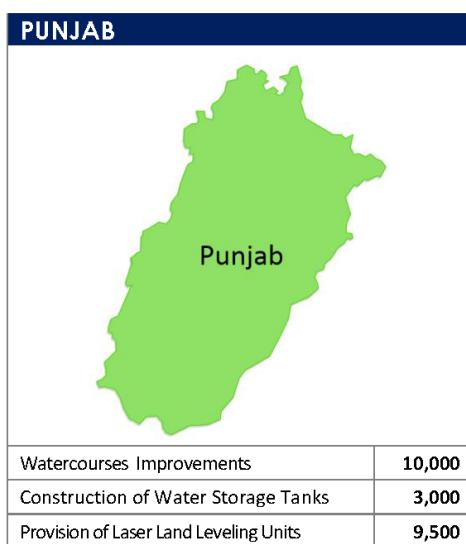


Figure-1.2: Location Maps & Zonal Targets

2. SCOPE AND SERVICES OF ME&IE CONSULTANTS

2.1 INTRODUCTION

The ME&IE Consultants services are planned to be provided through a multi-disciplinary team of qualified professionals. All firms in the joint venture have rich experience in the field of monitoring and evaluations. The team deputed for this task in the project comprises highly qualified professionals having long practical experience of such project earlier launched in Pakistan. The consultant will develop a State of the Art Management Information System (MIS) with GIS focuses for NPIWC-II to monitor progress on project interventions and to carry out affective monitoring process. The MIS will help decision makers to make informed the decisions.

2.2 OBJECTIVES

The objective of ME&IE Consultancy services is to carry out monitoring and evaluation of project impacts to ensure achievement of project development objectives.

2.3 SCOPE OF THE SERVICES

The ME&IE Consultants will be responsible for monitoring, evaluation and impact evaluation, and in this context will carry out the following activities:

- i) Undertake baseline, midline and endline surveys for 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, evaluation and validation reports of the project activities
- iv) Assessing the water saving per annum on watercourses, water storage tanks and field levels as well as aggregate due to the project interventions
- v) Assessing the improvement in water availability due to the provision of conveyance system
- vi) Assessing the economic benefits to the agriculture in terms of changes in yields, irrigated area, cropping pattern, cropping intensity, farm income and employment in command area of watercourses and water storage tanks
- vii) Assessing the extent of community mobilization, financial and administrative sustainability of water users' associations and ensuring the

maintenance of watercourses, water storage tanks and laser land Leveling.

- viii) Economic impact of project interventions.
- ix) Carry out the impact evaluation of the project intervention on the economy and stakeholders.
- x) Develop a website containing information on facilities and services, applications, procedures, watercourses, water storage tanks and laser Leveling database, etc. (while the project staff will maintain the website)
- xi) Provide technical support for the development of a custom-designed mobile application (Android) to capture on-site project progress and geo-tagged photos. It should be synchronized with the central MIS/GIS database and application for instant reporting and feedback to the management. The said requirement is based on the following functional features:

- *Development of a GIS database with all spatial layers related to activities being undertaken under the project*
- *Give technical assistance for up-dation/up-gradation of water management GIS database.*
- *Development of web-based GIS application as a dashboard interface for comprehensive representation of all spatial and tabular information: custom designed web GIS application be developed for large LED screens, should be self-operative and represent project data on multiple layouts of application interface.*
- *Development of a MIS application as an integral part of web GIS to maintain information on facilities and services, applications, procedures, watercourses database, etc.*
- *Development of a custom designed mobile application (Android) to capture on-site project progress, geo-tagged photos; should be synchronized with the central MIS/GIS database and application for instant reporting and feedback to the management.*
- *Application should generate custom designed reports and analysis as per user-defined requirements.*
- *Application should generate alerts (SMS, email, web-notifications) to the user on the non-conformance of project's key indicators; the application should have the provision to custom define alerts levels and desired notifications.*

2.4 MONITORING STRATEGY

The monitoring strategy planned to be followed by ME&IE Consultants is briefly described in the following Table-2.1. However, detailed methodology and procedures to carry out the Monitoring,

Evaluations and Impact Evaluations of the project interventions are explained in Chapter 6. The strategy aims to be finalized and implemented in close coordination with the client and active participation of the beneficiaries as well as the project stakeholders.

Table-2.1: Monitoring Strategy for ME&IE Activities

Sr. No.	Monitoring Activity	ME&IE Team Responsible	Monitoring Strategy
1	Baseline, midline and endline surveys	Team Leader, Socio-Economic Expert, Agricultural Economist and Deputy Team Leader of respective province/unit.	<ul style="list-style-type: none"> Baseline and impact surveys will be done on sample basis. Data will be collected by field teams on pre-designed data collection tools through an android application on TABs. Baseline and impact surveys will be done in phases as target watercourses are not preselected. Baseline will be done before the intervention and the impact one year (two crop seasons) after the completion of the intervention. The midterm study will review the project progress at middle of the project implementation The endline study will assess the impact of the project interventions.
2	Reporting	All core team members	<p>Following periodic reports will be prepared and submitted:</p> <ul style="list-style-type: none"> Draft Inception Report 45 days after the agreement. Final Inception Report one week after the issuance of comments by the client on the draft Monthly Monitoring Report on 10th of following month. Quarterly Monitoring Report on 10th of the first month of the following quarter Annual Monitoring and Evaluation Report during first month of the following year Baseline Survey Reports (in phases) – two months after the data collection completion for the baseline phase. Impact Survey Reports (in phases) – two months after the data collection completion for the impact phase. Midline report in the middle of the assignment Endline Report at the end of endline survey Draft Assignment completion Report at completion of the physical works. Final Assignment Completion Report at completion of works and financial transactions Special Reports, as and when asked by the client.
3	Water saving assessment	Irrigation Agronomist, Field Team/ Engineers	<p>Water Saving on Watercourses:</p> <ul style="list-style-type: none"> Water flow will be measured on sample watercourses selected for the baseline and impact surveys The flow will be measured at four points of the selected watercourses: close to water outlet, head reach, middle reach and tail reach. The measurements will be done through current meters. Based on water savings on sample watercourses, total water savings will be estimated for all project watercourses. The savings will be reported per watercourse, per annum and aggregate for the project in LPS and Acre feet.

Sr. No.	Monitoring Activity	ME&IE Team Responsible	Monitoring Strategy
			<p>Water Savings on WSTs</p> <ul style="list-style-type: none"> Since WSTs will be filled and emptied on a continuous basis, the water savings will be assessed on the basis of water pumped from the tank to irrigate the fields. The assessment will be done either by readings on the pump gauge or periodic interviewing the farmer. Based on water savings on sample WSTs, total water savings will be estimated for all project WSTs. The savings will be reported per WST, per annum and aggregate for the project in LPS and in Acre feet. <p>Water savings due to Laser Land Leveling</p> <ul style="list-style-type: none"> Water savings at field level will be assessed through farmers' interviews The impact survey form will include questions to be asked from the farmers who got their land levelled: <ul style="list-style-type: none"> In how much time an acre was irrigated before watercourse improvement and land leveling In how much time an acre is irrigated after watercourse improvement with land leveling <p>The difference will be water saving due to laser land leveling</p>
			<p>Based on water savings on sample LLL units, total water savings will be estimated for all project LLL units. The savings will be reported per LLL unit, per annum and aggregate for the project in LPS and in Acre feet.</p>
4	Community mobilization	Social and Gender Specialist and Socio-Economic Expert	<p>The extent of community mobilization will be assessed by investigating whether:</p> <ul style="list-style-type: none"> WUAs is functional Holds regular meetings and keep record of them Makes decisions democratically The participation in the organization is voluntary It is financially and administratively sustainable Takes steps and ensures maintenance of watercourses, WSTs and laser land leveler
5	Economic benefits assessment for agriculture	Team Leader, Socio- Economist and Agricultural Agronomist	<ul style="list-style-type: none"> As indicated at serial No. 1, Agriculture data will be collected before (baseline) and after (impact) the watercourse improvement and WSTs construction. In both the surveys same forms will be used and same sample farmers will be interviewed Data on variables such as crop yields, irrigated area, cropping pattern, cropping intensity, farm income and employment will be collected and analyzed The difference between before and after situations minus natural growth will be assumed as economic benefits to the agriculture
6	Impact evaluation-on the economy	Team Leader, Agricultural Economist and Socio-Economic Expert	<ul style="list-style-type: none"> The results of the baseline and impact surveys will be used to quantify impact on the economy Additional food produced due to the project will be estimated. It is benefit towards food security Project costs and benefits will be compared in economic and financial terms to carry out economic and financial analysis. Parameters like IRR, NPV and BCR will be estimated.

Sr. No.	Monitoring Activity	ME&IE Team Responsible	Monitoring Strategy
7	Impact evaluation-on the stakeholders	Team Leader, Agricultural Economist and Socio-Economic Expert	<ul style="list-style-type: none"> Analysis as in serial 6 will be carried out with reference to various stakeholders, like community, government, farmers, etc.
8	Spot checking	Team Leader, Deputy Team Leaders, Field teams/Engineers.	During the field visits for WUAs baselines impacts of Watercourses, WSTs and laser units, the interventions will be spot checked for quality of construction, material, functioning and beneficiaries' satisfaction etc.
9	Process monitoring	Field teams of client, project consultant, ME&IE Consultants ICT/Technology Specialist	<ul style="list-style-type: none"> The process data for all the interventions will be fed to the MIS/GIS database. Client's field staff and field teams of consultants will furnish data of their activities. The ME&IE will assist in developing mobile application for this purpose From this data reports will be generated for process monitoring All interventions will be fully (100%) covered.
10	Project website and MIS/GIS dashboard development	Team Leader and ICT / Technology Specialist (all other core team staff will also coordinate in completing data for the MIS/GIS	<ul style="list-style-type: none"> The State-of-the-art MIS / Progress Monitoring Model will be developed for NPIWC-II. Customized forms will be developed to collect data from the implementing teams on-site for progress monitoring These forms will be made available to the teams on smart phones through an android application The teams will be adequately trained to use the application Data on physical and financial stages with dates will be fed to the system for process monitoring GIS coordinates for watercourses, WSTs, laser units (if available) and WUAs offices will be uploaded to the system and could be viewed / reached by the management online The system will be maintained on GOOGLE server so that it is accessible by the management from anywhere in Pakistan and abroad Custom reports will be possible as the user demands / desires The results could be displayed on small as well as large screens.
11	Development of Android based application	ICT / Technology Specialist	All the data collection forms / tools will be executed through customized developed Android based applications accessible with smart phones / TABs.

2.5 FRAMEWORK AND RESULTS-BASED MONITORING (RBM) INDICATORS

The framework and Results-Based Monitoring (RBM) Indicators are identified in Table-2.2 below. The indicators will be further enhanced and refined in consultation with the client as well as stakeholders. They will also get improved as the project implementation progresses as in the light of real and on the ground situations.

The draft log-frame of the project inputs, outputs, outcomes and impacts with ME&IE methodologies is placed at **Annex-A**.

Table-2.2: Results-Based Framework and Monitoring Strategy

Sr. No.	PDO Level Results Indicators	Unit	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				Year-1 (2019-20)	Year-2 (2020-21)	Year-3 (2021-22)	Year-4 (2022-23)	Year-5 (2023-24)			
1	Watercourses with an increase in water course conveyance efficiency of at least 15%.	Number	0	5,330	15,650	27,871	39,510	47,278	Annually	ME&IE Report(s)	ME&IE Consultants
2	Direct project beneficiaries of watercourse improvements- households (number) ^(a)	Number	0	186,550	547,750	975,485	1,382,850	1,654,730	Annually	ME&IE Report(s)	ME&IE Consultants
3	Construction of Water Storage Tanks	Number	0	1,593	4,577	8,472	12,257	14,932	Annually	ME&IE Report(s)	ME&IE Consultants
4	Provision of Laser Land Leveling	Number	0	1.900	4,654	7,460	10,060	11,610	Annually	ME&IE Report(s)	ME&IE Consultants
5	Increase in cropping intensity in Canal command areas (watercourses).	Percentage	168%	0	0	5	5	5	Annually	ME&IE Report(s)	ME&IE Consultants
6	Increase in Cropping Intensity in non-canal command areas	Percentage	110%	0	0	24	24	24	Annually	ME&IE Report(s)	ME&IE Consultants
7	Increase in Agriculture output per unit of water (watercourses)	Rs/M ³	8	0	0	3	3	3	Annually	ME&IE Report(s)	ME&IE Consultants
8	Reduction in water losses in project area due to watercourse lining	Percentage	45%	0	0	33	33	33	Annually	ME&IE Report(s)	ME&IE Consultants
9	Reduction in field application losses due to laser land leveling	Percentage	30%	0	0	33	33	33	Annually	ME&IE Report(s)	ME&IE Consultants
10	Increase in agriculture output per unit of water (laser leveling)	Rs/M ³	8	0	0	25	25	25	Annually	ME&IE Report(s)	ME&IE Consultants
11	Area benefited due to improvement of watercourses ^(b)	Acres	0	1,279,200	3,756,000	6,689,040	9,482,400	11,346,720	Annually	ME&IE Report(s)	ME&IE Consultants
12	Area levelled by laser Land Leveling units	Acres	0	570,000	1,396,200	2,238,000	3,018,000	3,483,000	Annually	ME&IE Report(s)	ME&IE Consultants
13	Area served by Water Storage Tanks ^(c)	Acres	0	13,142	37,760	69,894	82,995	95,782	Annually	ME&IE Report(s)	ME&IE Consultants

(a) Assuming 35 beneficiaries per watercourse, (b) Assuming 240 acres benefitted per watercourse, (c) Assuming average area served by each WST at 8.25 acres

3. MOBILIZATION OF ME&IE CONSULTANTS' TEAMS

3.1 MOBILIZATION OF ME&IE CONSULTANTS' CORE TEAM

The ME&IE Consultants mobilized its specialists (core) team on November 7, 2020. The list of key specialists is shown in Table-3.1(a) & Table-3.1(b). It is also depicted in Figure-3.1 organogram. The non-specialist but supporting staff recruitment is in progress and soon they will be mobilized as well. Following specialist team members (Table-3.1) with planned time inputs have been mobilized.

Table-3.1(a): Core Team and Planned Time Input (Key Staff)

Sr. No.	Name	Position	Time Input (months)
1	Dr. Muhammad Abdul Quddus	Team Leader / M&E Specialist	48
2	Dr. Muhammad Sarwar Zahid	Deputy Team Leader / M&E Expert	48
3	Dr. Sultan Ali Adil	Socio-Economic Expert	12
4	Mr. Rizwan Saleem	ICT / Technology Specialist	12
5	Dr. Fateh Muhammad Chaudhry	Irrigation Agronomist	11
6	Dr. Muhammad Jameel Khan	Agricultural Economist	30
7	Ms. Muniza Bashir Tarar	Social & Gender Specialist	14
8	Mr. Waseem Ahmad Masood	Financial Management Specialist	42

Table-3.1(b): Core Team and Planned Time Input (Non-Key Staff)

Sr. No.	Name	Position	Time Input (months)
1	Recruitment in progress	Chief Project & Document Controller	42
2	Recruitment in progress	ICT Manager	24
3	Recruitment in progress	Data Analyst	48
4	Recruitment in progress	Data Supervisor	48
5	Recruitment in progress	BOM	6
6	Recruitment in progress	Other Support. Tech & Non-Tech staff (Various)	30

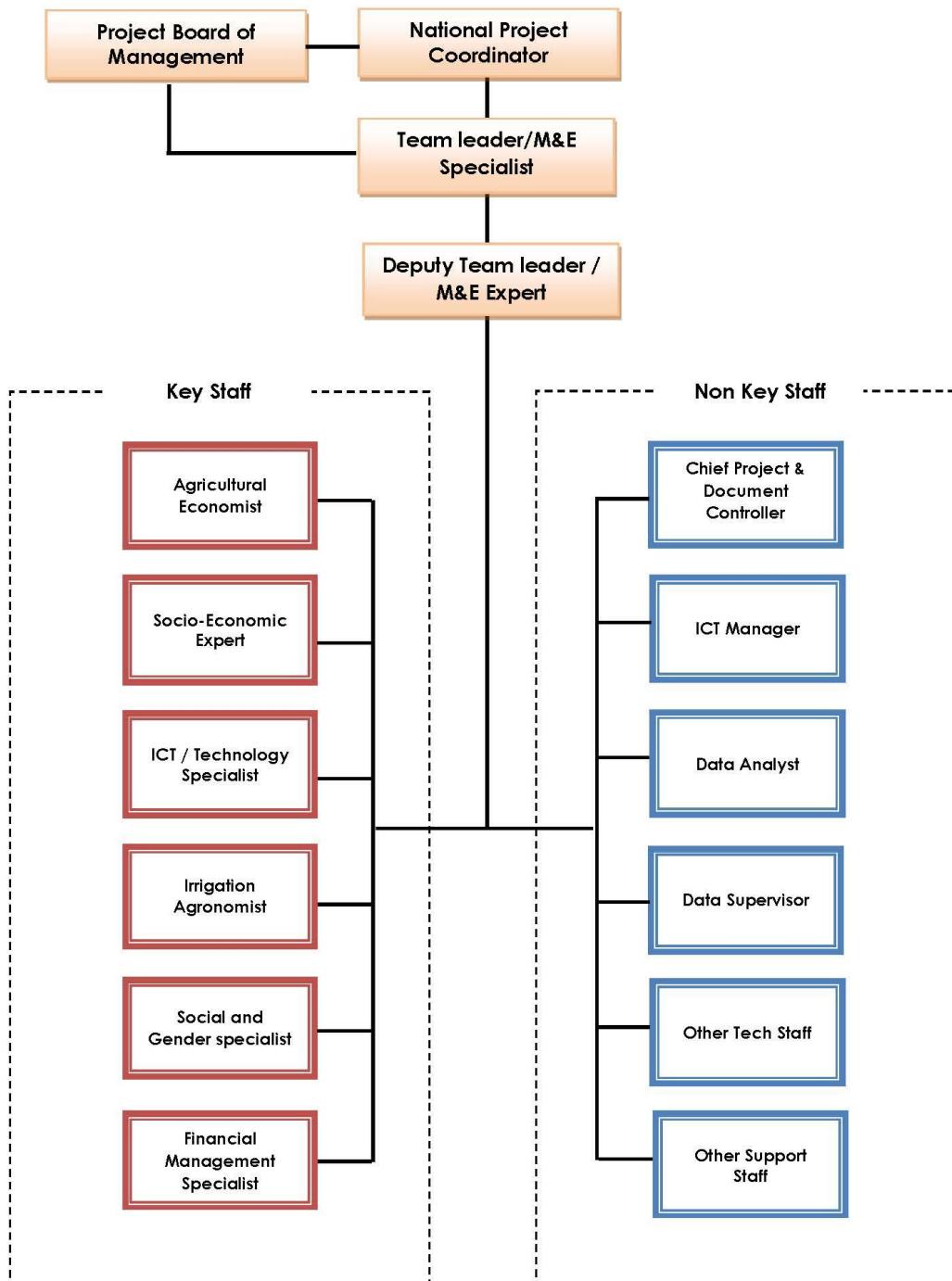


Figure-3.1: The organogram of the core team

3.2 MOBILIZATION OF ZONAL TEAMS

The ME&IE Consultants mobilized its Zonal Teams on November 20, 2020. Following Zonal Team members with planned support staff have been mobilized (Table-3.2). The selection process of the field teams is in progress.

Table-3.2(a): Zonal Team and Planned Time Input (Key Staff)

Sr. No.	Name	Position	Time Input (months)
1	Mr. Muhammad Yousaf Bhatti	Deputy Team Leader / M&E Specialist (Punjab)	48
2	Dr. Ali Muhammad Khushk	Deputy Team Leader / M&E Specialist (KPK)	48
3	Mr. Rizwan Ahmad	Deputy Team Leader / M&E Specialist (Balochistan)	48
4	Recruiting Process in progress	3 ICT / Technology Specialists	144
5	Recruiting Process in progress	3 Irrigation Agronomists	33
6	Recruiting Process in progress	3 Agricultural Economists	36
7	Recruiting Process in progress	3 Social & Gender Specialists	36
8	Recruiting Process in progress	Other Supporting Tech & Non-Tech staff (Various positions for 4 years)	190

Table-3.2(b): Zonal Team and Planned Time Input (Non-Key Staff)

Sr. No.	Name	Position	Number	Time Input (months)
1	Recruitment in progress	Field Team In-Charge, M&E Expert, Socio-Economic Expert	10	480
2	Recruitment in progress	Field Engineers, Supervisors, Data Collectors, Field Monitors, Technicians, M&E Officers, Socio-Economic Officers	20	840

3.3 ORGANIZATION OF FIELD TEAMS AND THEIR PLACEMENTS

ME&IE Consultants will comprise of 10 field teams. They will be allocated 3 teams each in Punjab, KPK and GB and Balochistan. The tenth team will work at the National Office, Islamabad.

Each field team will be comprised of one Socio Economic Expert/ME&IE Expert and two ME&IE Officers. The ME&IE Officers will include Engineers/graduates with sufficient relevant experience of data collection in the field.

4. JOB DESCRIPTION OF CORE TEAM MEMBERS

The core team professionals as proposed in our technical proposal are available to the JV and have already been mobilized.

4.1 TEAM LEADER / M&E SPECIALIST

The Team Leader/ M&E Specialist is responsible for providing guidance and direction to all the team members for providing assistance about the ME&IE assignment in accordance to scope of work and ensuring the compliance and supervise the consultant core/field teams and coordination of consultant's activities with relevant Government departments / agencies.

4.1.1. Responsibilities of the Team Leader / M&E Specialist

- i) Lead the ME&IE consultant's team for accomplishment of requisite assignment.
- ii) Liaison with NPC FPMU-FWMC, Project Consultants, Field Teams and District Teams.
- iii) Carry out monitoring and evaluation of improved water management practices and techniques for their performance assessment as well as propose measures.
- iv) Attend all meetings as required and keep a record of such meetings.
- v) Ensure the submission of periodic reports and project completion reports.
- vi) Coordinate with Project Consultants for getting/providing the information as and when required.
- vii) Any other relevant duties assigned by the project management.

4.2 DEPUTY TEAM LEADER(S) / M&E EXPERT(S)

The Zonal Team Leader/M&E Specialist will be responsible for providing guidance and direction to all the provincial as well as field team members for providing assistance about the ME&IE assignment in accordance to scope of work and ensure the compliance and supervise the consultant provincial/field teams and coordination of consultant's activities with relevant Government departments/agencies.

4.2.1. Responsibilities of the Deputy Team Leader / M&E Specialist

- i) Lead the ME&IE consultant's team for accomplishment of requisite assignment.
- ii) Liaison with Client, Consultants, project, Field Teams and District Teams.
- iii) Carry out monitoring and evaluation of improved water management practices and techniques for their performance assessment as well as propose measures.
- iv) Attend all meetings as required and keep a record of such meetings.
- v) Ensure the submission of periodic reports and project completion reports.
- vi) Any other relevant duties assigned by the project management.

4.3 SOCIO-ECONOMIC EXPERT

The Socio-Economic Expert is responsible for:

4.3.1. Responsibilities of the Socio-Economic Expert

- i) Devising 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.
- ii) Managing baseline, midline and endline surveys of the project activities / interventions in all the project areas.
- iii) Developing monitoring strategy, framework and Result Based Monitoring (RBM) indicators.
- iv) Supporting in preparation of Monthly, Quarterly and Annual Monitoring, Evaluation,
- v) Validating Reports of the project activities.
- vi) Assisting in carrying out monitoring and evaluation of improved water management practices and techniques for their performance assessment as well as propose measures.

4.4 ICT / TECHNOLOGY SPECIALIST

The ICT specialist will be responsible for designing and leading the development team of a computer based state of the art project monitoring and information system (MIS) to monitor key performance, produce useful reports and track achievements according to plan and develop an integrated user friendly web and mobile integrated software to manage project activities in accordance with the modern concept of project

management and track key project indicators, install this on the secure web server as per specifications.

4.5 IRRIGATION AGRONOMIST

The Irrigation Agronomist will be responsible to analysis 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 also assist in preparation of M&E reports.

4.6 AGRICULTURAL ECONOMIST

The Agricultural Economist will be responsible for:

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

4.7 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 haries.

The Social and Gender Specialist will monitor the 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.

4.8 FINANCIAL MANAGEMENT SPECIALIST (FMS)

The FMS will be responsible for monitoring of project progress, analyses and its reporting, highlighting weaknesses that require management attention as well as assisting in the identification of potential successes and constraints to facilitate timely decisions. FMS will also give assistance for development of project progress Dashboard on need bases.

5. ESTABLISHMENT OF ME&IE CONSULTANTS OFFICES

5.1 PROJECT NATIONAL OFFICE AT ISLAMABAD

The ME&IE Consultants national office has been established at Islamabad.

Address: House No. 6-A, F-6/4, Embassy Road, Islamabad.

5.2 ZONAL OFFICE - PUNJAB

The ME&IE Consultants Zonal Office for Punjab province has been established at Lahore.

Address: First Floor, Orchard Heights, Areena Commercial, Bahria Orchard, Raiwind Road, Lahore.

5.3 ZONAL OFFICE – KHYBER PAKHTUNKHWA & GILGIT BALTISTAN

The ME&IE Consultants Zonal Office for KPK province has been established at Peshawar.

Address: Acquisition is under progress.

5.4 ZONAL OFFICE – BALOCHISTAN

The ME&IE Consultants Zonal Office for Balochistan province has been established at Quetta.

Address: Acquisition is under progress.

5.5 FIELD TEAMS OFFICES - PUNJAB

There will be three field teams working in Punjab for data collection and field monitoring activities. Two teams will sit at Lahore, The third field team will be stationed at Field Office Multan to cover southern Punjab. The second team stationed at Lahore will camped at Sargodha during field operations. Team's deployment will remain largely flexible. District wise allocation of field teams are shown in **Table-5.1**.

Table-5.1: District wise allocation of Field Teams in Punjab

Team-1	Team-2	Team-3
Chiniot	Bhakar	Bahawalnagar
Faisalabad	Gujranwala	Bahawalpur
Jhang	Gujrat	Dera Ghazi Khan
Kasur	Hafizabad	Khanewal
Lahore	Khushab	Layyah
Nankana Sahib	Mandi Bahauddin	Lodhran
Okara	Mianwali	Multan
Pakpattan	Narowal	Muzaffargarh
Sahiwal	Sargodha	Rahim Yar Khan
Sheikhupura	Sialkot	Rajanpur
Toba Tek Singh		Vehari

5.6 FIELD TEAMS OFFICES - KHYBER PAKHTUNKHWA & GILGIT BALTISTAN

There will be three field teams working in Khyber Pakhtunkhwa & Gilgit Baltistan for data collection and field monitoring activities. Two teams will sit at Peshawar Zonal Office and Third at Mansehra Field Office to cover Mansehra District and entire area of Gilgit Baltistan. The second team stationed at Peshawar will camped at Dera Ismail Khan during field operations. Team's deployment will remain largely flexible. District wise allocation of field teams are shown in **Table-5.2**.

Table-5.2: District wise allocation of Field Teams in Khyber Pakhtunkhwa & Gilgit Baltistan

Team-1 (KPK)	Team-2 (KPK)	Team-3 (KPK&GB)
Bajaur	Bannu	Abbottabad
Battagram	Dera Ismail Khan	Haripur
Buner	Hangu	Mansehra
Charsadda	Karak	Astore
Chitral	Kohat	Darel
Khyber	Kurram	Diamer
Lower Dir	Lakki Marwat	Ghanche
Lower Kohistan	North Waziristan	Ghizer
Malakand	Orakzai	Gupis-Yasin
Mardan	South Waziristan	Hunza
Mohmand	Tank	Kharmang
Nowshera		Mansehra
Peshawar		Nagar
Shangla		Roundu
Swabi		Shigar
Swat		Skardu
Torghar		Tangir
Upper Dir		
Upper Kohistan		

5.7 FIELD TEAMS OFFICES – BALOCHISTAN

There will be deployment of three field teams in Balochistan for data collection and field monitoring activities. Two teams will be stationed at Quetta in the Zonal Office for covering outreach of north areas of the province and Third field team will be stationed at Naseerabad Field Office. The second team stationed at Quetta will camped at Khuzdar during field operation. Team's deployment will remain largely flexible. District wise allocation of field teams are shown in **Table-5.3**. This is an indicative arrangement.

Table-5.3: District wise allocation of Field Teams in Balochistan

Team-1	Team-2	Team-3
Barkhan	Dera Bugti	Awaran
Duki	Harnai	Chagai
Killa Abdullah	Jaffarabad	Gwadar
Killa Saifullah	Jhal Magsi	Kalat
Loralai	Kachi	Kech
Mastung	Kohlu	Kharan
Musakhail	Lehiri	Khuzdar
Noshki	Naseerabad	Lasbella
Pishin	Sibi	Panjgor
Quetta	Sohbat Pur	Shaheed Sikandarabad
Sherani		Washuk
Zhob		
Ziarat		

5.8

**FIELD TEAMS OUTREACH OFFICE
ISLAMABAD CAPITAL TERRITORY (ICT) &
AZAD JAMMU & KASHMIR**

The tenth team will be located at National Office Islamabad. This team will cover all the areas of ICT & AJK. Moreover, districts of Rawalpindi, Attock, Chakwal and Jhelum will also be covered by this team. Team's deployment will remain largely flexible.

Zone wise placement of field teams and their operational areas are shown in Figure-5.1 to Figure-5.4.

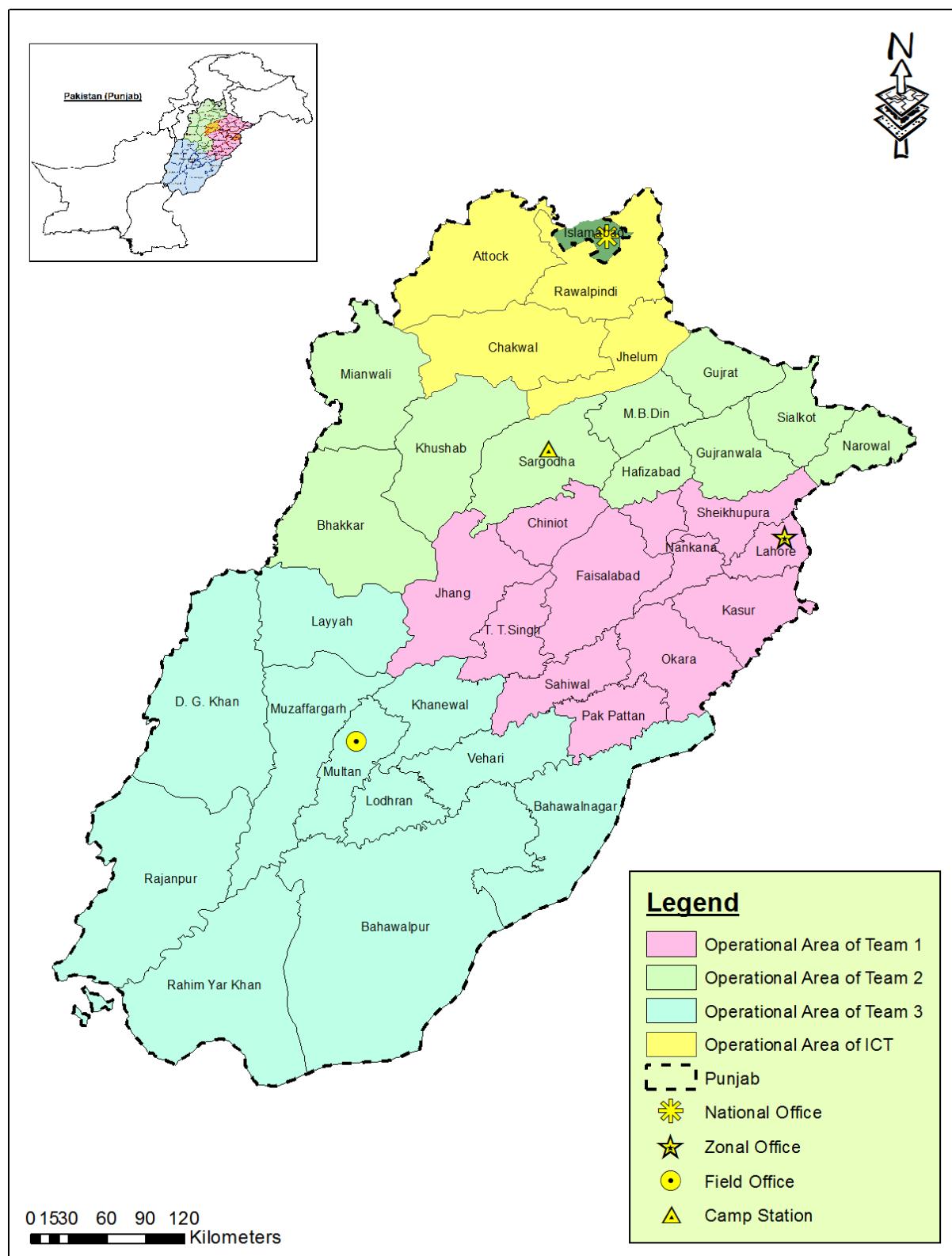


Figure-5.1: Field Teams placement and their operational areas in Punjab

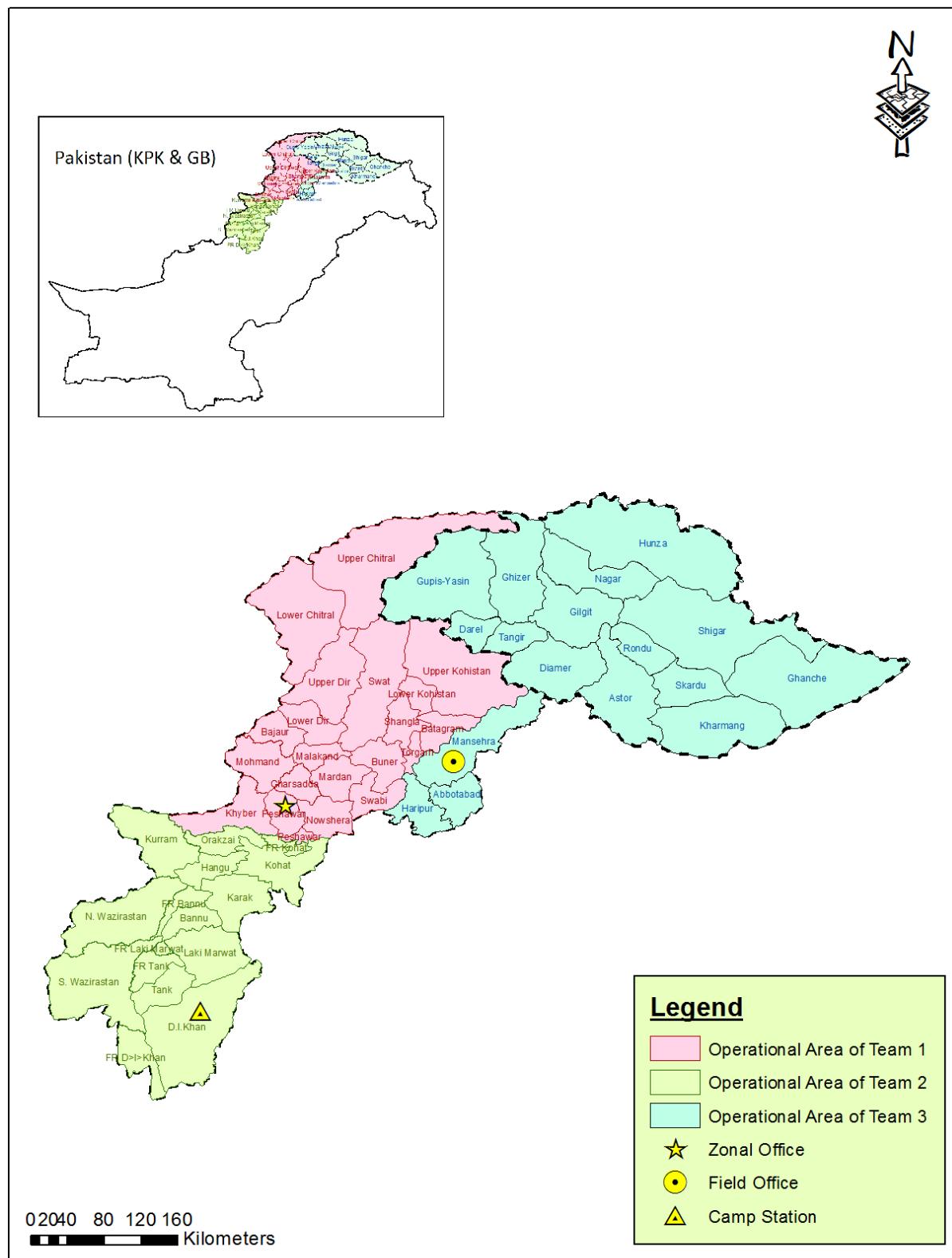


Figure-5.2: Field Teams placement and their operational areas in Khyber Pakhtunkhwa & Gilgit Baltistan

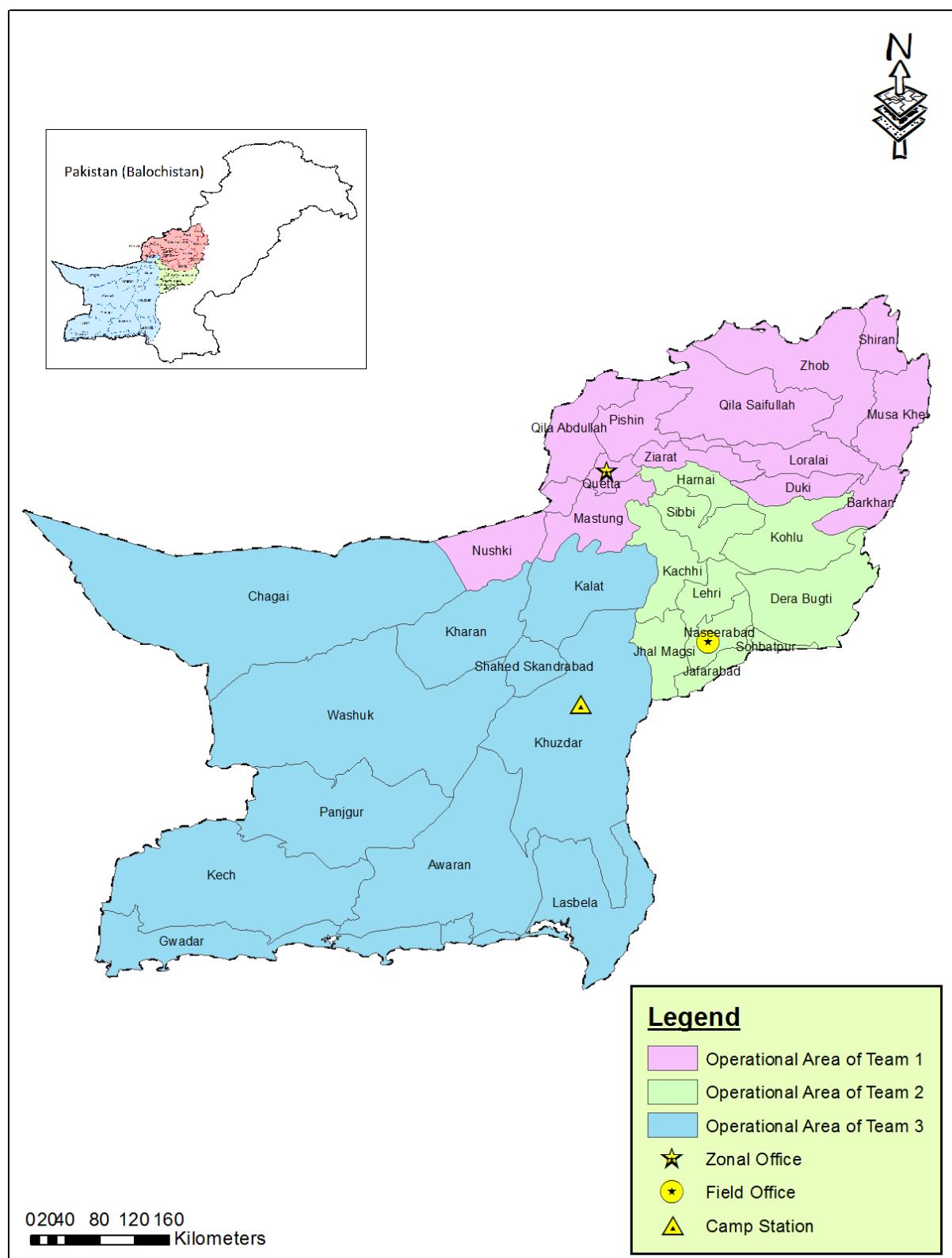


Figure-5.3: Field Teams placement and their operational areas in Balochistan

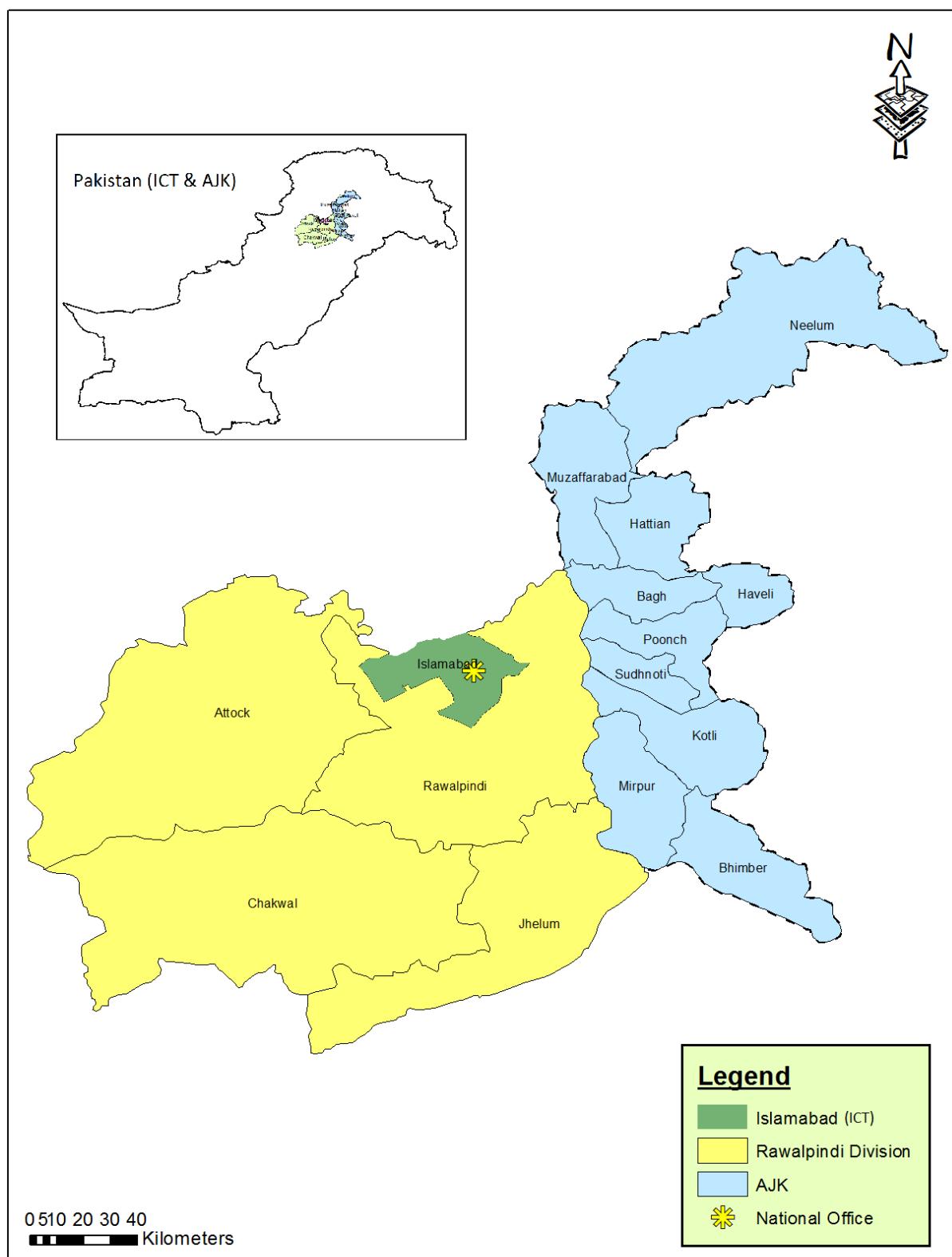


Figure-5.4: Field Teams placement and their operational areas in ICT, AJK and RWP Division

6. CONSULTANTS' APPROACH AND METHODOLOGY

6.1 BASICS OF ME&IE SYSTEM

The ME&IE at NPIWC-II 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. 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 NPIWC-II 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 measure that determine whether the objectives formulated in the log-frame have been achieved (draft log-frame developed NPIWC-II is placed at [Annex-A](#)).

The matrix below 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.

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 watercourses improved, number of WSTs provided, number of laser land leveling equipment delivered, etc.).
Activities	The tangible goods and services delivered by the project (e.g., provision of material inputs, staff, etc.)	Process indicators	Process indicators describe the activities undertaken (e.g., process of watercourse improvement, process of delivering WSTs, laser units).
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 WUAs)

6.2 GUIDING APPROACH FOR MIS/GIS DATABASE

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 NPIWC-II 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 work load 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.
- viii) The system's outputs are presented in formats that can be easily converted to other formats and data types without human intervention.

6.3 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.

6.4 MONITORING, EVALUATION AND IMPACT EVALUATION PLAN

6.4.1. 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.

6.4.2. 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.

6.4.3. 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.

6.4.4. Project Progress Reporting Framework (PPRF)

The Project Progress Reporting Framework (PPRF) placed at **Annex-O**, 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.

6.4.5. 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.

6.4.6. 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 Watercourses, Water Tanks or through Laser Land Leveling. 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.

6.4.7. 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 system helps, plan, execute, and close project management goals. During the planning process, project managers use MIS for budget framework such as estimating costs. The Management Information System is also used to create a specific schedule and define the scope baseline. At the execution of the project management goals, the project management

team collects information into one database. The MIS is used to compare the baseline with the actual accomplishment of each activity, manage materials, collect financial data, and keep a record for reporting purposes. During the close of the project, the Management Information System is used to review the goals to check if the tasks were accomplished. Then, it is used to create a final report of the project close. To conclude, the management information system (MIS) is used to plan schedules, budget, and execute work to be accomplished in project management.

At the methodological approach, participation of, and consultation with key stakeholders are the key elements that will guide the strategy and our proposed interventions. Our approach reflects our experience gained from previous similar assignments in several other projects.

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, ongoing 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 remains 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.

6.4.8. 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, OFWM Depts., FO/WUAs, District Governments, etc.

In order to track the indicators' values and measure the project performance, the ME&EI Consultancy will have to analyze the relevant M&E 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.

7. MONITORING PROJECT PROGRESS

7.1 INTRODUCTION

The ME&IE Consultants understand that the program NPIWC-II will be implemented by the FMFSR in Punjab, Balochistan, KPK, AJK, GB and ICT 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.

7.2 COMPONENT C1: ORGANIZATION OF WATER USERS' ASSOCIATIONS (WUAs)

7.2.1. Objectives and output indicators

Effective involvement and participation of the shareholders in execution of envisaged interventions is the key to success of the program.

a) Objectives

- i. *Registration of WUAs under WUAs Ordinance to take up key responsibilities of participation in the program such as*
 - *Arrange skilled and unskilled labour for construction/maintenance of earthen water channels, water control structures and lining of critical reaches.*

- *Procure construction materials for civil works construction.*
- *Facilitate construction by arranging alternate channel of conveying water during execution.*
- *Carry out works as per standards and specifications under supervision of OFWM field staff.*
- *Settle disputes among water users in respect of WC improvement.*

b) Output Indicators

- i. *Timely registration of WUAs before applying for water course improvement/ lining.*
- ii. *Completion of improvement/ lining of WC as per standards and time schedule.*
- iii. *Resolve settlement of disputes arising due to program implementation within the water users.*
- iv. *The improved watercourses are properly maintained.*
- v. *Laser units and water storage tanks are maintained as per standards*
- vi. *Regular meetings of the WUAs held and minutes recorded*
- vii. *An account is maintained in a bank for maintenance of the watercourse.*

7.2.2. Provincial, District and Year-Wise Targets

Since a Water Users' Association (WUAs) will be formed and registered on each watercourse selected for improvement, total target for WUAs is as the target of watercourses. The provincial and year-wise targets are presented in Section 1.3 above. They are assumed for WUAs as well. As regards district targets, they are expected to be set during project implementation keeping in view district situation and available human and other resources as well as level of cooperation of the farmers.

7.2.3. Process and Timeline

The process for organizing a Water Users' association includes: (a) mobilization of shareholders of the watercourse by OFWM staff to organize Water Users' Association; (b) registration of the same under OFWM and WUAs Ordinance (Act) 1981 as amended in 2001 /rules; (c) opening an account in a bank by the WUAs to be operated jointly by its Chairman and Treasurer; (d) Submitting an application for watercourse improvement to OFWM staff; and (e) executing an output-based agreement with Deputy Director Agriculture (OFWM).

7.2.4. Monitoring Project Progress

The project implementation had started few months before the mobilization of ME&IE consultant. All the progress made during this period will be covered getting 2-5% sample and visiting them once the ME&IE field teams are placed in the field and are fully functional.

7.2.5. Monitoring Methodology for WUAs

a) Monitoring Functioning of WUAs

The monitoring the WUAs will be done on sample basis. The watercourses sample taken for the Baseline and Impact (after completion) surveys will be used for this purpose as well. They will also be visited twice during the project. First, before the watercourse improvement but after the issuance of Technical Sanction (TS). This is the stage when community mobilization is completed, the WUAs is formed and registered and it has signed agreement to participate in the process of watercourse improvement. It has also committed to contributing its share for skilled and un-skilled labour.

At this stage a survey for the baseline will be planned and implemented. During this survey, WUAs office bearers and 3 of the members (randomly selected) will be interviewed using a data collection tool specially designed for this purpose. The tool will include questions related to output indicators as listed in section 7.2.1(b) above. The Monitoring Template 1 (MT1) designed for this purpose is placed at **Annex-B**.

The WUAs is supposed to be functional while the watercourse is being improved and after the improvement to maintain the watercourses on long term basis. Therefore, to ensure that the WUAs is functioning after the watercourse improvement, it will be revisited one year after the improvement and again same respondents will be interviewed of the WUAs.

The data during the visits will be collected through TABs using an android-based application. As a result, the data will be automatically uploaded to the MIS/GIS system. From where it will be downloaded and analyzed to assess the functioning and effectiveness of the WUAs.

b) Monitoring Process and Timeline

The steps outlined under (a) to (c) in section 7.2.3. above, are a standard process for WUAs formation, Once the WUAs is registered it is understood that it passed through these steps. The development work starts once the WUAs submits an application for the improvement of its watercourse. Therefore, application by the WUAs, issuance of TS, execution of the agreement and all other steps followed to complete the watercourse improvement are important. Dates of these steps will be recorded in the MIS/GIS system to monitor whether or not all steps/stages are being completed as per agreed timeline. In case of delays corrective steps will be suggested to the implementers. This data will be included in the Monitoring Templates (MT) for component C2 as discussed in section 7.3. below.

7.2.6. Beneficiaries' Feedback

The ME&IE consultants will also cover beneficiaries' feedback, and will be executed during the baseline and impact surveys to know Whether or not participation in the WUAs is voluntary, it's functioning / decision making is democratic, it is sustainable, shareholders' / beneficiaries' opinion about the quality of improvement work and how they assess the benefits they were supposed to enjoy after the improvement. The data will be collected through TABs using an android-based application. This application will be used on specially provided TABs to the field teams. However, it will also be running on smart phones commonly used by people.

7.3 COMPONENT C2: WATERCOURSE IMPROVEMENTS

7.3.1. Introduction

The watercourse improvement is the major activity of the project. Other three activities are mostly to enhance its impact. Since the project is being implemented in all the provinces along with GB, AJK and ICT, there might be site specific variations in the process and style of watercourse improvement. The methodology of ME&IE activities outlined in these pages is standard as per information contained in the ToR. However, if site-specific variations are found, the ME&IE methodologies will be adjusted in consultation with the client.



Figure-7.1: View of a re-constructed watercourse

7.3.2. Watercourse categories to be improved

Following three categories of watercourses will be taken for improvement under NPIWC-II:

- i) Improvement of new watercourses that had not been improved under earlier projects / programs.
- ii) Reconstruction of more than 20 years old watercourses that outlived their economic life.
- iii) Additional lining up to 50% of already improved watercourses.

7.3.3. Watercourse Lining Options

The standard lining executed under previous and ongoing OFWM projects has been a rectangular shaped channel constructed by using double brick masonry walls and a brick masonry floor plastered inside and on top of the walls. However, it is planned to continue adoption of feasible lining techniques including brick lining, precast concrete parabolic lining, stone masonry, concrete & HDPE pipes etc. for improvement of watercourses under NPIWC(Phase-II) as per demand/choice of the farmers/WUAs and technical feasibility of the site. It is indicated that supplier firms for supply of PCPS would be pre-qualified by the provincial governments, as per criteria approved in component PC-Is, for providing services under the proposed project.

The watercourse improvement / reconstruction consists of:

- i) Complete demolishing of the community channel

and its rebuilding/re-aligning according to the engineering design with clean compacted soil.

- ii) Parts of reconstructed channel are lined, and necessary water control structures are installed to improve conveyance of the canal and tube well water.
- iii) Precast "nakkas" are installed at all authorized places to reduce channel deterioration, curtail seepage loss, and improve water control as well as to minimize drudgery in irrigation operation.
- iv) Under normal conditions where the land is fairly leveled and belongs to one or two farmers only, the standard practice of providing one nakka (timeout and check) for every 25 acres is quite satisfactory.
- v) Extra provision of nakkas would, however, be made where the land has been subjected to fragmentation because of uneven topography, repeated division of ownership, social problems etc.
- vi) Culverts would be constructed at major crossings as well as a limited number of check/drop structures
- vii) Animal wallows/buffalo baths, and laundry sites would be developed as required.



Figure-7.2: View of a constructed lined watercourse

All of the above conditions and options have their benefits and cost implications. The design options should be considered which optimize benefits and costs.

7.3.4. Cost sharing arrangements

Depending upon the options adopted and conditions met in the design, as discussed in previous section, construction cost of the watercourse and share of farmers may vary. Under brick lining the cost sharing

on the average is 60:40, i.e., 60% project and 40% farmers. Whereas, under other lining methods, like PCPL, concrete, etc., the cost sharing may vary.

7.3.5. New and 20 years old watercourses

a) Selection criteria

Following is selection criteria for new and 20 years old watercourse:

- i. Watercourse has not been previously improved in case of new and in case of reconstruction, the watercourse has been improved more than 20 years earlier under various programs.
- ii. The farmers are willing to form a Water Users Associations (WUAs) and agree with the cost sharing arrangements to be followed under the proposed program.
- iii. The shareholders agree to reconstruct the katcha portion of the watercourse prior to commencement of lining work.
- iv. Sections of watercourse to be lined will be selected as per following criteria.
 - Head reaches having maximum usage and flows.
 - Elevated sections susceptible to leakage, over topping, and spillage.
 - Portion of watercourse crossing/passing through/along villages/roads.
 - Sections having sandy/porous soils.

b): Procedure for improvement

The procedure outline to improve these watercourses is as under:

- i. The tehsil level OFWM staff will mobilize shareholders of the watercourses to organize Water Users Associations (WUAs). The same will be registered under OFWM and WUAs Ordinance [Act] 1981 (Amended 2001)/ rules;
- ii. The WUAs will open a joint account to be operated by its Chairman and Treasurer in a Commercial Client. The WUAs will provide Client statement along with the specimen signatures of Chairman and Treasurer to ADA (OFWM) who will forward the same to DDA (OFWM);
- iii. The WUAs will execute an output-based agreement with Deputy Director Agriculture (OFWM) wherein, roles and obligations of both the parties will be defined. The agreement will be based on lump-sum contracts with payments linked with achievement of physical milestones as defined in agreement;
- iv. The OFWM staff in the respective tehsil will conduct engineering surveys of the watercourse

command area and prepare design and cost estimates in consultation with WUAs that will be checked/verified by project consultants.

- v. The competent authority i.e. Director Agriculture (OFWM)/Deputy Director Agriculture (OFWM) will accord Technical Sanction of entire cost of the construction materials;
- vi. The WUAs will carry out earthen improvement of 50 percent of proposed length under the supervision of OFWM field staff. This will involve removal of stubs, bushes, and vegetation as well as other natural or man-made obstructions from the right of way. It will be followed by demolishing of existing channel, constructing a well compacted pad, and excavation of new channel as per design. It will, however, be ensured that only those trees are cut from the right of way which either fall in the water flow area of the watercourse or the civil works;
- vii. The WUAs will deposit labour charges (mason & labour) for lining and installation of water control structure in the joint Client account of the WUAs;
- viii. The WUA will make procurement of construction materials as per approved SOPs and shall maintain vouchered account of all transactions carried out through its Client account;
- ix. The requisite funds from Specified Account/ Cost Centers/ DDO codes will be released into joint account of the respective Water Users Associations by Deputy Director Agriculture (OFWM) in three installments on recommendations of the project consultants as per following release of funds criteria.



Figure-7.3: View of water running in watercourse

c) Criteria for Release of funds in three installments

- i. *Criteria for Release of First Installment.* Release of 40 percent of the estimated material cost on receipt of First Intermediate Completion Report (ICR-I) from the consultants certifying following requirements:
 - Issuance of Technical Sanction by the competent authority
 - Deposit of 50 percent Farmers' share on account of labour charges for lining and installation of water control structures.
 - Renovation of at least 50 percent of designed earthen sections.
- ii. *Criteria for Release of Second Installment.* Release of 30 percent of the estimated material cost on receipt of Second Intermediate Completion Report (ICR-II) from consultants verifying followings:
 - Deposit of remaining 50 percent labour charges of farmers' share on account of lining/installation of water control structures etc.
 - Renovation of entire designed earthen sections.
 - Completion of at least 30 percent planned lining and other works
- iii. *Criteria for Release of Third Installment* Release of remaining 30 percent of the estimated material cost on receipt of Final Completion Report (FCR) from project consultants certifying following factors:
 - Completion of all planned works.
 - Rectification of any pending discrepancy.

d) Total targets for new and more than 20 years old watercourses

New and 20 years old watercourses are mixed with additional lining when setting the targets. Thus, the total target for 20 years old and additional lining is 14,089 watercourses, while the target for new is 33,189, making the total project target at 47,278.

7.3.6. Additional lining of Partially Improved Watercourses

a) Total targets

The targets for additional lining are mixed with targets of 20 years old as discussed in section 7.3.4(d) above. These watercourses will be decided with set criteria and defined approval procedures. Total of both will be 14,089, but the mix could be any.

b) Selection / Eligibility criteria

The procedures for new watercourses and for 20 years old have been kept the same in the project. In case of additional lining, they are different to some extent. Therefore, they are taken up separately. In order to ensure execution of additional works on already improved watercourses, following transparent selection criteria will be adopted:

- i) *The WUAs agrees to:*
 - repair/ rehabilitate the already lined section;
 - maintain earthen section of the watercourse for efficient flow of irrigation water;
 - extend lining up to possible limits;
 - contribute Farmers' share; and
 - provide litigation free right of way
- ii) *Sections of watercourse eligible for extension of lining will be based on following criteria:*
 - Head reaches, (if left unlined under earlier programs), portions having maximum usage and flows;
 - Elevated sections susceptible to leakage, over topping, and spillage;
 - Portion of watercourse crossing/ passing through/ along villages/ roads; and
 - Sections having sandy/ porous soils.

c) Lining limit for additional lining

The maximum limit for additional lining of watercourses would be up to 50 percent of total length of watercourses.

d) Execution procedure for additional lining

Following procedure would be adopted for carrying out additional lining on already improved watercourses.

- i) *The yearly target of each district will be fixed by the Project Steering Committee (PSC) at the start of each financial year on the basis of improved watercourses and work load in each district;*
- ii) *The OFWM staff will mobilize WUAs/shareholders for active participation in improvement works. Already registered WUA will be reactivated/ reorganized for the purpose or new WUA will be registered if required;*
- iii) *Afterwards, the OFWM field staff will conduct engineering surveys of the command area and prepare a complete case including inventory of previously executed works and that planned to be covered under the NPIWC-II, which will be marked on the topo map with different colors. The design and cost estimates of*

- planned/required civil works will be prepared in consultation with WUA;
- iv) The proposal will be submitted to the consultants 'Field Engineer by DDA (OFWM) for its scrutiny and verification. The project consultants will also review the design and performance of existing lined sections of the watercourses to recommend modification in design and up-gradation of the sections to be lined for improving its efficiency, if needed;
 - v) The DDA (OFWM)/Consultants will submit inventory of the watercourses including total length, already completed works as well as planned, cost incurred, project name etc. on a prescribed proforma to the Directorate General Agriculture (WM) for checking/ verification/up-dation of water management database system;
 - vi) An output-based agreement will be signed with WUA wherein, roles and responsibilities of both the parties will be defined;
 - vii) An account will be opened in a Commercial Client with the authorization of DDA (OFWM) to be operated jointly by Chairman and Treasurer of WUA recommended and each transaction will be regulated/ authorized by ADA (OFWM) through an advice along with cheque issued by authorities.
 - viii) The competent authority will accord the Technical Sanction for entire cost of the construction materials;
 - ix) The WUA will collect the required farmers' share as per approved cost sharing mechanism and arrange execution of works under its supervision including maintenance of already lined section of the watercourse;
 - x) The OFWM staff will provide technical assistance to WUA for execution of the watercourse works by making the frequent visits at sites to ensure that same is being carried out as per prescribed standards/specifications;
 - xi) The project consultants will conduct spot checking as per their ToRs during watercourse improvement for quality assurance, recommending transfer of funds to WUAs, and certification of completed works.
 - xii) On recommending the third installment of payment, the consultant will submit certified FCRs along with Takmeli certificate to the DGA (OFWM) for up-dation of the database records.

7.3.7. Monitoring Progress / achievements

The project implementation had started a few months before the mobilization of ME&IE consultants. All the progress made during this period

will be covered by getting 2-5% sample and visiting them once the ME&IE field teams are placed in the field and are functional. The teams will start making spot checks, up-dating data backlog in the MIS/GIS system, conducting baselines, impact surveys of completed watercourses and water flow measurements before the improvements and after completion. The data up-dation on the MIS/GIS will be 100% watercourses for all their stages of development and all intermediate and final financial payment. However, for other ME&IE activities 2-5% sample will be taken to carry out the activities.

7.3.8. Scope of ME&IE activities

The ME&IE activities includes:

- i) Development of web-based MIS/GIS System / Progress Monitoring Dashboard to record, with minimum lag, all development activities, processes, criteria, achievements (physical as well as financial) geo-tagged images with dates and quantities for all (100%) watercourses
- ii) Made this data available to managers and decision makers for monitoring progress while sitting in their offices or anywhere in the world
- iii) Developing an android-based application to be used on TABs and smart phones to send real time data/progress from the field by the field staff of the client, project consultants and ME&IE Consultants
- iv) Training of all concerned staff in the use of the application
- v) Training of managers / decision makers in the use of MIS/GIS Progress Monitoring system
- vi) Carry out spot check of completed watercourses on sample basis for quality of construction. (The spot check will be done using monitoring template 2 (MT2) placed at **Annex-C**.)
- vii) Carry out water flow measurements before watercourse lining and after the lining to see the impact of the lining on reduction in conveyance losses. (See section 12.3)
- viii) Conduct baseline surveys before the watercourse lining and impact surveys one year after the lining to see impact of the lining on agriculture like, cropping intensities, crop yields, agriculture input and operations, farm income, employment, etc. (See section 8)
- ix) Ascertain beneficiaries' feedback on the quality and timelines of development works and benefits, etc.



Figure-7.4: Pygmy Current Meter

7.3.9. Monitoring Indicators

Following are monitoring indicators to be watched by the ME&IE Consultants:

- i) Selection criteria for all the three watercourse categories are met
- ii) Process approved for improvement of the watercourse is followed
- iii) Timeline for various stages of the process is met
- iv) Financial releases made as per criteria agreed
- v) Field staff of the executing agency share data on all activities, including geo tagged images as soon as it is generated / or as soon as an activity is completed.

The data regarding monitoring of process for watercourse improvement will be collected and added to MIS/GIS Database with the help of monitoring template 3 (MT3) designed for this purpose. The same is placed at **Annex-D**.

7.3.10. Beneficiaries' feedback

The beneficiaries' feedback will be ascertained on a pre-designed form before and after the watercourse improvement on a 2-5% sample basis regarding quality and timelines of the development works and benefits of the activities. The data regarding watercourses beneficiaries' feedback will be collected using monitoring template 4 (MT4). The same is placed at **Annex-E**.

7.4 COMPONENT C3: CONSTRUCTION OF WATER STORAGE TANKS (WSTs)

7.4.1. Introduction

The goal of NPIWC-II is to conserve surface water for irrigation. Major component is to improve thousands of watercourses to reduce conveyance losses at tertiary level. However, there are many more occasions where surface water is wasted due to non-

availability of storage facilities, like rain-runoff water, tail-enders excess runoff, low yield springs, streams, tube-wells, dug wells, etc. Water from these sources gets wasted as it is insufficient for direct irrigation. However, if these low flows are collected in ponds / tanks, the water could be used for irrigation at critical times. It is therefore, extremely important to meet the goal of the project.

7.4.2. Objectives / Purpose

Purpose / objectives of the Water Storage Tanks are as under:

- i) Store water during the rainy season and times of no use in the commands of perennial/ non-perennial canals for subsequent irrigations at the critical crop growth stages.
- ii) Provide flexibility for storage of plentiful canal and rainfall runoff water for its more expedient use subsequently
- iii) Collect, store and filter water from:
 - Small Dams, Springs, Streams, Nallas etc.
 - Rainfall runoff over agricultural catchment during rainy season
 - Tube wells and dug wells of low flows
 - Tail waters from agricultural fields
- iv) Regulate the flows so that it can be used efficiently when needed in large flow rates

7.4.3. Cost sharing arrangements

Cost sharing of water storage tanks would be 60 percent by the project and 40 percent by the Farmers. The subsidy for water storage tanks will be in both irrigated as well as in Barani areas where canal and rain water are the source of irrigation and the tank is technically required for supplemental irrigation with flood irrigation or High Efficiency Irrigation System (HEIS).

7.4.4. Selection criteria

The farmers having farms with a potential of sufficient water to be stored would be provided financial support for the development of water storage tanks to produce a reliable water source for irrigation of crops. Following criteria will be used to select the farmer for the subsidy:

- i) Farmer has agricultural land in canal command or outside the canal command area
- ii) The quality of available water is suitable for irrigation.
- iii) Farmers are willing to develop the farm tank for

- their agricultural land.
- iv) Applicant is willing to contribute his share as per approved cost sharing formula.
 - v) Farmers agree to use the stored water for irrigation purposes (through flood or preferably drip irrigation).
 - vi) Applicant is not a defaulter of any government financial institution.
 - vii) Farmer will abide by the decisions of the Project Implementation Committee (PIC) as well as respective Secretaries of the relevant departments or his/ her authorized representative and will not challenge the same in any court of law.
 - viii) Full cost of government share will be recoverable from farmer as areas of land revenue in case he/she violates any of the conditions.
 - ix) Farmers agree that they will be fully responsible for successful operation of the water storage tank and there will be no responsibility on the department for any damage and they agree to rectify any damage, which might hinder the usefulness of the intervention regarding irrigation of crops.

7.4.5. Size of the WSTs

Water storage tanks will be constructed as per design requirements. The consultants shall approve design and cost estimates of water storage tanks by considering the crop water demands, canal water availability, and potential rainwater available, excess canal water during the rainy season etc. Water storage tanks having storage capacity to meet peak crop water demands at critical crop growth stages for specific periods will be preferred.

7.4.6. Implementation Arrangements

Following procedure will be adopted during construction of storage tank:

- i) Design and cost estimate of water storage tank (preferably trapezoidal shape) with geo-membrane lining (minimum 0.5 mm wall thickness) will be prepared by the OFWM staff on the prescribed proforma, based on the sizing of water storage requirement.
- ii) Dimensions of WST shall be site specific. Water depth in the WST shall not exceed 5 feet with sufficient allowance of freeboard (preferably 0.30 m). Side slopes shall be selected based on the soil characteristics (generally it could be 1.5:1).
- iii) The design and cost estimate shall be approved

- by the Project Consultants and the design of WST will be submitted to Directorate General Agriculture (Water Management) for approval to construct the water storage tank as per approved design.
- iv) Farmers shall manage to construct a water storage tank using his own financial resources through any of the geo-membrane laying from as per approved standard and specifications. OFWM staff shall provide technical guidance and supervision to the farmers.
 - v) The farmer will arrange skilled labour/mechanical excavator for excavation activities as per approved design.
 - vi) The rates of geo-membrane lining will be fixed by the Pre-qualification Committee (PQC). The rates of excavation, geo-membrane laying/ jointing and earth cover (clay) will be approved by District Rate Committees (DRC) keeping in view the Market Rates System and respective Finance Departments of the provinces and other areas.
 - vii) Excavation of water storage Tank and anchor trench shall be accomplished as per standard engineering practices. Proper compaction of sub-grade should be ensured.
 - viii) Project Consultants will inspect the excavated water storage tank and the quantity and quality of geo-membrane.
 - ix) Upon satisfaction, Farmer shall be allowed to start geo-membrane affixation in the water storage tank as per acceptable standards and specification. All joints shall be welded through fusion welding or other similar techniques. Testing of joints /welded parts shall be done before filling the water storage tank.
 - x) Proper earthen cover (clay) up to 0.30 m depth shall be provided over the installed geo-membrane, if required.
 - xi) After completion of geo-membrane lining as per approved design (before filling the WST with water), the OFWM staff will prepare the completion report on the prescribed proforma indicating the constructed dimensions and detail of total expenses incurred for the construction of WST. The DDA (OFWM) shall forward the Completion Report to the Project Consultant for physical verification.
 - xii) Project Consultant will check the completion report of the lined WST and certify the completed works as per approved design and recommend release of project subsidies to the Farmer on actual cost basis.
 - xiii) In order to qualify to receive the Project subsidy, the farmer shall have to complete construction

- of a water storage tank within 60 days after issuance of the approval for construction of the WST.
- xiv) On receipt of Verified Completion Report from the Project Consultant, project subsidy @ 60% of the verified costs will be released by the Director General Agriculture (OFWM)/ Project Director to the farmer through cross cheque.
 - xv) If a farmer intends to construct water storage tanks for smaller storage capacity, design & cost estimates shall be prepared accordingly and the actual cost incurred shall be verified by the Project Consultant and 60% of that cost shall be released to Farmer.
 - xvi) In case, water storage tanks of larger capacity than the approved are constructed by the farmer, the additional cost over and above the approved cost shall not be paid.
 - xvii) If Farmer intends to construct a water storage tank with brick/ concrete lining after approval from the competent authority; the maximum subsidy shall be worked out based on the cost estimates for geo-membrane lining and payment will be made accordingly

7.4.7. Project targets

It is planned that 14,932 On Farm Water Storage Tanks will be constructed during the project period to supply the supplemental irrigation.

7.4.8. Progress

The project implementation had started a few months before the mobilization of ME&IE consultants. All the progress made during this period will be covered by getting 2-5% sample and visiting them once the ME&IE field teams are placed in the field and are functional.

The teams will start spot checks, up-dating data backlog in the MIS/GIS system, conducting baselines, impact surveys of completed water storage tanks and estimates of water saving due to the WSTs. The data up-dation on the MIS/GIS will be for 100% of WSTs for all their stages of development and all intermediate and final financial payments. However, for other ME&IE activities 2-5% sample will be taken.

7.4.9. Scope of ME&IE activities

The ME&IE activities for the WSTs include:

- i) Development of web-based MIS/GIS System / Progress Monitoring Dashboard to record, with

- minimum lag, all development activities, processes, criteria, achievements (physical as well as financial) geo-tagged images with dates and quantities for all (100%) WSTs
- ii) Made this data available to managers and decision makers for monitoring progress while sitting in their offices or anywhere in the world
 - iii) Developing an android-based application to be used on TABs and smart phones to send real time data/progress from the field by the field staff of the client, project consultants and ME&IE Consultants
 - iv) Training of all concerned staff in the use of the application
 - v) Training of managers / decision makers in the use of MIS/GIS Progress Monitoring system
 - vi) Carry out spot check of completed WSTs on sample basis for quality of construction. [Monitoring Template 5 (MT), placed at **Annex-F**].
 - vii) Carry out estimation of water savings due to WSTs. (See section 12.2).
 - viii) Conduct baseline surveys before the construction of WSTs and impact surveys one year after the construction to see impact of the WSTs on agriculture like, cropping intensities, crop yields, agriculture input and operations, farm income, employment, etc. (See chapter 9)
 - ix) Ascertain beneficiaries' feedback on the quality and timelines of development works and benefits, etc.

7.4.10. Process Monitoring indicators

Following are monitoring indicators to be watched by the ME&IE Consultants:

- i) Selection criteria for WST farmers are met
- ii) Process approved for improvement of the WSTs is followed
- iii) Time line for various stages of the process is met
- iv) Financial releases made as per criteria agreed
- v) Field staff of the executing agency share data on all activities including geo-tagged images as soon as it is generated / or as soon as an activity is completed.

The process data for WSTs will be collected using monitoring template 6 (MT6), placed at **Annex-G**.

7.4.11. Beneficiaries' feedback

The beneficiaries' feedback will be ascertained on a pre-designed form before and after the WSTs construction on a 2-5% sample basis regarding quality

and timelines of the development works and benefits of the activities. The beneficiaries' feedback for WSTs will be taken with monitoring template 7 (MT7), placed at **Annex-H**.

7.5 COMPONENT C4: PROVISION OF LASER LAND LEVELING UNITS

7.5.1. Introduction

A significant part of the Water saved at tertiary level by lining the watercourses and water saved through water storage tanks is wasted at field level due to uneven fields. It is a frustrating situation as billions of rupees are spent on watercourse lining and construction of water storage tanks. This situation can be improved if the fields are levelled. The best technique for this purpose is laser land leveling. Keeping in view the significance of land leveling to save water at field level, the project is subsidizing provision of laser land leveling units to farmers / service providers.

7.5.2. Objectives

Main objective of the provision of laser land leveling units to farmers / service providers is to save water at field level. Since the majority of farmers are small, they cannot utilize the full capacity of a laser unit. Therefore, besides farmers, service providers are also included in the beneficiaries of the scheme. They will be encouraged to level other farmer's fields on rent.

7.5.3. Selection / Eligibility Criteria for service providers / farmers

An applicant will be eligible for the grant of financial assistance to receive a laser unit provided that he / she:

- i) Possesses/ owns a tractor capable of operating LASER unit;
- ii) is owner/tenant/lease holder and self-cultivator of land not more than 12.5 acres and is preferably agricultural machinery service provider or an agricultural graduate possessing requisite land ownership;
- iii) has not availed the facility under any other such scheme;
- iv) will agree to rent out the equipment for LASER land leveling in the area;
- v) undertakes to carry out/provide rental services for LASER land leveling of 300 acres per unit annually during project period; and
- vi) will be liable to pay full amount of financial assistance received for the purpose as arrears of

land revenue in case of violation of any of the conditions of the scheme.

The Provincial Steering Committee (PSC) would be authorized to amend/modify the above said criteria for selection of farmers/service providers.

7.5.4. Pre-qualification of Supply and Service Companies (SSCs)

Following is the criteria for their pre-qualification:

- i) Already approved standards and specifications of LASER equipment by Agriculture Department will be adopted in NPIWC-II.
- ii) The SSCs already prequalified under NPIWC-I will be eligible to supply the equipment.
- iii) The prequalification of SSCs will remain a continuous process under NPIWC-II (if required).
- iv) The recipient will have the option of purchasing the equipment of his/her own choice from amongst pre-qualified farms.
- v) The PSC may amend/modify eligibility criteria for prequalification of SSCs, if required, at any stage of project implementation.

7.5.5. Cost sharing arrangements

It is planned to provide one-time financial assistance of Rs. 250,000 per unit to the farmers/ service providers while the beneficiary farmer would contribute the entire remaining cost of the equipment. It is pointed out that eligible beneficiary is required to own a tractor capable of operating a LASER unit and submit valid documents/proof for the purpose.

7.5.6. Implementation Procedures

The implementation modalities to be followed for the NPIWC-II are described hereunder:

- i) The annual quota for each province, preferably based on balance requirement of LASER land leveling, will be approved by the Federal Steering Committee (FSC) and the same will be conveyed to the province by the FPMU-FWMC;
- ii) Massive awareness and publicity campaign will be launched through print/electronic media at the provincial level as well as in the provinces/areas;
- iii) Agriculture Department will advertise for invitation of applications from the farmers interested in working as service providers for LASER land levelling rental services;
- iv) All provinces/areas will be informed about the

- time bound action plan for provision of LASER land Leveling to the Farmers/service providers;
- v) The applications will be received/ collected in the office of DDA (OFWM) that will be scrutinized vis-a-vis approved criteria by the designated community;
 - vi) The ineligible applicants will be informed about rejection of their applications who may submit appeal against the ineligibility within specified period and concerned authority will decide the eligibility/ ineligibility after hearing appeals within stipulated time frame;
 - vii) The DDA (OFWM) will convey the complete list of eligible applicants to the DGA (OFWM) for confirmation of quota as the activity will be demand driven. In case of a smaller number of eligible applicants than allocated quota, the extra LASER units will be allocated to other provinces/areas where demand is higher than the available quota for the district;
 - viii) The allotment of LASER units to the eligible applicants will be made by the District Allotment Committee (DAC) through balloting;
 - ix) The allotment letters will be issued to the successful applicants by the DDA (OFWM) with the advice to book LASER units with pre-qualified firm within 30 days of allotment by submitting original draft of his/her entire/full share, drawn in favor of prequalified firm of his/her choice to concerned DDA(OFWM);
 - x) The DDA (OFWM) will retain the original Client draft and forward its copy along with his recommendation to the DGA (OFWM) for issuance of work order to concerned firm;
 - xi) Director General Agriculture (Water Management) will issue advice to the concerned firm for supply of booked LASER unit within 90 days of the issuance of this advice (or period specified in the supply order) under intimation to the concerned DDA (OFWM);
 - xii) The supplier firm will ensure delivery of booked unit within stipulated period and defaulting firms will be dealt as per government Rules;
 - xiii) In case of failure of a firm to deliver the unit within specified time, the farmer will have the choice to book the LASER unit with one of the other pre-qualified supplier firms through concerned DDA (OFWM) and DGA (OFWM);
 - xiv) A committee comprising of representative of concerned DDA (OFWM), representative of concerned Director Agriculture (OFWM), recipient farmer/service provider, and Field Engineer of consultants will inspect the equipment jointly, handover to the farmers/service providers, and record the make, model, serial number and other features of all components of LASER unit;
 - xv) The DDA (OFWM) will hand over the original Client draft of farmer's share to the concerned supplier firm under proper acknowledgement.
 - xvi) The technical inspection report, duly signed by the inspection committee and receipt of draft release to the firm, will be sent by DDA (OFWM) to DGA (OFWM) along with his recommendation for releasing the government share; and
 - xvii) DGA (OFWM) will make payment of project assistance to the concerned firm through cross cheque.

7.5.7. Criteria for distribution of Laser Land Leveling Units

An applicant will be eligible for the grant of financial assistance for provision of Laser Land Leveler.

- i) Possesses a tractor capable of operating LASER Land Leveling unit,
- ii) owns an irrigation tube well,
- iii) Is owner/tenant of land not more than 12.5 acres and is preferably agricultural machinery service provider or an agricultural graduate possessing requisite land ownership,
- iv) Will agree to rent out the equipment for LASER land leveling in the area,
- v) Will be liable to pay full amount of financial assistance received for the purpose as areas of land revenue in case of violation of any of the conditions of the scheme.

7.5.8. Training of Farmers / LLL Operators & Technical Support

OFWM staff available at tehsil level will provide technical assistance and backup support for carrying out LASER land leveling in the field. Water Management Training Institute (WMTI), Lahore will arrange training for capacity building of the service providers/farmers or their Tractor/ LASER Operators for following activities.

- i) Survey and designing for LLL.
 - ii) Planning and development of farm layouts considering soil type, farmer's tillage equipment, crops to be grown, source/quality of irrigation supplies etc.
 - iii) Operation of LLL units
 - iv) Maintenance and trouble-shooting of equipment
- Training courses will be conducted for LASER Operators in "LASER Land leveling" to train one operator for each LASER unit. It is planned that a

training course comprising around 20 participants each will be arranged at Provincial Water Management Departments and other relevant institutes. The training will be evaluated using monitoring template 8.1 (MT8.1), placed at **Annex-I**.

7.5.9. Project Targets

The Total target for provision of LLL over 5 years span is 11,610 units. The distribution of units in Punjab is 9,500, KPK 600, Balochistan 1,500, GB 5, AJK 5 and ICT no unit.

7.5.10. Progress

The project implementation had started a few months before the mobilization of ME&IE consultants. All the progress made during this period will be covered by getting 2% to 5% sample and visiting them once the ME&IE field teams are placed in the field and are fully functional.

The teams will start carrying out spot checking, updating data backlog in the MIS/GIS system, conducting visits to the unit owners one year after the delivery to find out area levelled by the farmers. The data up-dation on the MIS/GIS will be for 100% of lasers for all their stages and final financial payments. However, for other activities 2% to 5% sample will be collected.

7.5.11. Scope of ME&IE Consultants Activities

The ME&IE Consultants activities for the LLL units include:

- i) Development of web-based MIS/GIS System / Progress Monitoring Dashboard to record, with minimum log, all development activities, processes, criteria, achievements (physical as well as financial progress) geo-tagging images with dates and quantities for all (100%) LLL units
- ii) Availability of data to the managers and decision makers for monitoring progress, while sitting in their offices or anywhere else.
- iii) Developing of an android-based application using TABs and smart phones for sending real time data/progress from the field by the field staff of the client, project consultants and ME&IE Consultants.
- iv) Training of all concerned staff for use of the App.
- v) Training of managers / decision makers in the use of MIS/GIS Progress Monitoring System.
- vi) Carry out spot checking of LLL units on sample basis for quality of these units and after sale services of the SSC. (See section 12.4).

- vii) Carry out visits to sample laser units after one year of their delivery to find out area levelled by them. (See section 12.4).
- viii) Ascertain beneficiaries' feedback on the quality and timelines of unit's delivery and after sales services by the SSCs.

7.5.12. Monitoring indicators

Following are monitoring indicators to be watched by the ME&IE Consultants:

- i) Selection criteria for laser recipient farmers is met
- ii) Process approved delivery LLL units is followed
- iii) Timeline for various steps to make delivery of LLL units are met
- iv) Financial releases made as per criteria agreed
- v) Field staff of the executing agency share data on all activities including geo-tagged images as soon as it is generated / or as soon as an activity is completed.

The data on process indicators of laser units will be collected on monitoring template 8.2 (MT8.2), placed at Annex-I.

7.5.13. Beneficiaries' feedback

The beneficiaries' feedback will be ascertained on a pre-designed form during the visit of sample laser units. The sample for the visits will be 2% to 5% of the total units delivered. The data on beneficiaries' feedback for laser units will be gathered with monitoring template 9 (MT9), placed at **Annex-J**.

8. BASELINE STUDY FOR IMPROVEMENT OF WATERCOURSES

8.1 INTRODUCTION

Watercourse improvement is a major intervention of the project. Output of the development activities in this component will be improved / lined watercourses. The outcome of the output will be reduced by conveyance losses and water saving up to 15%. This outcome will be measured by ME&IE consultants in a separate activity under which water flow measurements will be taken before and after the improvement. The impact of this outcome is expected to an increase in cropping intensities, increase in crops yields, farm income and employment. In order to see whether these variable changes due to the intervention, their before values are recorded. This is termed as Baseline or Benchmark.

8.2 OBJECTIVES

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 water logging & salinity and time to irrigate one acre with canal / tube well water. These baseline values will help in the net impact of the intervention from impact survey data.

8.3 SAMPLING METHODOLOGY

There are so many methods for drawing a representative sample from a given population. Keeping in view the ground realities of watercourses in Pakistan and their relation with the farmers, Multistage and purposive sampling methodology is used in drawing the sample. At the first stage predetermined number of watercourses is drawn. The sample size will be 2 to 5 percent of total number of watercourses. This will be divided proportionally in each province/ unit and then district. While selecting watercourses for baseline survey, due diligence will be used to ensure that various types, lengths and capacity of the watercourses 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 watercourse 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 particular watercourse and members of the "Water Users Associations".
- ii) The farmers use the water of the same watercourse but not the owners of the land. They are the tenants, cultivating land either on leasing or share bases.

Out of this population of beneficiaries a sample of 6 beneficiaries will be purposively drawn, 2 from head, 2 from middle and 2 from the tail reaches of the watercourse. However, due consideration will be given to represent the farm size and tenurial status of the beneficiaries in the sample.



Figure-8.1: A view of Baseline Survey

8.4 SAMPLE SIZE OF THE WATERCOURSES

For determining the sample size total target number of watercourses will serve as the population. A sample size of 2 to 5 percent of the total targeted number of watercourses will be drawn. The sample drawn will be divided in proportion of the population amongst provinces/units and then districts. Actual sample will be drawn and shared with the client as the phases of the baseline surveys are planned and implemented.

8.5 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 Users Associations and includes data on agriculture asked from sample farmers. 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, consist of following which are placed at **Annex-K**.



Figure-8.2: Another 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 watercourse
Monitoring Template 14 (MT14)	Basic data for selected watercourse (from client)
Monitoring Template 15 (MT15)	Baseline data of selected farming household

8.6 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.

8.7 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 bi-products
- 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 laser land levelling and water course improvement

- xii) Any other variable as required for impact assessment or asked by the client

8.8 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.

8.9 BASELINE REPORT IN PHASES / AGGREGATE (WATERCOURSES)

Since the watercourses to be improved are not pre-selected, the baseline sample can't 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 TS, which is the stage when it is sure that the watercourse 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.

Data collection and analysis will be carried out independently for each phase 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.

9. BASELINE STUDY FOR WATER STORAGE TANKS (WSTs)

9.1 INTRODUCTION

The purpose of water storage tanks is to store water which was mostly going to be wasted. In this way it saves water for irrigation of crops / orchards. Due to increased availability of water the farmer getting WST is expected to have increased cropping intensities yields as well as various positive impacts on other agriculture aspects. For measuring these positive impacts there is a need to establish pre-WST conditions on the farmer's farm. This activity is termed as baseline.

9.2 OBJECTIVES

The baseline of the WSTs will cover following aspects of the intervention:

- i. Dimensions of the WST and its water storage capacity in liters
- ii. Source(s) of water to fill the tank
- iii. Farm size in acres
- iv. Sources of irrigation
- v. Acres irrigated
- vi. Crops sown, cropped area under each crop
- vii. Crop operations, inputs
- viii. Crop yields, farm income, employment, etc.

9.3 SAMPLING METHODOLOGY

For the baseline study 2-5 percent sample will be taken of WST population. Since total WST population is also not on the ground at the outset, it will also be done in phases. The sample for the baseline will be drawn once the TS is issued.

9.4 WST DATA COLLECTION TOOLS

A data collection tool (named as monitoring template 16 (MT16), placed at Annex-L) will be devised to record data regarding parameters of the tank. As regards data on agriculture, same forms will be used as in case of watercourses.

9.5 DATA COLLECTION THROUGH TABS / ANDROID-BASED SYSTEM

As in case of watercourses, the data collection will be through TABs / smart phone using an android-based application.

9.6 MAJOR COMPONENTS OF THE BASELINE DATA

Major components of data will be as listed in section 9.2 above. Agriculture data will be similar to watercourses.

9.7 DATA ANALYSIS USING SPSS

Data collected for the baseline of WSTs will be analyzed using SPSS. The data sets will be available online in MIS/GIS System as well as in Excel and in any other format as desired by the client.

9.8 BASELINE REPORT IN PHASES / AGGREGATE WSTs

A separate baseline report will be prepared and submitted for each phase. On completion of the total sample an aggregate baseline report will be compiled and submitted to the client.

10. BASELINE STUDY FOR WUAs AND LASER LAND LEVELING

For Water Users Associations (WUAs) and Laser Land Leveling no baseline will be prepared as there is no before data which is required to be compared with after situation to net out the impacts. For WUAs monitoring surveys will be done twice during the project period on sample basis and their functioning and level of maintenance of watercourses, WSTs and Laser units will be assessed.

For Laser Land Leveling, a sample survey will be carried out one year after the delivery of the unit. In this survey area levelled during the year, quality of unit maintenance will be assessed. Beneficiaries' feedback will also be asked from the unit owners regarding quality of the unit delivered and quality of after sales service and training by the SSCs.

11. MID-TERM EVALUATION (MTE)

During mid-term, it will be monitored whether the project is on track at the middle of the project life. If not, remedial measures will be suggested.

By the mid-term baseline of all the watercourses is expected to be completed. Moreover, a sizable number of watercourses would have been visited for an after/ impact survey. Using their data, intermediate results for impact of the project will also be reported. This analysis will show interim/ intermediate results regarding impact of the project on agriculture with regard to cropping patterns, cropping and land use intensities, crop yields, farm income and employment.

Meanwhile some data will also be available on land/ levelled by LLL units and additional water made available by WSTs. Expected project impact of these activities will also be estimated.

12. END-TERM / IMPACT ASSESSMENT

12.1 IMPACT OF WATERCOURSES IMPROVEMENT / END-TERM IMPACT SURVEY

The same watercourses as visited during the baseline will be visited again at least one year (two crop seasons) after the completion of the watercourses. During the visit, the same sample farmers will be interviewed again using the same questionnaires.

The impact in the form of changes in cropping intensities, crop yields, cropping patterns, labour demand and farm income will be assessed by taking the difference between impact data and the baseline data.

Since changes in technology and other aspects of agriculture are continuous, impact of these factors will be assessed from secondary data and previous studies. The difference determined above will be subtracted from the impact to find out pure impact of this project, i.e., NPIW-II.

The impact of water storage tanks and laser equipment will automatically be reflected in crop data for the baseline and impact surveys.

12.2 INCREASED WATER AVAILABILITY DUE TO WSTs

In order to assess increased water made available by the WSTs, 2-5% of them will be taken as a sample. The sample will be selected at random. All the sample WSTs will be visited and farmers interviewed regarding:

- i) Max. capacity of the sample WSTs
- ii) Level of maintenance
- iii) Number of times the WSTs got filled during the year due to:
 - Tail run-off
 - Rainwater
 - Any other source
 - How the water is used from the WSTs
 - Additional water available due to the WSTs
- iv) How much water used for irrigation during the year

The data to be collected will be discussed and agreed with the client before finalizing the form and carrying out a survey. All the data so collected will be fed to MIS, analyzed and reported in ME&IE periodic reports.

12.3 MEASURING WATER SAVING ON IMPROVED WATERCOURSE

A sample of two (2-5%) percent of total watercourses is proposed for water flow measurement to assess water savings on improved watercourses. (However, the final size of this sample will be decided/ agreed with the client).

The water flow will be measured "before" improvement (baseline) and "after" improvement. The measurement will be done using pygmy current meter. To record observations a format will be developed and agreed with the client.

The observations will be taken at 4 points of the watercourses as under:

- a) At Mogha
- b) At 30% of the watercourse length
- c) At 50% of the watercourse length
- d) At 75% of the watercourse length

At each point 3 to 9 observations will be recorded depending on the width of the watercourse. An average of all the observations will be used to estimate the quantity of the water flow. The difference between "before" and "after" will be the losses reported in percentage will be the water saving. The flow data will be recorded on monitoring template 17 (MT17), which is placed at **Annex-M**.

12.4 MEASURING LAND LEVELLED BY THE LASER UNITS

A 2% to 5% of the LLL units will be taken as sample for measuring total area levelled by the LLL units delivered to farmers. The 5% figure is our proposal. However, it will be finalized/ agreed with the client before the surveys are initiated.

The visit to sample LLL units will be done by ME&IE teams at least one year after delivery. A format will be agreed with the client for type/ kind of data to be collected for the LLL recipient farmers/ service providers.

During the visit, the ME&IE Consultants field team will collect data on the following broad parameters:

- i) Make and model of the unit.
- ii) Area levelled since delivering on own farms by months.
- iii) Area levelled since delivery on other farms on rent.
- iv) Level of maintenance of the unit

- v) Whether the operator got training as planned under the project.
- vi) Farmers' feedback on the after-sale service of the Supply and Service Companies (SSCs).
- vii) Farmers' feedback on the availability of spares.
- viii) Farmer feedback on the quality of the unit when delivered.
- ix) Any other data as agreed with the client.

All the data will be fed to MIS and reported in ME&IE periodic reports. The sample results will be extrapolated for the total units on pro-data basis to get estimated total area levelled by all LLL units delivered under NPIW-II. The laser data will be collected through monitoring template 18 (MT18), which is placed at **Annex-N**.



Figure-12.1: Water flow measurement

12.5 ECONOMIC IMPACT EVALUATION OF THE PROJECT INVESTMENT

The economic or Impact evaluation of a project investment assesses benefit to the society or economy as a whole in real term. In this analysis costs and benefits are taken in real resource terms.

The cost of the project is investment cost (Govt. share + beneficiaries' contributions). The annual recurring cost is the cost of maintaining the facilities created by the project. The project benefits/ income is net income generated on beneficiary farms due to changes (increased as expected) in crop yields, cropping and land use intensities. The shifts in cropping patterns towards high value crops will also contribute towards increased net income.

Keeping above in view, project cost and benefit/ income streams will be established. The project beneficial life will be taken as 20 years.

The costs and benefits of the project will be compared with real economic value and discounted. The discount factor will be taken at 10%. Standard economic analysis methodology will be used as articulated by the donor agencies like the World Bank, ADB, etc. and being used in Pakistan.

The economic analysis of the project will generate parameters as under:

- i) Economic Internal Rate of Return (EIRR)
- ii) Net present Value (NPV) of the project
- iii) Benefit Cost Ratio (BCR)

In order to see whether the project is robust enough to bear shocks like cost overrun and benefits shortfalls, sensitivity analysis will also be carried out.

Other project benefits to the farming/ non-farming community as well as the whole economy will be increased employment and increased economic activities due to increased agricultural production.

12.6 Financial Analysis

The financial analysis will be carried out using benefits of the project and quantum of investment in financial terms. The value used in section 12.5 in real terms will be based for converting the value in financial terms. Parameters like FIRR, financial NPV and BCR will be estimated. To assess the projects' financial robustness, sensitivity analysis will also be done.

13. DEVELOPMENT OF WEBSITE FOR THE PROJECT

13.1 INTRODUCTION

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.

13.2 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) Watercourses Improvements
- v) Water Storage Tanks
- vi) Laser Land Leveling Units
- vii) Progress Reports
- viii) Monitoring Reports
- ix) Impact Reports
- x) Project Progress
- xi) Procurement
- xii) Procurement of Goods, Services & works
- xiii) Evaluations and Results
- xiv) Career
- xv) Media Gallery
- xvi) Contact
- xvii) FAQs (Frequently Asked Questions)

13.3 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. NPIWC-II 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.

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

14.1 INTRODUCTION

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:

- 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's 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 can't 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.

14.2 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, through 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.

14.2.1. 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).

14.2.2. 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.

15. DEVELOPMENT OF MIS/GIS SYSTEM

15.1 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. 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, both structured system analysis, design, object-oriented analysis, and design approaches will be used.

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 time frame. 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 NPIWC-II 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.

15.2 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 WUAs will be monitored and reported to the PMUs. The progress on the formation of the WUAs 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 time frame, all activities; Improvement of Watercourses, Water Storage Tanks and Laser Land Leveling input activities 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.

15.3 FUNCTIONAL REQUIREMENTS

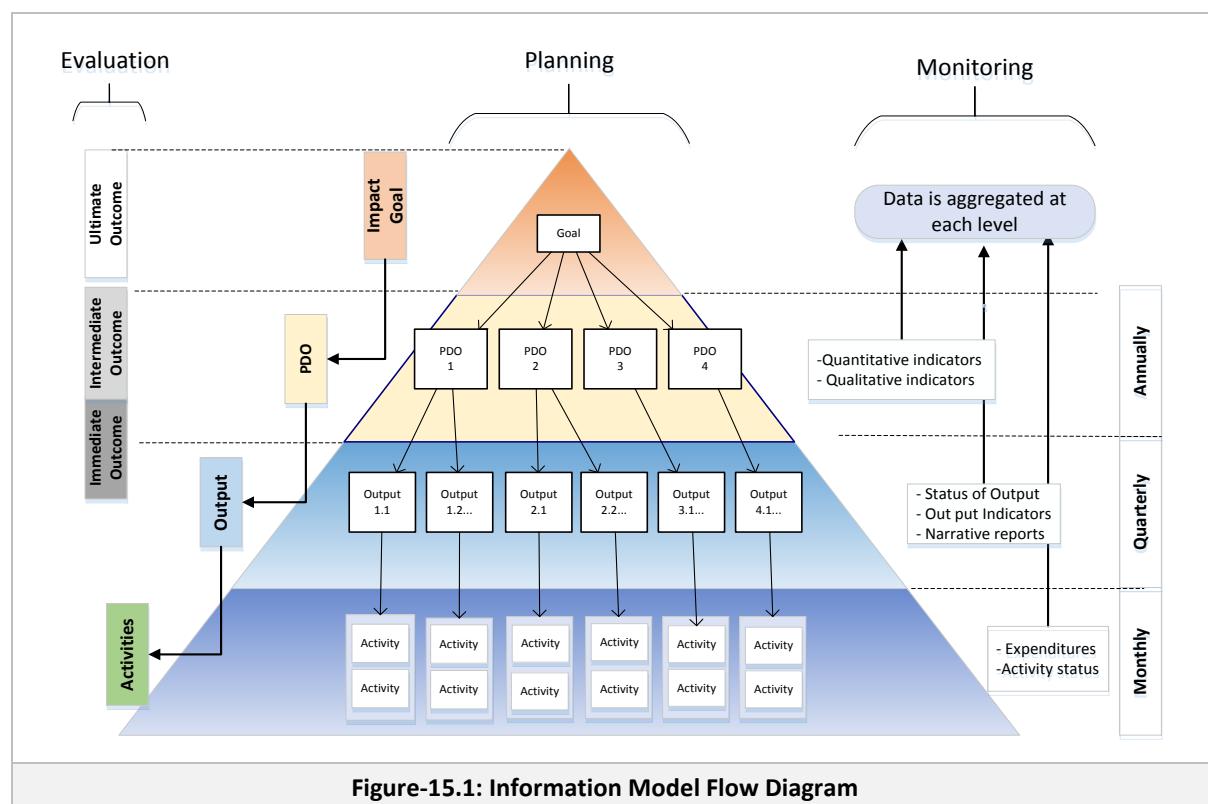
The following presents a general overview of the features for the system:

- 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)

15.4 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.



15.4.1. Results Hierarchy and information flow

The information below will be available in the Information Management System:

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 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.

15.5 DATA FLOW DIAGRAM

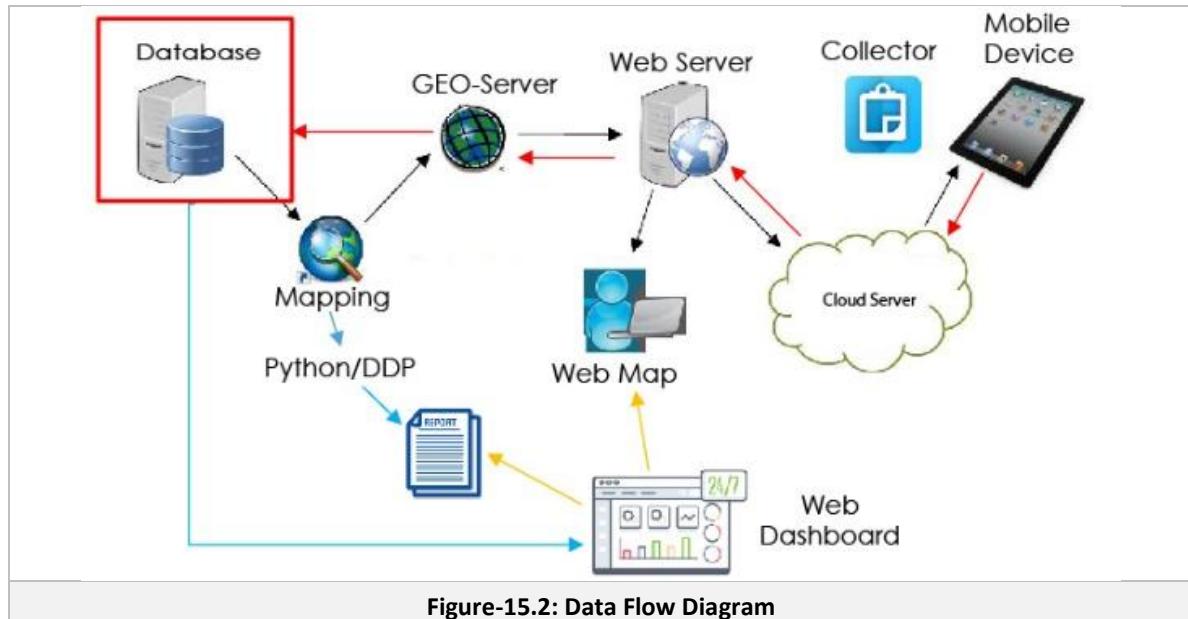


Figure-15.2: Data Flow Diagram

15.5.1. 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:

- i) It supports a wide range of data types.
- ii) It hosts blank designed data collection form and

on any update in form it synchronizes with mobile application and updates the blank form.

- iii) Store and manage submission data.
- iv) Visualize collected data using maps and simple graphs.
- v) Create summary reports with graphs and tables and fine-tune your report's charts, colors and questions.
- vi) Visualize collected data on a map.
- vii) Disaggregate data in reports and maps.
- viii) Export and publish data in a variety of formats.

Watercourse Certifications & FCR Information (L)										
starttime	endtime	username	district	distt_label	taluka	taluka_label	watercourses_id	selected_submission_section	wc_certif_info_and_imgs	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_verification date_of_earthwork_completion date_of_fcr_issue	
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_verification date_of_earthwork_completion date_of_fcr_issue	
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_verification date_of_earthwork_completion date_of_certif_for_2nd_i date_of_fcr_issue	
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_verification date_of_earthwork_completion date_of_certif_for_2nd_i date_of_fcr_issue	
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_verification date_of_earthwork_completion date_of_certif_for_2nd_i date_of_fcr_issue	

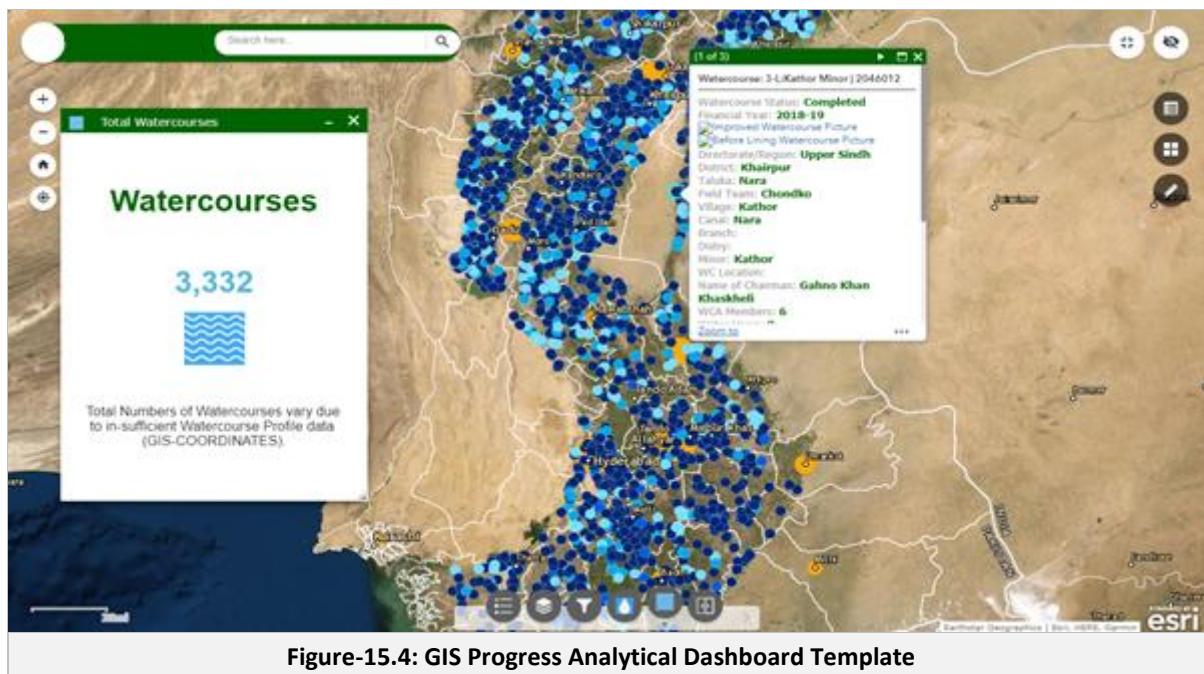
Figure-15.3: Aggregate Dashboard Template

15.5.2. 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.



15.5.3. Example of a GIS 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.

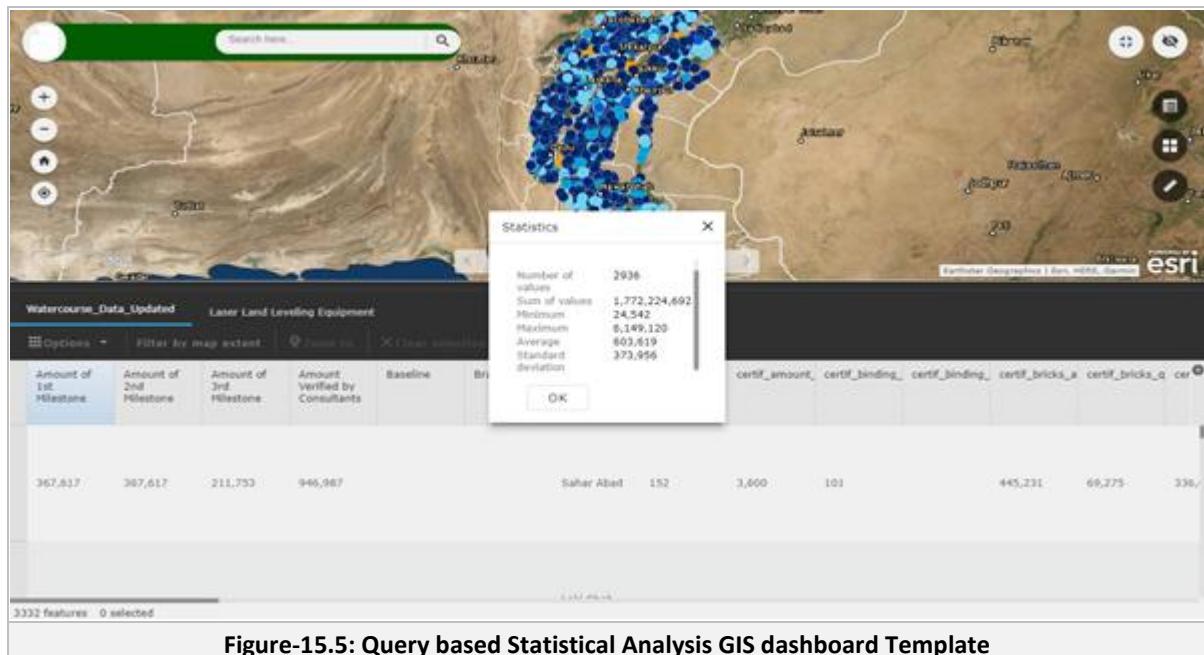


Figure-15.5: Query based Statistical Analysis GIS dashboard Template

15.6 FEATURES

15.6.1. 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

The following project information will also be always accessible.

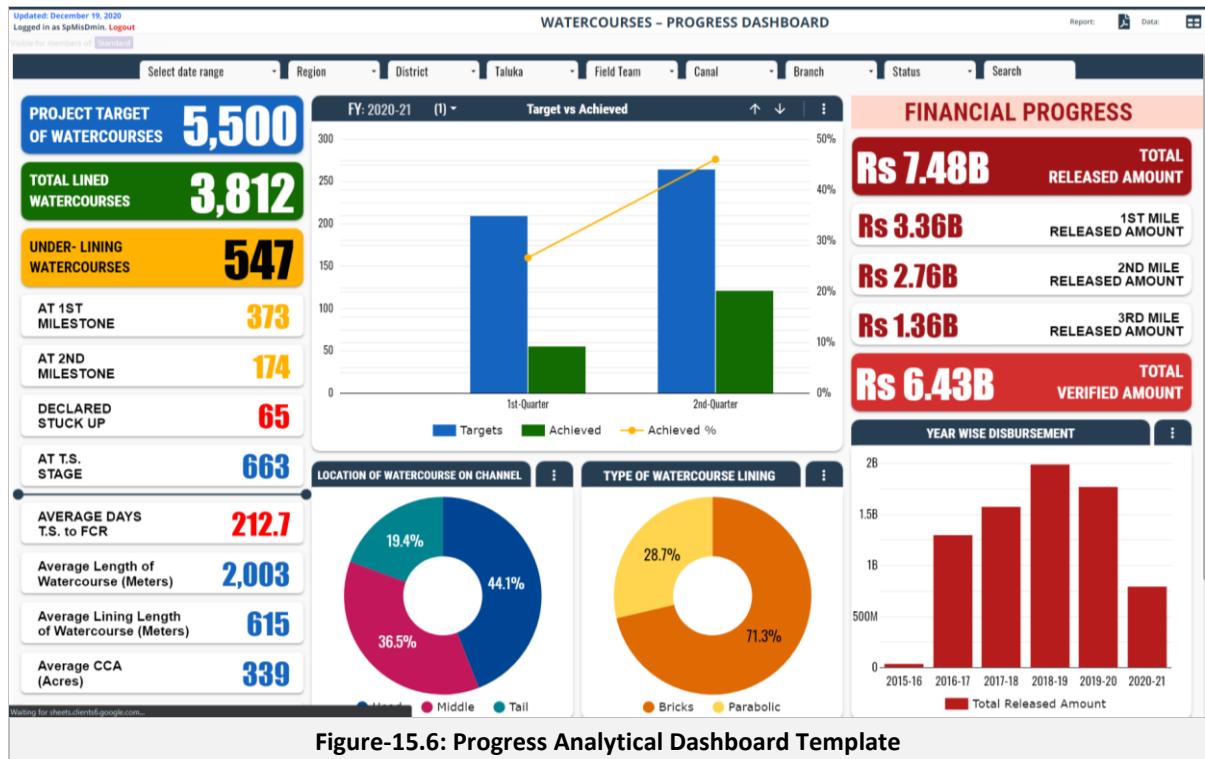
- i) Project description
- ii) Description of project's objectives
- iii) Implementation partners

- iv) Locations of implementation
- v) Timelines
- vi) Project activities (and % of accomplishments)
- vii) Budgets (percentage of spending)

15.6.2. 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.



15.6.3. 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.

15.6.4. 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

- 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

- 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 allowable

- formats (Office Files, PDF, Pictures)
- v) 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
 - vi) The MIS shall support users with data entry to reduce errors
 - vii) The MIS shall provide peripheral instructions to support data entry
 - viii) The MIS shall elicit a feeling of trustworthiness by its users.
 - ix) The MIS shall evoke in its users the feeling that its output is trustworthy.
 - x) The informational part of the MIS shall evoke in its users the feeling that its content is authoritative.
 - xi) 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 through the use of 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 NPIWC-II.*
 - *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 endline studies, additional water flow measurements, water made available by WSTs and land levelled by LLL units. 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, endline, 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.*

16. DELIVERABLES/REPORTING REQUIREMENTS

The list of deliverables of ME&IE Consultants with the timelines are as under:

Table-16.1: Deliverables/Reporting Requirements

Sr. No.	Document	Copies	Due
1	Draft Inception Report	8	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 Monitoring Report	10	10 th of the following month
4	Baseline Survey Report	10	4 months after start of the assignment
5	Midline Survey Report	10	In the middle of the assignment
6	Endline Survey Report	10	At the end of the Endline survey
7	Quarterly Monitoring and Evaluation Report	10	10 th of the first month of following quarter
8	Annual Monitoring and Evaluation Report	10	During first month of following year
9	Draft Assignment Completion Report	5	At completion of physical works / activities
10	Final Completion Report	25	At completion of works as well as financial transactions
11	Special Reports	10	As and when required

ANNEXES A to Q

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.

ANNEX-A: MONITORING LOG-FRAME

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II (NPIWC-II)

Annex-A: Monitoring Log-frame

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
C1: Organization of Water Users' Associations (WUAs)	Reactivation of existing / organization of water users' associations. Ensuring one on each target watercourse. Total WUAs ensured 47,278.	a) Community mobilization at 47,278 watercourses	a) Total 47,278 WUAs reactivated / established/registered	a) Right of way of 47,278 watercourses available b) Skilled and unskilled labour required for watercourse improvement available c) Construction material for civil works of watercourses procured d) Alternate arrangement for water conveyance during construction made e) Watercourse improved	a) Disputes among the water users settled b) Farmers' branched improved c) Water allocation made amicably d) Maintenance of watercourses, WST and laser units done e) Cooperation among farmers increased	a) 47,278 watercourses improved and 15 percentage points conveyance losses reduced b) Litigation among farmers reduced	a) The functioning of the WUAs will be established through sample interview surveys of WUAs members twice during the project period
C2: Watercourses Improvements	Improvement of 47,278 watercourses on cost sharing basis: 40% farmers in	a) Establishment of 47,278 Water users' associations (WUAs);	a) 47,278 WCAs established; b) 47,278 WCAs registered;	a) Conveyance losses for improved watercourses decreased by	a) Increase in cropping intensity on improved	a) Increase in farm income; b) Increase in employment for farm labour;	a) The water flow measurements will be carried out at before and after

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
	terms of labour, and 60% funded by project.	<p>b) Registration of 47,278 WUAs;</p> <p>c) Improvement and realignment of earthen section of 47,278 watercourses;</p> <p>d) Lining of up to 50% length of 47,278 watercourse either by:</p> <ul style="list-style-type: none"> • Precast concrete parabolic lining (PCPL) segments, or • Rectangular brick masonry, or any other method as approved by the project 	<p>c) 47,278 watercourses improved and lined;</p>	<p>about 15 percentage points.</p> <p>b) 1.654 million households benefited from the activity;</p> <p>c) 11.347 million acres served with improved watercourses</p>	<p>watercourses by 5-24%;</p> <p>b) Increase in crop yields.</p> <p>c) Increase in irrigated area</p> <p>d) Increase in agriculture output per unit of water by about 37%</p> <p>e)</p>	<p>c) Reduction in poverty;</p> <p>d) Enhanced food security for the country.</p>	<p>watercourse improvement on 2-5% sample basis;</p> <p>b) Agriculture survey before and after watercourse improvement on 2-5% sample basis;</p> <p>c) The survey will determine: <ul style="list-style-type: none"> • Cropping pattern before and after the improvement; • Cropping intensities before and after improvement; • Before and after crop yields; • Before and after employment; </p> <p>d) The difference between before and after will be considered the</p>

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
							result of the intervention after netting out the contribution of the growth pattern of the crop sector otherwise.
C3: Construction of Water Storage Tanks (WSTs)	a) Construction of 14,932 water storage tanks	a) 14,932 small farmers mobilized to construct water storage tanks for irrigation b) They agree to contribute 40% of the cost c) Agree to first construct the tank with his/her own funds and then received subsidy at 40% on issuance of FCR	a) 14,932 WSTs constructed b) 14,932 WSTs operated and maintained	a) Water which was otherwise largely going to be wasted is saved b) Irrigation provided at critical stages of the crops c) Flexibility achieved for irrigation	a) More area irrigated b) Increased cropping intensities	a) Increased crop yields b) Increased total crop output quantum c) Increased farm income d) Increased farm employment	a) 2-5% sample of WSTs will be surveyed b) A data collection form will be designed to measure water saving due to WSTs c) The forms used for baseline and impact surveys in case of watercourses will also be used for WSTs d) Same data analysis will be carried out here as in case of watercourses.
C4: Provision of Land Leveling Units	a) Provision of 11,610 laser land leveling units to	a) 11,610 laser units provided to	a) 11,610 farmers / service providers	a) Land levelled on Farmers' / service	a) Water application efficiency	e) Increased area under irrigated crops;	a) The land levelling is expected to save irrigation

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
	<p>farmers and service providers on a cost sharing basis: 50% by farmer / service provider and 50% by the project.</p>	<p>farmers / service providers;</p> <p>b) Farmers trained in using the units.</p>	<p>received PLL units;</p> <p>b) Farmers / service providers received training in using the units.</p>	<p>providers' farms;</p> <p>b) Land levelled on fellow farmers on rent;</p> <p>c) Total 3.483million acres levelled by 11,610 units.</p>	<p>increased at field level;</p> <p>b) Even germination of seed.</p> <p>c) Field application losses reduced by 10 percentage points</p> <p>d) Water productivity increased by 24%</p>	<p>f) Enhanced crop yields</p> <p>g) Increased farm income</p>	<p>water and result in better and even germination of seeds which can enhance crop yields. The crop yields thus affected will be reflected in agriculture sample surveys.</p> <p>b) 2-4% sample units will be visited by ME&IE Consultants teams after one years of delivery</p> <p>c) The unit will be verified</p> <p>d) Area treated during the year will be collected</p> <p>e) Farmers' feedback collected on quality of the unit, quality of the after-sale service, etc.</p>

ANNEX-B: MONITORING TEMPLATE 1 (MT1)

MONITORING WATER USERS' ASSOCIATION / FEEDBACK

Monitoring Template -1

Watercourse ID _____

NAME OF SURVEY AND DATE _____

MONITORING WATER USERS' ASSOCIATIONS / FEEDBACK

1. Identification of the Watercourse

- | | | | | |
|------|--|------|-------------------------|------|
| 1.1 | Watercourse 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 watercourse on the canal | Head | Middle | Tail |
| 1.14 | Director OFWM / Agriculture Department _____ | | | |

2. Process of WUA Establishment

- | | |
|-----|--|
| 2.1 | Date of Application for Registration |
| 2.2 | Date of registration under OFWM / WUA Ordinance (AC) 1981 as amended in 2001 |
| 2.3 | Date of opening an account in the bank |
| 2.4 | Date of submission as application for watercourse improvements |
| 2.5 | Date of signing an agreement for watercourse improvement |

Day	Month	Year
Day	Month	Year
Day	Month	Year
Day	Month	Year
Day	Month	Year

3. Carry out watercourse improvement work

- | | |
|-----|--|
| 3.1 | Arranged skilled and unskilled labour for earthen improvement of the watercourse |
| 3.2 | Arranged skilled and unskilled labour for watercourse lining |

Yes	No	DK
Yes	No	DK

- 3.3 Arranged alternate channel for water flow during watercourse construction
- 3.4 Arranged to carry out civil works
- 3.5 Resolve disputes arising during construction the watercourse

Yes	No	NA
Yes	No	DK
Yes	No	NA

4. Maintaining of project interventions

- 4.1 The improved watercourse is properly maintained
- 4.2 Resolves disputes arising during water distribution
- 4.3 Is the laser unit properly maintained, which was delivered by the project
- 4.4 Does the WUA assists the owner of Laser unit(s) in this regard
- 4.5 Is the WST operational and properly maintained, which was delivered by the project
- 4.6 Does the WUA assists the owner of Laser unit(s) in this regard

Yes	No	NA
Yes	No	NA
Yes	No	NA
Yes	No	DK
Yes	No	DK
Yes	No	DK

5. Functional Status of the WUA

- 5.1 The WUA holds regular meetings of the association
- 5.2 Decisions are made democratically
- 5.3 Majority of the shareholders participate in the meetings
- 5.4 The WUA maintains an account in the bank

Yes	No	DK

6. Enumerator's comments

Name & Signature

Date _____

ANNEX-C: MONITORING TEMPLATE 2 (MT2)

WATERCOURSE SPOT CHECKS

Monitoring Template -2

Watercourse ID _____

NAME OF SURVEY AND DAE _____

SPOT CHECK FORM

IDENTIFICATION

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

Rectangular Watercourse

1	Removal of vegetation from watercourse 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 watercourse			1-YES	2-NO
4	Proportion of Total cultural commanded area of the watercourse irrigated		1-Up to 35%	2-36 to 70%	3-70% plus
5	Type of Moga / 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 watercourse is as per design?			1-YES	2-NO
9	Width of watercourse 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 Ketcham / earthen portion of watercourse		1-Full length improved	2-Only lined portion	
18	Number of Paccka Nakkas in Katcha portion of watercourse installed	1-Number installed as required	2-Installed less than required	3-None installed	
19	Number of Pacca Nakkas in lined portion of watercourse installed	1-Number installed as required	2-Installed less than required	3-None installed	
20	Number of Culverts provided on the watercourse	1-Provided as required	2-Less than required	3-None	4-Not required

COMMENTS

Name and Signature _____

Date _____

Parabolic Watercourse

21	Removal of vegetation from watercourse properly			1-YES	2-NO
22	Is designed discharge (as per Irrigation Department)			1-Adequate	2-Not adequate
23	Is additional discharge (via. Tube Well / lift machine) at watercourse			1-YES	2-NO
24	Total cultural commanded area of WC irrigated		1-Up to 35%	2-36 to 70%	3-70% plus
25	Type of Mogha / outlet	1-Open	2-Closed	3-Closed-Pipe	4-Closed-Pump
26	Lining length is as per design?			1-YES	2-NO
27	Total length is as per design?			1-YES	2-NO
28	Quality of pre-cast parabolic segments?			1-Good	2-Not Good
29	Filling of joints of the parabolic segments			1-Good	2-Not Good
30	Slop of the parabolic segments		1-As per design		2-Not as per design
31	Back filling of pre-cast parabolic slabs		1-Proper		2-Not proper
32	Rehabilitation of Katcha / earthen portion of watercourse		1-Full length improved		2-Only lined portion
33	Number of Pacca Nakkas in Katcha/ earthen portion of watercourse	1-Number installed as required		2-Installed less than required	3-None installed
34	Number of Pacca Nakkas in lined portion of the watercourse	1-Number installed as required		2-Installed less than required	3-None installed
35	Number of Culverts provided on the watercourse	1-Provided as required	2-Less than required	3-None	4-Not required

COMMENTS

Name and Signature _____

Date _____

ANNEX-D: MONITORING TEMPLATE 3 (MT3)

PROCESS MONITORING OF WATERCOURSE IMPROVEMENT

Monitoring Template -3

Watercourse ID _____

SURVEY NAME AND DATE _____

PROCESS MONITORING FOR WATERCOURSE IMPROVEMENT

2. Identification of the Watercourse

- | | | | | |
|------|--|-------|-------------------------|------|
| 1.1 | Watercourse 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 watercourse on the canal | Head | Middle | Tail |
| 1.14 | Director OFWM / Agriculture Department | _____ | | |

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Watercourse Improvement - Process Monitoring Template MT3

**** Note: This form is designed based on two major types of watercourses; Bricks and Parabolic.**

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Watercourse Improvement - Process Monitoring Template MT3

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Watercourse Improvement - Process Monitoring Template MT3

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Watercourse Improvement - Process Monitoring Template MT3

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Watercourse Improvement - Process Monitoring Template MT3

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Watercourse Improvement - Process Monitoring Template MT3

ANNEX-E: MONITORING TEMPLATE 4 (MT4)

WATERCOURSES BENEFICIARIES' FEEDBACK

Monitoring Template-4.1

Watercourse 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 watercourse has not yet been started at the time of survey

Identification

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

Beneficiary Feedback: Part-A

1	Are you a member of the Watercourse Association (WCA)? (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 or 3) Do you participate in the meetings?	Always	1	
		Occasionally	2	
		Never	3	
7	(If the answer in question 5 is 1, 2 or 3) 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 watercourse association?	1	2	3
10	Were you approached to be member of watercourse association?	1	2	3
11	Do you know that your watercourse 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 watercourse length?	1	2	3
13	Would you like to be a member of watercourse association?	1	2	3
14	Do you think that watercourse lining up to 50% will benefit you?	1	2	3
15	Do you think that if the watercourse is reconstructed, trees will be cut	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

Watercourse ID _____

NAME AND DATE OF SURVEY _____

BENEFICIARY FEEDBACK FORM-2

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

1. Identification

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. Beneficiary Feedback: Part-A

1	Are you a member of the Watercourse Association (WCA)? <i>If "NO" or "NA" then skip to question 8)</i>	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 or 3) Do you participate in the meetings?	Always	1	
		Occasionally	2	
		Never	3	
7	(If the answer in question 5 is 1, 2 or 3) 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
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3

9	Do you know about watercourse association?	1	2	3
10	Were you approached to be member of watercourse association?	1	2	3
11	Do you know that your watercourse 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 watercourse length?	1	2	3
13	Would you like to be a member of watercourse association?	1	2	3
14	Do you think that watercourse lining up to 50% will benefit you?	1	2	3
15	Do you think that if the watercourse 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 watercourse 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 watercourse was earthen improved/renovated?	1-YES	2-NO
22	If 'Yes' how much in your view watercourse 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
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

Watercourse ID _____

NAME AND DATE OF SURVEY _____

BENEFICIARY FEEDBACK FORM-3

Use this template if the watercourse has already been improved / lined at the time of survey

1. Identification

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. Beneficiary Feedback: Part-A

1	Are you a member of the Watercourse Association (WCA)? <i>(If answer is "NO" or "NA" then skip to question 8)</i>	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	<i>(If the answer in question 5 is 1, 2 or3)</i> Do you participate in the meetings?	Always	1	
		Occasionally	2	
		Never	3	
7	<i>(If the answer in question 5 is 1, 2 or3)</i> 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 watercourse association?	1	2	3
10	Were you approached to be member of watercourse association?	1	2	3
11	Do you know that your watercourse 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 watercourse length?	1	2	3
13	Would you like to be a member of watercourse association?	1	2	3
14	Do you think that watercourse lining up to 50% will benefit you?	1	2	3
15	Do you think that if the watercourse 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 watercourse 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 watercourse was earthen improved/renovated?		1-YES	2-NO	3-NA
19	If 'Yes' how much in your view watercourse 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 watercourse	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 watercourse lining?	1-YES	2-NO	3-NA
25	What arrangements are made by the WCA for maintenance of the watercourse?	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 Watercourses

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / 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 OFWM 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 Watercourse

- | | | | | |
|------|--|-------|-------------------------|------|
| 1.1 | Watercourse 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 watercourse on the canal | Head | Middle | Tail |
| 1.14 | Director OFWM / Agriculture Department | _____ | | |

2. Process Monitoring

Name and signature of Interviewer _____

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Process Monitoring of Water Storage Tanks MT6

ANNEX-H: MONITORING TEMPLATE 7 (MT7)

BENEFICIARIES' FEEDBACK FOR WATER STORAGE TANKS

Monitoring Template -7

WST ID _____

SURVEY NAME AND DATE

BENEFICIARIES' FEEDBACK FOR WATER STORAGE TANKS

Identification

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / 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 _____

ANNEX-I: MONITORING TEMPLATE 8.1 (MT8.1)

MONITORING TRAINING OF OWNERS OF LASER UNITS

MONITORING TEMPLATE 8.2 (MT8.2)

PROCESS MONITORING FOR PROVISION OF LASER UNITS

Monitoring Template-8.1

Laser Unit ID: _____

Monitoring, Evaluation and Impact Evaluation Consultants (ME&IE)

CHECKLIST FOR MONITORING OF OPERATORS OF LASER UNITS

1. IDENTIFICATION

- | | | | | |
|------|--|-------|-------------------------|------|
| 1.1 | Watercourse 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 watercourse on the canal | Head | Middle | Tail |
| 1.14 | Director OFWM / Agriculture Department | _____ | | |

AREAS OF TRAINING

Areas of training for farmers / service providers / operators of the laser units:

- a) Survey and designing for laser land leveling
- b) Planning and development of farm layouts considering soil type, farmer's tillage equipment, crops to be grown, source / quality of irrigation supplies, etc.
- c) Operation of laser units
- d) Maintenance and trouble-shooting of the equipment

2. EXTENT OF PARTICIPATION

- 2.1. Number of Trainees Expected: Male (No) _____ Female (No) _____
- 2.2. Actually Participated: Male (No) _____ Female (No) _____

3. AVAILABILITY OF FACILITIES

3.1. Audio-Visual Aids for Training

Blackboard	Yes	No	Flip Charts	Yes	No
Overhead Projector	Yes	No	Multimedia	Yes	No
White Board	Yes	No	Any other _____	Yes	No

- 3.2. Refreshments Provided to the Participants Yes No
- 3.3. Necessary Stationery for the trainees Yes No
- 3.4. Handouts provided to the trainees Yes No
- 3.5. Copies of the curriculum provided to the trainees Yes No

4. OTHER ASSESSMENT ITEMS

S.#	Assessment Items	Evaluator's Judgment (cross the relevant box)				
		1	2	3	4	5
4.1	Coverage					
	i) Extent of coverage of the curriculum					
	ii) Depth of trainer's knowledge					
	iii) Other related topics covered					
4.2	Effectiveness of the Speakers/Trainers					
	i) How subject matter was introduced					
	ii) Use of Participatory Approach					
	iii) Clarity/command on the subject					
	iv) Style of delivery					
	v) Reference to handouts/training material					
	vi) Confidence of the trainer					
	vii) Use of Audio-Visual Aids					
	viii) Handouts Provided					

	ix) Level of Interest Maintained					
	x) Managed Session within Time Limit					
	xi) Effective Reply to Questions					
	xii) Explained with examples					
4.3	Group Discussions					
	i) Level of Participation of Trainees					
	ii) Question Answer session Held					
	ii). Quality of Group Discussions					
4.4	Training Environment					
	i) Seating Arrangement					
	ii) Comfort of Participants					
	ii). General Discipline					
	iv) Participation Environment/Encouragement					
	v) General Treatment Extended by TAT Staff					
4.5	Participants/Trainees					
	i) Enthusiasm					
	ii) Level of Participation/Involvement					
	iii) Regularity/Attendance					
4.6	Overall Assessment of the Training Process					

Note: 1 Excellent; 2 Very good; 3 Good; 4 Satisfactory; 5 Not Satisfactory

5. General Comments

6. Name of Monitor _____ Signatures _____

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Laser Land Leveler - Process Monitoring Template MT8.2

NATIONAL PROGRAM FOR IMPROVEMENT OF WATERCOURSES IN PAKISTAN PHASE-II

Laser Land Leveler - Process Monitoring Template MT8.2

ANNEX-J: MONITORING TEMPLATE 9 (MT9)

BENEFICIARIES' FEEDBACK FOR LASER UNITS

Monitoring Template -9

LASER UNIT ID _____

SURVEY NAME AND DATE _____

BENEFICIARIES' FEEDBACK FOR LASER UNITS

1. Identification

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. BENEFICIARY FEEDBACK

1	Delivery of the unit	Timely	Delayed		No comments
2	Quality / durability of the unit	Good	Satisfactory	Not satisfactory	Do not Know
3	After sale service of the SSC	Good	Poor	Very Poor	Do not Know
4	Complaints attended by the SSC	Promptly	Not Promptly	No Response	Do not Know
5	Rates charged by the SSC to provide the after-sale service	Costly	Normal	Do not know	
6	Availability of spares	When required	Takes long time	Do not know	

7	Prices charged by the SSC for the spares	Costly	Normal	Do not know
8	Spares are available	Only with the SSC	From open market	I did not need yet
9	Raining Survey and design		Yes	No
10	Training in Planning and layout		Yes	No
11	Training in operation of the unit		Yes	No
12	Training in maintenance and trouble shooting		Yes	No

Name and Signature of the enumerator _____

ANNEX-K: MONITORING TEMPLATE 10 TO 15

BASELINE SURVEY OF WATERCOURSES

Monitoring Template -10

Watercourse ID _____

NAME AND DATE OF SURVEY _____

VILLAGE PROFILE

A. IDENTIFICATION

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

B. VILLAGE SOCIO-ECONOMIC DATA

1. Total Population of the village (Persons)		2. Number of farming households		
3. Number of artisan households		4. Number of laboring households		
5. Number of business / trading households		6. Number of other households (e.g. doing govt. or private service)		
7. Total command area of the village (Acres)		8. Number of watercourses in the village		
9. Number of watercourses in the village		10. Availability of electricity	1-YES	2-NO
11. Source of drinking water (tick two major sources)	1-Hand Pump	2-Well	3-Water Supply scheme	4-Other
12. Sources of irrigation water	1-Canal	2-Tube Well	3-Canal +Tube Well	4-Rain-Fed

C. AVAILABILITY OF SERVICES / FACILITIES

S.#	How close are the following Services facilities from the village	In the village	Distance if not in the village (Km)
1	Police station		
2	City / town		
3	Metalled road		
5	Telephone service		
6	Bank branch office		
7	Post office		
8	Public Transport		
9	Primary school for boys		
10	Primary school for girls		
11	Secondary School for boys		
12	Secondary School for girls		
13	College for boys		
14	College for girls		
15	Basic Health Unit (BHU)		
16	Rural Health Center		
17	PPHI Center		
18	Community center		
19	Mobile shop		
20	Agriculture extension office		
21	Water Management office		
22	Agriculture bank		
23	Farm Produce Market (Mandi)		

S.#	How close are the following Services facilities from the village	In the village	Distance if not in the village (Km)
24	Veterinary hospital		
25	Pesticide dealer		
26	NGO office		
27	Fertilizer shop		

28	Seeds shop		
29	Kiryana (grocery) shop		
30	Tractor Mechanic Shop		

D. LIST OF MAJOR CROPS GROWN IN THE VILLAGE (Tick all crops reported)

Name of Crop	Tick (v)	Name of Crop	Tick (v)
1. Wheat		2. Rice	
3. Cotton		4. Sugarcane	
5. Sunflower		6. Rape Seed and Mustered	
7. Mango		8. Dates	
9. Banana		10. Tomato	
11. Chilli		12. Okra	
13. Onion		14. Fodder	
15. Any Other (Specify) _____		16. Any Other (Specify) _____	

E. Agriculture Output Prices

S.#	Name of Crop	Product (Rs./Md)	Bi-Product (Rs./Md)
1	Wheat		
2	Rice		
3	Cotton		
4	Sugarcane		
5	Sunflower		
6	Rapeseed		
7	Mango		
8	Dates		
9	Banana		
10	Tomato		
11	Chilli		
12	Okra		
13	Onion		
14	Fodder		

F. Agriculture input prices including transportation cost

S.#	Commodities/Inputs	Unit	Unit Price (Rs.)
1	Urea	Bag	
2	DAP	Bag	
3	Potash	Bag	
4	SSP	Bag	
5	23-23	Bag	
6	FYM	Ton	
7	Seed of Wheat	Kg	
8	Seed of Rice	Kg	
9	Seed of Cotton	Kg	
10	Seed of Sugarcane	Kg	
11	Seed of sunflower	Kg	
12	Seed of Rapeseed	Kg	
13	Seed of Tomato	Kg	
14	Seed of chilli	Kg	
15	Seed of Okra	Kg	
16	Seed of Onion	Kg	
17	Tractor use	Hour	
18	Tube Well Water	Hour	

19	Thresher	Hour	
20	Laser Land Levelling	Hour	
21	Deep Ripping	Hour	
22	Labour	Day	

COMMENTS

Name and Signature _____

Date _____

Monitoring Template -11

Watercourse ID _____

NAME AND DATE OF SURVEY _____

LIST OF WATERCOURSE SHAREHOLDERS

1. Identification of the Watercourse

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. Shareholders List

S.#	Name of Shareholder	Area Owned (Acres)	Area Rented-in (Acres)	Area Rented-out (Acres)	Area operated (Acres)	Gender 1. Male; 2. Female	Location on WC 1. Head, 2. Middle, 3. Tail
1							
2							
3							
4							
5							
6							

S.#	Name of Shareholder	Area Owned (Acres)	Area Rented-in (Acres)	Area Rented-out (Acres)	Area operated (Acres)	Gender 1. Male; 2. Female	Location on WC 1. Head, 2. Middle, 3. Tail
7							
8							
9							
10							
11							
12							

Note: Use additional sheets if the number is more than 14.

Name and signature of Interviewer _____ Date _____

Monitoring Template -12

Watercourse ID _____

NAME AND DATE OF SURVEY _____

LIST OF WATERCOURSE BENEFICIARY

1. Identification of the Watercourse

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. List of Beneficiary

S.#	Name of Share Croppers / tenants / Lease holders, etc.	Area operated in Acres	Gender 1. Male; 2. Female	Location on WC 1. Head; 2. Middle; 3. Tail
1				
2				
3				
4				
5				

S.#	Name of Share Croppers / tenants / Lease holders, etc.	Area operated in Acres	Gender 1. Male; 2. Female	Location on WC 1. Head; 2. Middle; 3. Tail
6				
7				
8				
9				
10				
11				
12				

Note: Use additional sheets if the number is more than 12.

Name and signature of Interviewer _____ Date _____

Monitoring Template -13

Watercourse ID _____

NAME AND DATE OF THE SURVEY _____

BRIEF PROFILE OF SELECTED WATERCOURSE

S. #	QUESTIONS	ANSWERES		
1	Name of selected watercourse			
2	Name of Canal			
3	Name of Distributary/Branch/minor			
4	Name of Village			
5	Name of Taluka			
6	Name of District			
7	Name of District Team			
8	Name of Field Team			
9	Status of watercourse improvement. <i>(please tick one code which shows the latest stage of the watercourse improvement)</i>	Code	Status	
		4	Technical Sanction (TS) issued	
		5	First milestone certification issued	
		6	Second milestone issued	
		7	Final Completion Report (FCR) issued	
		8	Watercourse handed over to WCA	
10	If the watercourse has been handed over to watercourse association, mention date of handing over	DD	MM	YEAR
11	Total lining length in meters if WC has been completed / handed over			
12	Total length of the watercourse in meters			
13	Total command area of the watercourse in acres			

S. #	QUESTIONS	ANSWERES		
14	Location of the WC on Distributary/Minor, etc. (tick one)	1-Head	2-Middle	3-Tail
15	Quality of underground water	1-Saline	2-Fresh	
16	Number of shareholders (owners) on the watercourse by size of farm	Farm stage category		Number
		Small (up to 12.5 acres)		
		Medium (Above 12.5 up to 25 acres)		
		Large (Above 25 acres)		
17	Number of other beneficiaries including "tenants", "Farming on Annual Lease basis" and others	Farm stage category		Number
		Small (up to 12.5 acres)		
		Medium (Above 12.5 up to 25 acres)		
		Large (Above 25 acres)		
18	Mode of lining (tick one)	1-Rectangular	2-Parabolic	3-PVC Pipe
19	Sanctioned Discharge (LPS)		17. Design Discharge (LPS)	

COMMENTS

Name and Signature _____

Date _____

Watercurses Data from the Client for Sampling MT14

Monitoring Template -15

Watercourse ID _____

NAME AND DATE OF THE SURVEY _____

QUESTIONNAIRE FOR FARMING HOUSEHOLDS

1. IDENTIFICATION

- 1.1 Watercourse 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 watercourse 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		Laser Land Leveling		Deep Ripping		Use of Seed	
		Acres	Hr./Ac.	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)									
Hena Plantation (Old)									
Hena Plantation (New)									
Tomato									
Chili									
Okra									
Onion									
Rabi Fodder									
Kharif Fodder									
Other Orchard (New)-Name									
Other Orchard (Old)-Name									
Other Field Crop-Name									
Other Vegetable-Name									

4.2. CROP INPUTS (Rabi Year _____ and Kharif Year _____)

Name of Crop	Seedling Cost Total (Rs.)		Total Cost of plants for orchards /hena plantation Rs.	Use of Chemical Fertilizers (Bags)				Use of Chemicals	
	Home Grown	Bought		Urea	DAP	Potash (SOP)	NP (23-23)	Other	Area treated (Acres)
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)									
Hena Plantations (Old)									
Hena Plantations (new)									
Tomato									
Chili									
Okra									
Onion									
Rabi Fodder									
Kharif Fodder									
Other Orchard Old-									
Other Orchard New- Name									
Other Field Crop-Name									
Other Vegetable - Name									

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)											
Hena Plantations (Old)											
Hena Plantations (new)											
Tomato											
Chili											
Okra											
Onion											
Rabi Fodder											
Kharif Fodder											
Other Orchard Old-											
Other Orchard New-											
Name											
Other Field Crop-Name											
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 through contractor	
	Area picked by pickers (Acres)	Number of picking per acre	Share of pickers in output (%)				Acres harvested	Share of harvesters in output (%)	Acres threshed	Share of contractor in the output (%)
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)										
Hena Plantations (Old)										
Hena Plantations (new)										
Tomato										
Chili										
Okra										
Onion										
Rabi Fodder										
Kharif Fodder										
Other Orchard Old-Name										
Other Orchard New-Name										
Other Field Crop-Name										
Other Vegetable - Name										

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

Name of Crop	Laser Land Leveling				Deep Ripping				Land Preparation			
	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)												
Hena Plantations (Old)												
Hena Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old-Name												
Other Orchard New-Name												
Other Field Crop-Name												
Other Vegetable - Name												

(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)												
Hena Plantations (Old)												
Hena Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old-Name												
Other Orchard New-Name												
Other Field Crop-Name												
Other Vegetable – Name												

(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)												
Hena Plantations (Old)												
Hena Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old-Name												
Other Orchard New-Name												
Other Field Crop-Name												
Other Vegetable - Name												

(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)															
Hena Plantations (Old)															
Hena Plantations (new)															
Tomato															
Chili															
Okra															
Onion															
Rabi Fodder															
Kharif Fodder															
Other Orchard Old-Name															
Other Orchard New-															
Other Field Crop-Name															
Other Vegetable - Name															

(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)															
Hena Plantations (Old)															
Hena Plantations (new)															
Tomato															
Chili															
Okra															
Onion															
Rabi Fodder															
Kharif Fodder															
Other Orchard Old-															
Other Orchard New-															
Other Field Crop-Name															
Other Vegetable - Name															

(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,												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Hena Plantations (Old)												
Hena Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old-												
Other Orchard New-												
Other Field Crop-Name												
Other Vegetable - Name												

(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,												
Mango Orchard (Old)												
Mango Orchard (New)												
Dates Orchard (Old)												
Dates Orchard (New)												
Banana Orchard (Old)												
Banana Orchard (New)												
Lemon Orchard (Old)												
Lemon Orchard (New)												
Hena Plantations (Old)												
Hena Plantations (new)												
Tomato												
Chili												
Okra												
Onion												
Rabi Fodder												
Kharif Fodder												
Other Orchard Old-Name												
Other Orchard New-Name												
Other Field Crop-Name												
Other Vegetable - Name												

(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)				
Hena Plantations (Old)				
Hena Plantations (new)				
Tomato				
Chili				
Okra				
Onion				
Rabi Fodder				
Kharif Fodder				
Other Orchard Old-Name				
Other Orchard New-Name				
Other Field Crop-Name				
Other Vegetable - Name				

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

6.1. Crop Yield (Maund /Acre)

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		
23-23			Laser Land Leveling		
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			Lift Pump per hour		
Seed of Sunflower			Laser charges per		
Seed of Rapeseed			Thresher Rs. Per hour		
Seed of Tomato			Permanent hired		
Seed of Chili			Permanent hired		
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.	How many acres of land were irrigated in one turn before laser land leveling?		
7.2	How many acres are irrigated in one turn after laser land leveling?		
7.3	Do you think crop yields have increased in the fields where laser land leveling was done?	Yes	No
7.4	Do you think waterlogging has reduced after watercourse lining?	Yes	No
7.5	Do you think salinity has reduced after watercourse lining	Yes	No

COMMENTS

Name and Signatures: _____

ANNEX-L: MONITORING TEMPLATE 16 (MT16)

WATER STORAGE TANKS CAPACITY DATA

Monitoring Template -16

WST ID _____

SURVEY NAME AND DATE

WATER STORAGE TANK CAPACITY / WATER SAVING DATA

1 Identification

- | | | | | |
|------|--|-------|-------------------------|------|
| 1.1 | Watercourse 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 watercourse on the canal | Head | Middle | Tail |
| 1.14 | Director OFWM / Agriculture Department | _____ | | |

2. Beneficiary Feedback: Part-A

To estimate water saving due to WSTs, first a pilot survey will be done to know the patterns of WST fillings and water intakes from the tank. After acquiring this information, methodology for water saving from the WSTs will be devised and implemented.

Name and signature of enumerators _____

ANNEX-M: MONITORING TEMPLATE 17 (MT17)

WATERCOURSE FLOW MEASUREMENT DATA

Monitoring Template 17

Watercourse ID _____

Pygmy Current Meter PCM) Readings for Determination of Velocity

1. IDENTIFICATION

- 1.1 Watercourse 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 watercourse on the canal Head Middle Tail
- 1.14 Director OFWM / Agriculture Department _____

2. Watercourse Improvement Status

1	Total Watercourse Length in Meters _____				
2	Stage of Watercourse Improvement (tick)	Improved		Not improved	
3	If watercourse is improved or TS issued then length of lining part in meters _____				
4	Type of lining if improved	Brick	Parabolic	PVC Pipe	
5	Name of Enumerator	A16	Signature with date		

B. STATION -1: PYGMY CURRENT METER READINGS NEAR WATERCOURSE OUTLET (At about 10 meters away from Mogha)

PYGMY CURRENT METER READING WITH

b) X-section width from edge of WC in inches _____ : d) WC depth in inches _____

Observations	Pygmy Current Meter Depth in inches	Pygmy Current meter revolution counts in 40 seconds
Observation-1	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 1 to 2 feet, skip to next station OTHERWISE CONTINUE WITH 'Observation-2'

Observation-2	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 2 to 3 feet skip to next station, otherwise continue with 'observation-3'

Observation-3	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

SKETCH OF WATERCOURSE CROSS SECTION AREA

COMMENTS:

- C. **STATION-2: PYGMY CURRENT METER READINGS CLOSE TO THE END OF LINING PART (At about 10 meters before the end)**

PYGMY CURRENT METER READING WITH

b) X-section width from edge of WC in inches _____ : d) WC depth in inches _____

Observations	Pygmy Current Meter Depth in inches	Pygmy Current meter revolution counts in 40 seconds
Observation-1	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 1 to 2 feet, skip to next station OTHERWISE CONTINUE WITH 'Observation-2'

Observation-2	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 2 to 3 feet skip to next station, otherwise continue with 'observation-3'

Observation-3	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

SKETCH OF WATERCOURSE CROSS SECTION AREA

COMMENTS:

D. STATION-3: PYGMY CURRENT METER READINGS AT MID POINT OF MIDDLE REACH OF THE WATERCOURSE (At about middle of total length of the watercourse)

PYGMY CURRENT METER READING WITH

b) X-section width from edge of WC in inches _____ : d) WC depth in inches _____

Observations	Pygmy Current Meter Depth in inches	Pygmy Current meter revolution counts in 40 seconds
Observation-1	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 1 to 2 feet, skip to next station OTHERWISE CONTINUE WITH 'Observation-2'

Observation-2	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 2 to 3 feet skip to next station, otherwise continue with 'observation-3'

Observation-3	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

SKETCH OF WATERCOURSE CROSS SECTION AREA

COMMENTS:

**E. PYGMY CURRENT METER READINGS AT MID POINT OF TAIL REACH OF THE WATERCOURSE
(At about 75% length of the watercourse)**

PYGMY CURRENT METER READING WITH

b) X-section width from edge of WC in inches _____ : d) WC depth in inches _____

Observations	Pygmy Current Meter Depth in inches	Pygmy Current meter revolution counts in 40 seconds
Observation-1	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 1 to 2 feet, skip to next station OTHERWISE CONTINUE WITH 'Observation-2'

Observation-2	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

If the cross-section of the watercourse is 2 to 3 feet skip to next station, otherwise continue with 'observation-3'

Observation-3	Depth-1 in inches _____	
	Depth-2 in inches _____	
	Depth-3 in inches _____	

SKETCH OF WATERCOURSE CROSS SECTION AREA

COMMENTS:

Name and Signature of Measurer _____

ANNEX-N: MONITORING TEMPLATE 18 (MT18)

LASER UNITS OPERATIONS DATA

Monitoring Template -18

Serial Number of Laser Unit _____

FOLLOW UP VISIT TO THE LASER LAND LEVELING EQUIPMENT RECEIVERS

A. Identification

A1. Name of Farmer / Service Provider with address: _____

A2. Make and Model laser unit _____ A3. Date of Delivery _____

A4. Farm Size _____ A5. Location at W/C: Head / Middle / Tail

A6. Name of Water Course _____ A7. Name of Tube well _____

A8. Minor/Distributary _____ A9. Canal _____

A10. Field Team _____ A11. Village _____ 12. Taluka _____

A13 District _____ A14. Directorate _____

A15. Date of Field Visit by ME&IE Consultants team _____

B. Monitoring Checklist

B1	B1.1. The unit is in physical possession of the farmer / service provider as verified by the ME&IE Consultants team	Yes	No
	If 'YES' continue with B1-2, otherwise skip to B1.4		
B1.2. Indicate make and model of the unit (tick the unit that was physically verified and also specify address where Laser physically placed/working) at the time of ME&IE Consultants team visited: B1.2.1. Village: _____ B1.2.2. Taluka: _____ B1.2.3. District: _____ B1.2.4. Region: _____ (TAKE SNAPS OF THE UNIT WITH DATE AND COORDINATES)	AG 401	LL300S	
	AGL 3000 S	HIL TI PR2-HS	
	AGRO Lasers Smart	Proshot Pioneer XD	
	Alpha XD 32, MEI 367 SB	Any other pl. Specify:	
	AMA Laser DL 50		
B1.3. Condition / upkeep of the unit	Good	Satisfactory	Not satisfactory
Skip to B2			

	B1.4. If "NO" in question-B1.1, then reasons	B1.4(a) The service provider did not allow to see the unit	1	
		B1.4(b) It was told that the unit was sent for land leveling and the SP disagree to take the team	2	
		B1.4(c) Anything else (specify) _____	3	
B2	The service provider / farmer uses the laser unit for agricultural purposes only	Yes	No	
B3	Do you have one trained operator for your equipment?	Yes	No	
B4	Qualification of Operator: Primary/Middle _____ Matric _____ Inter& above _____			
B5	The operator has been given training in:	B5.1. Operation of Laser Leveler	Yes	No
		B5.2. Trouble Shooting	Yes	No
		B5.3. Repair & maintenance	Yes	No
		B5.4. Any other	Yes	No
B6	Keeps record of land leveled in writing or in memory (If "YES" continue with question-B7; if "NO" skip to question-B10)	Yes	No	
B7	Method of record keeping	B7.1. Keeps record in a logbook	1	
		B7.2. On loose papers /things	2	
		B7.3. Not in writing	3	
B8	Level of record keeping	Complete record is kept	1	
		Partial	2	
B9	Type information kept regarding farmers whose land was leveled (tick)	B9.1. Name of farmers served	1	
		B9.2. Land holding of farmers	2	
		B9.3. Area leveled in acres	3	
		B9.4. Date of land leveled	4	
		B9.5. Any other	5	
B10	B10.1. Submission of monthly progress report (If the answer is '1' or '2' then ask the farmer to show the last progress report submitted. B10.2. (Write month here _____) B10.3. (Write total area leveled in acres _____)	Regular	1	
		Occasional	2	
		Never	3	

B11	Land levelled during the last crop season (acres)	B11.1. Own land (acres)	
-----	---	-------------------------	--

				B11.2. Others' land (acres)		
				B11.3. Number of farmers served		
				B11.4. Duration in months		
B12	Receipts of expenditure relating to the equipment (tick)			B13.1. Keeps details of receipt	1	
				B13.2. Detail of expenditures	2	
				B13.3. Any other	3	
B13.	Detail of land leveled in acres during September, 2019 to August, 2020					
	Q. No.	Months, Years	Own land leveled in acres (a)	Land leveled on rent in acres (b)	Number of farmers served (c)	Rate per acre/hr in Rupees. (d)
						Hour
	B16.1	September, 2019				
	B16.2	October, 2019				
	B16.3	November, 2019				
	B16.4	December, 2019				
	B16.5	January, 2018				
	B16.6	February, 2020				
	B16.7	March, 2020				
	B16.8	April, 2020				
	B16.9	May, 2020				
	B16.10	June, 2020				
	B16.11	July, 2020				
	B16.12	August, 2020				

	Detail of land leveled in acres during September, 2020 to August, 2021					
	Q. No.	Months, Years	Own land leveled in acres (a)	Land leveled on rent in acres (b)	Number of farmers served (c)	Rate per acre in Rupees (d)
						Hour
	B17.1	September, 2020				
	B17.2	October, 2020				
	B17.3	November, 2020				
	B17.4	December, 2020				
	B17.5	January, 2021				

B17.6	February, 2021					
B17.7	March, 2021					
B17.8	April, 2021					
B17.9	May, 2021					
B17.10	June, 2021					
B17.11	July, 2021					
B17.12	August, 2021					

B15	Code of ME&IE Field Team	
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B16. Name of Enumerator _____ **Signature with date**

B17. Countersigned by concerned FTI: Name _____

Signature with date _____

ANNEX-O: PROJECT PROGRESS REPORTING FRAMEWORK (PPRF)

Project Title.....

Report Name and Period.....

Area Name

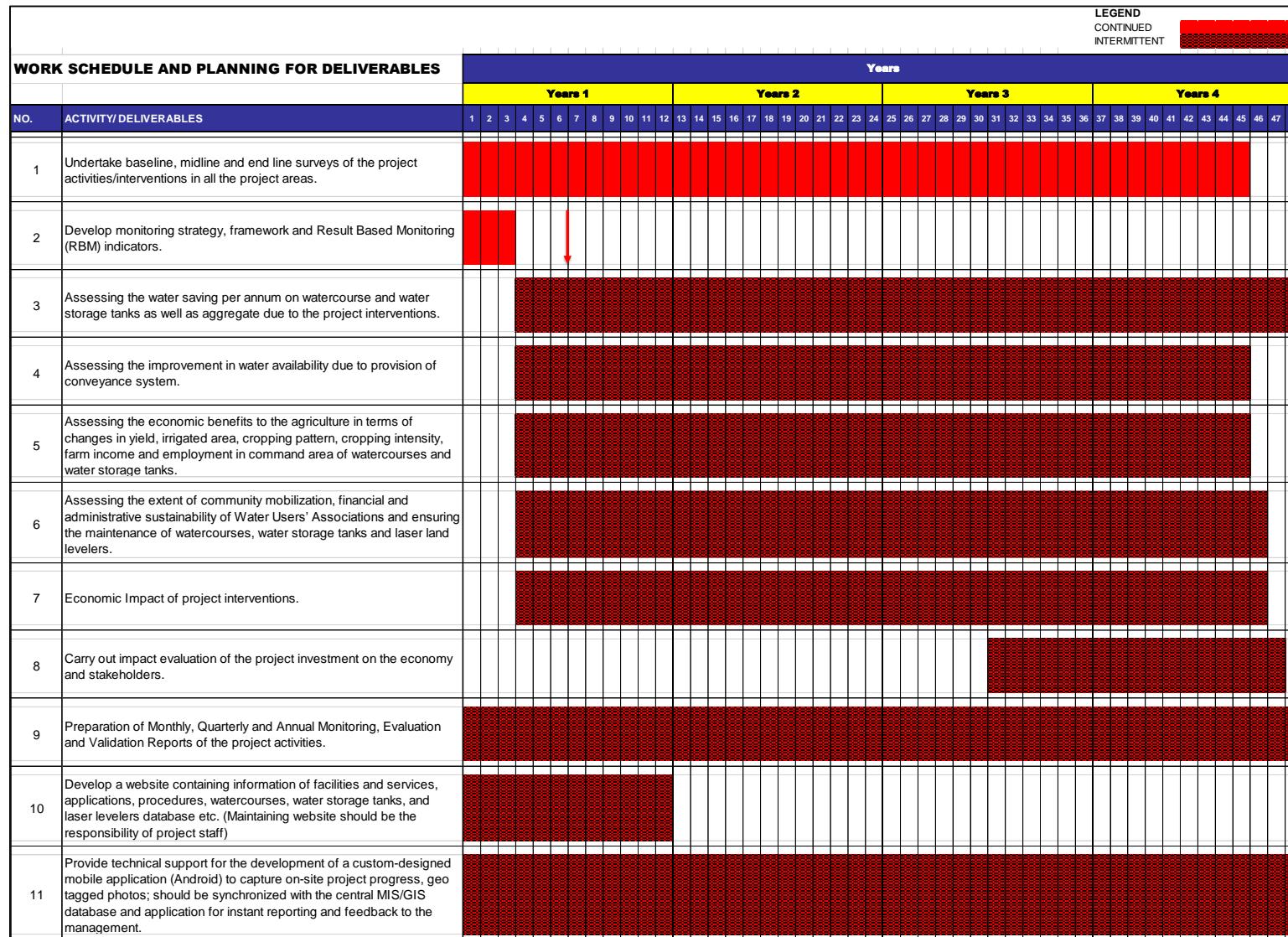
Sr. No.	STRATEGY /ACTIVITIES	Reporting Quarter							Year to Quarter (Cumulative)								
		Physical Progress			Financial Progress				Physical Progress			Financial Progress					
		Unit of Measure	Target / Planned	Actual / Achievement	Variance %	Committed Liability of Previous Year	Budget Allotted (PC-1)	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)
<u>Area details.....?</u>																	
1	Activity details																
<u>Sub Totals</u>																	
<u>Area details.....?</u>																	
2	Activity details																
<u>Sub Totals</u>																	
<u>Total(s)</u>																	
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-P: MATRIX OF RESPONSIBILITY

MATRIX OF RESPONSIBILITIES

SR. NO.	DELIVERABLE / ACTIVITIES	LEGEND			
		NPC-FPMU	Agriculture Dept. (QEWMM)	Project Consultants	ME&IE Consultants
1	Provision of Pre-requisite data of project components for starting of Field Activities: <ul style="list-style-type: none"> • Organization of Water Users Associations, • Watercourses Improvement, • Water Storage Tanks, • Laser Land Levelers, 	O	●	-	-
2	Certification of operational documents of the project, <ul style="list-style-type: none"> • Design, cost estimates, completion reports of watercourses, • Design, cost estimates, completion reports of water storage tanks, 	O	○	●	-
3	Undertake baseline, midline and endline surveys of the project activities/interventions in all the project areas.	-	-	-	●
4	Develop monitoring strategy, framework and Result Based Monitoring (RBM) indicators,	-	-	-	●
5	Assessing the water saving per annum on watercourse and water storage tanks as well as aggregate due to the project interventions.	-	-	-	●
6	Assessing the improvement in water availability due to provision of conveyance system.	-	-	-	●
7	Assessing the economic benefits to the agriculture in terms of increase in yield, irrigated area, cropping pattern, cropping intensity, farm income and employment in command area of watercourses and water storage tanks.	-	-	-	●
8	Assessing the extent of community mobilization, financial and administrative sustainability of Water Users' Associations and ensuring the maintenance of watercourses, water storage tanks and laser land levelers.	-	-	-	●
9	Economic Impact of project interventions.	-	-	-	●
10	Carryout impact evaluation of the project investment on the economy and stakeholders.	-	-	-	●
11	Preparation of Monthly, Quarterly and Annual Monitoring, Evaluation and Validation Reports of the project activities.	-	-	-	●
12	Develop a website containing information of facilities and services, applications, procedures, watercourses, water storage tanks, and laser levelers database etc. (Maintaining website should be the responsibility of project staff).	-	-	-	●
13	Provide technical support for the development of a custom-designed mobile application (Android) to capture on-site project progress, geo tagged photos; should be synchronized with the central MIS/GIS database and application for instant reporting and feedback to the	-	-	-	●

ANNEX-Q: ACTIVITY SCHEDULE (TECH-5)



ANNEX-R: 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	8	9	Home	Field	Total MM	
1. CONSULTANT CORE TEAM															
A. Key Staff															
1	Dr. Muhammad Abdul Quddus	Team Leader / Monitoring and Evaluation Specialist	Home	7.20	1.60	3.20	0.80	5.60	4.00	4.00	4.80	10.80	42.00	6.00	48.00
			Field	1.00	0.75	0.75	0.50	0.50	1.25	0.75	0.50				
	Dr. Sarwar Zahid	Deputy Team Leader/ M&E Specialist at H/Office	Home	2.50	6.25			4.75	3.25	4.50	5.25	17.50	44.00	4.00	48.00
			Field	0.50	1.00			0.50	1.00	0.50	0.50				
2	Dr. Sultan Ali Adil	Socio Economic Expert	Home	2.00	1.25			1.75	1.75	1.50	1.75		10.00	2.00	12.00
			Field	1.00				1.00							
3	Rizwan Saleem	ICT / Technology Specialist	Home	4.00	2.00	0.67	0.67	0.67	0.67	0.66	0.66	2.00	12.00	0.00	12.00
			Field												
4	Dr. Fateh Muhammad Chaudhry	Irrigation Agronomist	Home	1.00	0.80	2.80	1.00	0.75	0.45	0.40	0.80	1.00	9.00	2.00	11.00
			Field	0.40	0.20	0.80	0.40	0.20							
5	Dr. Muhammad Jameel Khan	Agricultural Economist	Home	3.00	2.00	1.00	4.00	8.00		2.00	2.00	3.00	25.00	5.00	30.00
			Field	1.00	0.50	0.50	1.00	2.00							
6	Muniza Bashir Tarar	Social & Gender Specialist	Home	4.25	1.25		0.50	1.50	1.00	0.75	1.00	1.75	12.00	2.00	14.00
			Field	0.40	0.10		0.50	0.30	0.70						
7	Waseem Ahmad Masood	Financial Management Specialist	Home	2.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	20.00	42.00	0.00	42.00
			Field												
													Total Core Team Key Staff	217.00	

TEAM COMPOSITION, ASSIGNMENT, AND KEY EXPERTS INPUTS															
		POSITION		1	2	3	4	5	6	7	8	9	Total Time in Months		
NO.	NAME OF EXPERT	POSITION	Home	1	2	3	4	5	6	7	8	9	Home	Field	Total MM
1. CONSULTANT CORE TEAM															
A. Key Staff															
B. Non-Key Staff															
1	TBN	Chief Project and Document Controller	Home	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	10.00	42.00	0	42.00
2	TBN	Supporting Technical & Non-Technical Staff	Home	19.00	19.00	19.00	19.00	19.00	19.00	18.00	18.00	42.00	192.00	0	192.00
3	TBN	Un-allocated man-months JV BOM	G3EC Ease Pak												6.00
4	TBN	ICT Manager	Home	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	8.00	24.00	0	24.00
5	TBN	Data Analyst	Home	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	16.00	48.00	0	48.00
6	TBN	Data Supervisor	Home	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	16.00	48.00	0	48.00
													Sub Total National Non-Key Staff	360	

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	8	9	Home	Field	Total MM	
2. ZONAL TEAMS															
A. Key Staff															
1	Dr. Ali Mohammad Khushak	Deputy Team Leader/ Monitoring and Evaluation Specialist I/C Peshawar Zone Team	Home Field	6.00 1.00	2.40 0.50	2.40 0.50	1.60 0.50	4.30 0.50	3.00 1.00	4.80 1.00	5.50 1.00	12.00 1.00	42.00 6.00	6.00 48	
2	Muhammad Yousaf Bhatti	Deputy Team Leader/ Monitoring and Evaluation Specialist I/C Lahore Zone Team	Home Field	6.00 1.00	2.40 0.50	2.40 0.50	1.60 0.50	4.30 0.50	3.00 1.00	4.80 1.00	5.50 1.00	12.00 1.00	42.00 6.00	6.00 48	
3	Rizwan Ahmed	Deputy Team Leader/ Monitoring and Evaluation Specialist I/C Quetta Zone Team	Home Field	6.00 1.00	2.40 0.50	2.40 0.50	1.60 0.50	4.30 0.50	3.00 1.00	4.80 1.00	5.50 1.00	12.00 1.00	42.00 6.00	6.00 48	
													Total Provincial Team Key Staff	144	
B. Non-Key Staff															
1	TBN	ICT/ Technology Specialist-03 Nos.	Home Field	44.00 2.00	24.00 2.00	12.00 3.00	8.00 2.00	8.00 1.00	8.00 1.00	8.00 1.00	24.00 1.50	144.00 3.50	0.00 33.00	144.00	
2	TBN	Irrigation Agronomist- 03 Nos.	Home Field	2.00 2.00	2.00 1.00	8.00 3.00	3.00 2.00	2.00 1.00	1.00 1.00	1.00 1.00	1.50 1.50	24.00 3.50	9.00 33.00		
3	TBN	Agricultural Economist- 03 Nos.	Home Field	3.50 1.30	2.50 0.50	1.50 0.50	5.00 1.70	9.00 2.00		2.00 2.00	2.50 2.50	4.00 6.00	30.00 30.00	6.00 36.00	
4	TBN	Social & Gender Specialist-03 Nos.	Home Field	10.75 1.50	2.50 1.00		1.25 0.50	3.50 1.00	2.00 2.00	1.50 1.50	2.50 2.50	6.00 6.00	30.00 30.00	6.00 36.00	
5	TBN	Supporting Technical & Non-Technical Staff (Various)	Home Field	15.50 15.50	34.00 34.00	158.00 0.00	0.00 158.00								
													Total Provincial Team Non-Key Staff	407	

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	8	9	Home	Field	Total MM	
3. ZONAL FIELD TEAMS															
1	TBN	Field Team Incharge / M&E Expert / Socio-Economic Expert (10 Nos.)	Home*	7.00	2.00	2.00	5.00	5.00	5.00	5.00	12.00	48.00	432.00	480.00	
2	TBN	Field Engineers / Technicians (20 Nos.)	Home*	412.00		107.00	107.00	107.00	107.00			840.00	0	840.00	
Total Consultant's Field Teams													1320		
Grand Total													2448		