



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



WATER SAVING THROUGH NPIWC-II PROJECT INTERVENTIONS



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





Federal Project Management Unit (FPMU)
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)

WATER SAVING THROUGH NPIWC II PROJECT INTERVENTIONS
JANUARY 2024

CONTENTS

EXECUTIVE SUMMARY.....	1
1. Impact Evaluation of Component (Improvement of Watercourses)	1
2. Impact Evaluation of Component C3 (Construction of WSTs)	2
3. Impact Evaluation of Component C4 (Provision of PLL)	2
1. INTRODUCTION.....	3
2. METHODOLOGY:.....	6
2.1 Sample Size for Impact Evaluation	6
2.2 Surveys for Impact Evaluation	7
2.3 Water Saving Estimation	7
Following section deals with water saying.	7
2.3.1 Water Saving on Watercourses	7
2.3.2 Water Savings on WSTs	7
2.3.3 Water savings due to Precision Laser Land Leveling	8
2.4 Impact Evaluation on the Economy	8
2.5 Impact Evaluation on the Stakeholders	8
3. RESULTS & DISCUSSION	9
3.1 Progress Monitoring	9
3.3.1 Improving Watercourses	9
3.3.2 Constructing Water Storage Tanks (WSTs)	10
4. IMPACT EVALUATION OF COMPONENT C2	12
5. IMPACT EVALUATION OF COMPONENT C3	33
6. IMPACT EVALUATION OF COMPONENT C4	48
REFERENCES	50

LIST OF TABLES

Table 1 : Sample Size for WUAs Mobilization and Watercourses Improvement Components	6
Table 2 : Sample Size for WST Construction Component	6
Table 3 : Table-3: Sample Size for PLL Delivery Component	6
Table 4 : Improving Watercourses: Achievements Versus Project Targets by the end of June 2023	9
Table 5 : Construction of WSTs: Achievements Versus Project Targets by the end of June 2023	10

Table 6 : Provision of PLL Units: Achievements versus Project Targets by the End of June. 2023	10
Table 7 : Baseline and Midline/ Impact Sample Size for Monitoring Evaluation of Watercourses	12
Table 8 : Respondent Sample Farmers on 421 Sample Watercourses	12
Table 9 : Types of Sample Watercourses.....	13
Table 10 : Sample Watercourses According to Type of Lining	13
Table 11 : Impact/Midline Sample Watercourses According to Water Source	13
Table 12 : Non-Canal Sample Watercourses According to Water Source	14
Table 13 : Location of Sample Canal WC on Minor / Distributary	14
Table 14 : Quality of Ground Water in Sample Watercourses	14
Table 15 : Culturable Command Area (CCA) on Sample WC	15
Table 16 : Table 16: Distribution of Farmers According to Size of Holding	15
Table 17 : Distribution of Sample Farmers According to Tenure	15
Table 18 : Table 18: Farmer's Location on Watercourses	15
Table 19 : Total and Average Farm Area or Size of Holding (Acres) on Sample Farms	16
Table 20 : Table 20: Impact of WC Improvement on Cultivated Area (In acres)	17
Table 21 : Impact of WC Improvement on Overall Land Use Intensities on Sample Farms	17
Table 22 : Impact of WC Improvement on Cropping Intensities on Non-Canal Sample Farms	21
Table 23 : Impact of Watercourse Improvement on Crop Yields on Sample Farms.....	21
Table 24 : Impact of WC Improvement on Crop Area and Cropping Pattern on Sample Farms	23
Table 25 : Impact of Watercourse Improvement on Crop Production on Sample Farms	26
Table 26 : Impact of Watercourse Improvement on Agriculture Household Income	29
Table 27 : Impact on Total Gross and net Income of all the farms under completed Watercourses.....	29
Table 28 : Baseline and Midline/ Impact Sample Size for Monitoring Evaluation of WSTs.....	33
Table 29 : Farmer's Perception on Increase in Cropping Intensity and Crop Yields	35
Table 30 : Distribution of Farmers According to Tenure	36
Table 31 : Impact of WST Construction on Cultivated Area	37
Table 32 : Impact of WST Construction on Cropped Area	38
Table 33 2: Impact of WST Improvement on Land Use Intensities	39
Table 34 : Impact of WST Improvement on Crop Area and Cropping Pattern on Sample Farms.....	42
Table 535 : Impact on Total Gross and net Income of all the farms under completed Watercourses.....	46
Table 36 : WST Completed as per Approved Standards and Specifications.....	47
Table 37 : Issuance of Excavation Certificate by the Consultant	47
Table 38 : Subsidy Paid as per Cost Estimates.....	48
Table 39 : Annual Water Savings due to Laser Land Levelling.....	50

LIST OF FIGURES

Figure 1 : Watercourses Improvement: Achievements versus Project Targets	9
Figure 2 : Construction of WST: Achievements versus Project Targets.....	10
Figure 3 : Delivery of PLL Units: Achievements versus Project Targets.....	11
Figure 4 : Average Farm Area of Watercourse Sample Farms.....	16
Figure 5 : Impact of Watercourses Improvement on Land Use Intensities on Sample Farms	18
Figure 6 : Impact of Watercourses Improvement on Cropping Intensities on Sample Farms.....	20
Figure 7 : Impact of WC improvement on Major Crop Yields on Sample Farms	22
Figure 8 : Impact of WC improvement on Minor Crop Yields on Sample Farms	23
Figure 9 : Impact of WC improvement on Fruit Vegetables Yields on Sample Farms	23
Figure 10 : Impact of WC Improvement on Major Crop Area of Major Crops	24
Figure 11 : Impact of WC Improvement on Minor Crop Area of Major Crops	25
Figure 12 : Impact of WC Improvement on Crop Area under Fruit Vegetables on Sample Farms	25
Figure 13 : Impact of WC Improvement on Production of Major Crops on Sample Farms	27
Figure 14 : Impact of WC Improvement on Production of Minor Crops on Sample Farms.....	27
Figure 15 : Impact of WC on Production of Vegetables on Sample Farms	27
Figure 16 : Average Size of Holding or Farm Size of Sample WSTs' Farms	34
Figure 17 : Impact of WST Construction on Cultivated Area on Sample Farms	37

Figure 18 : Impact of WST Construction on Land Use Intensities on Sample Farms	38
Figure 19 : Impact of WST Construction on Cropped Area on Sample Farms	39
Figure 20 : Impact of WST Construction on Cropping Intensities on Sample Farms	40
Figure 21 : Impact of WST Construction on Major Crop Yields on Sample Farms.....	41
Figure 22 : Impact of WST Construction on Fruit Vegetables Yields on Sample Farms.....	41
Figure 23 : Impact of WST Construction on Crop Area of Major Crops on Sample Farms	42
Figure 24 : Impact of WST Construction on Area under Pulses, Fruit Vegetables on Sample Farms	43
Figure 25 : Impact of WST Construction on Major Crops Production on Sample Farms	44
Figure 26 : Impact of WST Construction on Fruit & Vegetable Production on Sample Farms	44

LIST OF ANNEXURE

ANNEXURE A : MONITORING LOG-FRAME.....	52
ANNEXURE B : FIELD SURVEY SCHEDULE - ZONE/UNIT WISE	57
ANNEXURE C : ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP AREA AND CROPPING PATTERN	97
ANNEXURE D : ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP YEILD ON SAMPLE FARMS	102
ANNEXURE E : ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP PRODUCTION.....	107
ANNEXURE F : ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON AGRICULTURE EMPLOYMENT	112
ANNEXURE G : ZONE-WISE IMPACT OF WATER TANKS ON CROP AREA AND CROPPING PATTERN	117
ANNEXURE H : ZONE-WISE IMPACT OF WATER TANKS ON CROP YIELDS	121
ANNEXURE I : ZONE-WISE IMPACT OF WATER TANKS ON CROP PRODUCTION	125
ANNEXURE J : ZONE-WISE IMPACT OF WATER TANK ON AGRICULTURE EMPLOYMENT.....	129
ANNEXURE K : WUA MONITORING AND WATERCOURSE IMPACT SURVEY TOOL	133
ANNEXURE L : WATER STORAGE TANKS IMPACT SURVEY TOOL.....	155
ANNEXURE M : SPOT CHECKING OF WATERCOURSES TOOL.....	163
ANNEXURE N : SPOT CHECKING TOOL FOR WATER STORAGE TANKS.....	168
ANNEXURE O : MONITORING TOOLS FOR PLL MTS LASER LAND LEVELING.....	170

WATER SAVING THROUGH NPIWC II PROJECT INTERVENTIONS

EXECUTIVE SUMMARY

Water is life. It has an important role in agriculture. Irrigation water helps to make grow crops, maintain landscapes, and re-vegetate disturbed soils in dry and arid areas. Also during times of below-average rainfall. Furthermore, to these purpose, irrigation is also employed to protect crops from frost, suppress weed growth in grain fields, and prevent soil consolidation. Irrigation offers moisture required for growth and development, germination and other related functions. The frequency, rate, amount and time of irrigation are different for different crops and also vary according to the types of soil and seasons.

Keeping in view the importance of irrigation water, the Government of Pakistan (GoP) is implementing a National Program for Improvement of Watercourses in Pakistan, Phase-II (NPIWC-II) funded by the Ministry of National Food Security and Research (MNFSR), Islamabad. The executing agencies (EAs) are Federal Water Management Cell (FWMC), Provincial Directorates of OFWM and respective departments of AJ&K, GB and ICT and Water Users Association (WUAs). The Project Consultant (NESPAK & JV Partners) carries out the project supervision. The task of Monitoring Evaluation & Impact Evaluation has been entrusted to ME&IE Consultants. The coordination rests with the Federal Project Management Unit (FPMU) and Federal Water Management Cell (FWMC).

The Project comprises 4 Components: namely (1) Social Mobilization (Capacity building and establishment of Water Users Associations), (2) Reconstruction/ renovation and remodeling of 47,278 watercourses, (3) Construction of 14,932 Water Storage Tanks and (4) Provision of 11,610 Laser Land Levelers.

The Project Covers; Punjab, Khyber Pakhtunkhwa (KP), Balochistan, Gilgit Baltistan (GB), Azad Jammu and Kashmir (AJ&K) and Islamabad Capital Territory (ICT).

Project Direct Benefit includes, cropping intensity to increase by 5-20%, Crops yield to increase by 10-15%, Equity in water distribution to increases by about 30%, water disputes / thefts and litigation amongst the Farmers over water distribution to reduce by about 80%. Help poverty reduction through generation of employment and Self-sufficiency in food through utilization of water saved. The total number of project beneficiaries are estimated 1.668 million farmers (owners as well as tenants). Taking family size at five, total net population benefiting is expected to be 8.34 million people.

In the middle of the assignment, ME&IE Consultants are required to submit Midline Survey/ Mid-term Impact Evaluation report which was produced in 2023 which included impact assessment results up to end December 2022 until unless mentioned otherwise elsewhere. It is to be clarified here that these assessments are, however, not final. Rather these are interim and until all the surveys and studies are completed after the termination of all project activities, these will remain indicative. Thus, these assessments should be taken just as interim or indicative and not final for the time being. The main findings of the report are summarized below:

1. Impact Evaluation of Component (Improvement of Watercourses)

Land use intensity due to watercourse improvement on sample farms has increased on an average by 4.1%, meaning thereby an increase of 4.1% in cultivated area. Cropping intensity has increased by 10.9%. These increases in land use and cropping intensities have resulted in about 11.8% increase in cropped area under various crops. The Watercourse Improvement Impact on Crop Yields per acre varied from 4% to 49% averaging at 11.4% on an overall basis.

Cumulative impact of Watercourses Improvement is reflected in total production of various crops. Production of various crops has increased at different rates varying from 11.6% in the case of peaches to 317.6% in case of other vegetables. However, weighted average impact calculates at 23% (11.4% due to yield increase and 11.8% due to area increase and one percent due interaction between the two).

On total completed watercourses up to June 2023, total increases in crop area have also been estimated. On total 12,968 (excluding GB) improved watercourses, increase in the crop area has been estimated around 196 thousand acres.

Impact of WC Improvement on per acre net income varies from crop to crop. It varies from PKR 1,008 for cotton to PKR 37,950 for vegetables per acre averaging at PKR. 4,053 for all crops.

Water Conveyance Efficiency on 20% lined additional improved watercourses increases by 14%age point and on new 50% lined watercourses increase by 29%age point. On piped lined watercourses efficiency increases by 50%. On overall basis saving in water losses calculates to 30% of 154 AF per watercourse per annum.

Due to 12,968 watercourses improvement (excluding GB), cultivated area increased by 61,144 acres, cropped area by 196,304 acres, gross income increased by 43,352 million PKR and net income by 19,414 million PKR.

2. Impact Evaluation of Component C3 (Construction of WSTs)

Land use intensity due to WSTs Construction on sample farms has increased on an average by 6.3%, meaning thereby an increase of 6.3% in cultivated area. Cropping intensity has increased by 15.4%. These increases in land use and cropping intensities have resulted in about 22% increase in cropped area under various crops.

The WSTs construction Impact on Crop Yields per acre varied from 6.6% in the case of Rabi fodder to 16.7% in case of pulses, averaging 10.2% on an overall basis.

Cumulative impact of WSTs reflected in total production of various crops. Production of various crops has increased at different rates varying from 20% in the case of cotton to 86% in the case of sugarcane. However, weighted average impact calculates at 35% (10% due to yield increase and 22% due to area increase and 3 percent due interaction between the two).

On total 5,062 completed WSTs (excluding GB) up to June, 2023, total increases in area have also been estimated 10,604 acres.

The impact of WSTs on per acre net income varies from crop to crop. It varies from 1,008 PKR for cotton to 37,905 PKR for other vegetables per acre averaging at 22,262 PKR for all crops.

As before the construction of tank, there was no such saving of water losses. The total water storage capacity from above mentioned sources of tank along with the reported filing up frequency leads to calculate the water saving impact. On overall basis, saving in water losses calculates to 7.31 AF per Storage Tank per annum.

Due to 5,062 WSTs (excluding GB), cultivated area increased by 3,460 acres, cropped area by 10,604 acres, gross income increased by 3,275 million PKR and net income by 1,780 million PKR.

3. Impact Evaluation of Component C4 (Provision of PLL)

PLL Beneficiaries: Total annual PLL beneficiaries calculate to 11,331 farmers including the owners themselves or 71 farmers per equipment.

Impact of PLL on Crop yields: Impact of PLL on crop yield was also assessed through the farmers' perception. The growers were of the view that laser leveling increases yields of various crops ranging from 8% to 14% averaging at 11% on the whole. Economics and economic benefits of PLL use were also estimated. Total number of delivered PLL up to end of June 2023 is 5,928. At the rate of 254 acres per PLL, total area levelled by all the delivered PLL calculates as 1,506 thousand acres. Net benefits per PLL comes to 521 thousand PKR per annum and for total 5,928 delivered PLL these calculate to 3,091 million PKR.

Water Saving Impact of PLL Units: Information was also asked from the growers regarding the saving of water due to Precision Land Leveling. On an average 25% saving in water use has been reported.

1. INTRODUCTION

Water is an important need of life, creatures, and flora. We cannot exist without water; everyone and everything will perish if no water is available. It helps in keep out our body temperature and aids in digestion too. It has an important role in agriculture. Irrigation water helps to make grow crops, maintain landscapes, and re-vegetate disturbed soils in dry and arid areas. Irrigation has helped to bring most of the fallow land under cultivation. It has stabilized the output and yield levels. Also, increases the availability of water supply, which in turn increases the income of the farmers. In addition to these uses, irrigation is also employed to protect crops from frost. Irrigation has been a key aspect of agriculture for over 5,000 years and has been developed by many cultures around the world (Snyder and Melo-Abreu, 2005). Irrigated agriculture is, on an average, to the lowest degree is twice as productive per unit of land as rain-fed agriculture, thereby allowing for more production intensification and crop diversification (World Bank, 2024). The frequency, rate, amount and time of irrigation are different for different crops and also vary according to the types of soil and seasons.

Keeping in view the importance of irrigation water, the agricultural water management sector is presently in the process of emplacement itself towards modern and sustainable service provision. It suggest an extraordinary water approach on building an elastic water services and sustaining water resources. Also managing risks related to broader social and economic water-related impacts. This includes transforming governance and service provision as well as supporting watershed management and greening the sphere and can be achieved by stipulating improved incentives for innovation, reforms, and accountability.

The Government of Pakistan is implementing a National Program for Improvement of Watercourses in Pakistan, Phase-II (NPIWC-II) funded by the Ministry of National Food Security and Research (MNFSR), Islamabad. This Project covers Punjab, Khyber Pakhtunkhwa (KP), Balochistan, Gilgit Baltistan (GB), Azad Jammu & Kashmir (AJ&K) as well as Islamabad Capital Territory (ICT) at a total cost of PKR 154, 542.355 million (Umbrella PC-I) over a period of five (05) years. The executing agencies (EAs) are Federal Water Management Cell (FWMC), all provincial departments of agriculture (Provincial Directorates of OFWM) and respective departments of AJ&K, GB and ICT, district Governments and Farmers' Organizations (FOs) / Water Users Association (WUAs). The project supervision is carried out by the Project Consultant (NESPAK & JV Partners). The task of Monitoring Evaluation & Impact Evaluation (ME&IE) has been entrusted to ME&IE Consultants: A Joint Venture of G-3 Engineering (Lead Firm) Consultants (Pvt.) Ltd., CSRD, EASE PAK and ADA in association with S&S Associates. The coordination rests with the Federal Project Management Unit (FPMU) and Federal Water Management Cell (FWMC).

The Project comprises 4 Components: namely (1) Social Mobilization (Capacity building and establishment of Water Users Associations), (2) Reconstruction/renovation and remodeling of 47,278 watercourses, (3) Construction of 14,932 Water Storage Tanks and (4) Provision of 11,610 Laser Land Levelers.

All over the world, Irrigation is one of the essential inputs required for sustainable irrigated agriculture. Traditionally for irrigation purposes, open channels system is the main water supply around the world despite this often criticized for their water conveyance losses. In irrigation network, watercourses conveyance losses are defined, as the difference between water delivered to the irrigation system and water delivered to the farmer field. These conveyance losses vary from year to year because of variations in operational methods, water accessibility, demands and climate which affect the crop productivity and need to quantify this difference in terms of income to the farmers. In this situation, efficient water saving can be achieved by keeping the conveyance losses to a minimum level. It is observed that 40% of the total water supply is lost in the watercourses before reaching the field and availability of low water is the main cause of the low crop productivity. Permanent lining is a long term effective technique for reducing seeping losses from the watercourse but for farmers it is not possible to make it by himself due to its high cost.

The groundwater is a reliable resource, which can be utilized any time for drinking, industry and used for agriculture. In Pakistan, thirty-five percent of agricultural water requirements are met from groundwater. Initial studies have shown that by using groundwater, yields of crops increased 150-200 percent and cropping intensities increased from 70 to 150 percent (Qureshi et al., 2004). Now the lowering of groundwater is a common phenomenon in Pakistan, as farmers are now pumping beyond the depth of 250 m. Now the ground

water is declining even to the extent of 3-4 m per year in some of the areas of Balochistan. To protect this precious natural resource, there is no mechanism for regulating groundwater use in Pakistan. Over 80 percent of groundwater is exploited by the private tube well owners/farmers. Due to continuous lowering of water table, groundwater is becoming inaccessible to small farmers, which is threatening the sustainability of irrigated agriculture. In this situation, new water saving technologies may be introduced to save our future generation water.

Generally, irrigation channels are made from loose soil called “Kacha Nali” in Pakistan. In these lining, lot of precious water seep down in soil due to loose porous medium via channel bed and banks (Syed et al., 2021) and can't achieve irrigation system water conveyance efficiency. It is reported that around 90% and 40% of water losses from the earthen irrigation channels in Australia and United States (Barkhordari et al. 2020). Worldwide water losses during conveyance have been estimated around 20–70% of total canal flows (Kulkarni and Nagarajan 2019, Lund et al. 2021). Pakistan has a vast network of earthen irrigation channels to convey irrigation water from its source to farmlands but a substantial amount of good quality canal water is lost annually by seepage (Shah et al., 2020). Syed et al. (2021) observed over 40% water losses from tertiary irrigation networks in Sindh and observed over 45% water losses from distributary canals in Punjab, Pakistan (Shah et al. 2020). The delivery losses measured from 38 to 62 % in the watercourses of district Khushab (Copland 1987). Seepage reduces the canal conveyance efficiency, diminishing water availability for agricultural purposes. The lower water supply in return affects crop production either in terms of less land cultivated or water volumes unsuitable to meet crop water demand.

In Pakistan, the available water for agriculture activities are less than the required water. The need to overcome this difference can be attained through sustainable water management practices. In this situation, water courses are the most economical method of enhancing water supplies to farmer's field. In this scarcity of water, cemented or PVC watercourses are better than the “katcha” unlined watercourses where the water is lost due to high density of weeds, siltation problems, sediments depositions, lack of proper maintenance and holes made by rodents. According to literature, in Pakistan seepage losses have been assessed to be about 45.5 and 66%, for the lined and unlined watercourses respectively (Arshad et al., 2009; William Young et al., 2019). However, 30 to 40% of seepage can be reduced with lining but it cannot be controlled completely (Swamee et al., 2000; Sepaskhah & Salemi, 2004). The effectiveness of the lining is reduced due to cracks in the lining (Plusquellec, 2019). It is observed that lining in the tertiary canals helped to increase the conveyance efficiency by 22.5% (Sultan et al., 2014).

To date, our knowledge about the impact of macro-scale water management strategies on salinization is limited. In arid and semi-arid region, the use of marginal water resource for the expansion irrigated cropland to improve crop productivity having low leaching efficiency and poor soil internal drainage condition is the main cause of salinity (Minhas et al., 2020). One-third of the world's irrigated land has been badly affected with salinization due to a rise in the groundwater table. In Pakistan approximately 6.5 Mha of irrigated land has been affected by water-logging and salinity. Excessive salt rates are adversely influencing the biological, chemical, and physical properties of soils and has reduced 25% agriculture productivity. The existing situation revealed a requirement to use available water in efficient and effective manner so that water losses could be minimized. The expenditure on the lining is economically justified if it is equal to about 5% of the value of the conveyed water (Kraatz, 1977).

Comparing the average water loss from lined and unlined channels, it is assessed that significantly lining reduces water conveyance loss in all target regions of Pakistan. Decreasing seepage losses results in saving of water and accordingly more water is available for irrigation at farm gate that can increase the cropped area and the crop yield. Javed et al. (2012) found that after lining of water courses, the cropping intensity of the target sites has increased from 17-19 %. Tareen et al. (2016) expressed that the improvement in conveyance efficiency of watercourses obtained was 8% by 30% lining of total length which helps to save 14.13 ha-m of water to cultivate 7 hectares more land as cultivated before lining. The cropping intensity has increased by about 29% in Rabi and 12% in Kharif seasons. The cropping pattern assessed before and after watercourse improvement has remained almost same as no other proper marketing facilities were available for the land owners for growing other crops like vegetables and fruits.

In our target area, we evaluated conveyance losses by inflow-outflow method using cut-throat flumes. The results shows that lining decreases water conveyance losses by 25% as compared to 48% for unlined water courses. Our results coincide with others results that lining has increased 25% conveyance efficiency and if Government of Pakistan manage to line all other watercourses, it will not only improve conveyance efficiency but manage equal water distribution on farmer's field and increase the cropped area (Arshad & Ahmad 2011).

Crop yield increased by 16% for wheat crop, 27% for cotton crop, 11% for sugar cane, 27% for chilies, and 19% for onion after lining the watercourses. On an average the water table in the command area of the watercourses under study has gone down by 1m after lining. Thus water logging problem has been minimized to some extent.

After the 18th amendment to the Constitution of Pakistan, water is a legally provincial subject, but still, some national institutions and policies coexist, prevail and overlap with provincial systems and policies (Young et al., 2019). However, watercourses and other on-farm water management fall in the preview of the Provincial Agricultural Departments.

World widely, lining of irrigation channels is a common practice for monitoring seepage losses and enhancing delivery efficiency to save irrigation water losses thereby increasing the supply of good quality water for irrigation crops. The major irrigation systems in Indus was developed prior to the early 20th century but still not yet widely promoted water-saving micro-irrigation has been initiated. Since the early 1960s, several efforts have been made to cope with the issues of salinity and water-logging. These included lining of watercourses to control seepage losses, adaptation of improved irrigation practices and the installation of surface and subsurface drainage systems. Most of these projects were funded by government and no efforts have been made by farmers. According to National Water Policy of Pakistan (2018) states that surface water availability back in 1951 was a 5260 m³ surface water, which has reduced to 1000 m³ in 2016 and it will further depleted in the prevailing practices to 860 m³ by 2050. It gives a clear indication for 'rapid development and management of the country's water resources on a war footing. In this regard, the primary purpose of this study was to assess OFWM project activities and their impacts on the saving of water and improvement of agriculture in Pakistan:

How farmers benefited from the project activities like new water courses and renovation of old water courses, water storage tanks and Precise land levelling have improved crop yields and increased cropping intensity, Farmers participation and their level of adoptability for crop improvement and increased crop intensity.

2. METHODOLOGY:

Following section described the methodology:

2.1 Sample Size for Impact Evaluation

The Monitoring and Evaluation Log Frame for all the components of the Project is placed at **ANNEX-A**. Impact assessment was to be carried out on a 2-5-20% random sample basis under the original methodology. For small sampling frames, 5% sample was to be taken, for very small sampling frames, 20% sample was to be taken, while for large sampling frames 2% sample was to be selected at random. However, under the revised methodology it was agreed that sample would be drawn randomly @ 5% cross the board, of the completed schemes or achieved targets, irrespective of small or large sampling frames. Samples calculated for total targets (sampling frames) under original methodology and for the completed schemes or achieved targets under revised methodology for WUAs Mobilization, Watercourse Improvement, Water Storage Tanks Construction and PLL delivery components are given in **Tables 1** through **3**.

Table 1: Sample Size for WUAs Mobilization and Watercourses Improvement Components

Zone / Unit	Original Methodology			Revised Methodology		
	Project Targets	Sample %age	Sample Size	Completed Schemes	Sample %age	Sample Size
Punjab	10,000	2%	200	4,063	5%	203
KPK	13,000	2%	260	3,187	5%	159
Balochistan	20,389	2%	408	5,202	5%	260
Gilgit Baltistan	2,500	5%	125	809	5%	40
AJ&K	1,165	5%	58	482	5%	24
ICT	224	5%	11	34	5%	2
Total	47,278	2.25%	1,062	13,777	5%	689

Table 2: Sample Size for WST Construction Component

Zone / Unit	Original Methodology			Revised Methodology		
	Project Targets	Targets Achieved	Sample Size	Completed Schemes	Sample %age	Sample Size
Punjab	3,000	2%	60	1,021	5%	51
KP	5,000	2%	100	1,188	5%	59
Balochistan	5,507	2%	110	2,499	5%	125
Gilgit Baltistan	825	5%	41	328	5%	16
AJ&K	600	5%	30	354	5%	18
Total	14,932	2.29%	341	5,390	5%	270

Table 3: Table-3: Sample Size for PLL Delivery Component

Zone / Unit	Original Methodology			Revised Methodology		
	Activity Targets	Sample %age	Sample Size	Completed Schemes	Sample %age	Sample Size
Punjab	9,500	2%	190	5,844	5%	292
KP	600	5%	30	50	5%	3
Balochistan	1,500	2%	30	34	5%	2
Gilgit Baltistan	5	20%	1	0	5%	0
AJ&K	5	20%	1	0	5%	0
Total	11,610	2.17%	252	5,928	5%	296

2.2 Surveys for Impact Evaluation

For evaluating the impact of watercourses improvement and WSTs construction, first, baseline surveys are conducted after the issuance of Technical Sanctions (TSs) and then after full one year of completion of Watercourses or WST construction, Impact Surveys are carried out to determine the impact of the interventions on various agricultural, social and economic indicators such as cropping intensities, cropped area under various crops, crop yields per acre, crop production, farmers' income and employment etc. For PLL delivery, Impact Surveys are conducted after one year of their delivery to the farmers / service providers. For evaluating the performance of Water Users Associations (WUAs), the sample of Watercourse Improving Component is adopted.

Baseline and impact surveys are carried out, the beneficiaries of project activities are interviewed and data from them are collected by field teams on pre-designed data collection tools through an android-based application on TABs. For each survey, data collection teams are arranged and their composition, data collection program as well as data collection templates are shared with NPC before sending the teams in the field. Baseline and Impact surveys are carried out in phases as target watercourses and WSTs are not pre-selected. Baseline surveys are carried out before the intervention but after the issuance of technical sanctions and the impact surveys are carried out after one year (two crop seasons) of the completion of the intervention. The information is collected by recall method from the beneficiaries. The mid-term study reviews the project progress in the middle of the project implementation. The end line study will assess the impact of the project interventions at the end of the Project.

The Impact surveys of PLL, monitoring evaluation surveys of WUAs and spot-checking surveys of the completed Watercourses and Water Storage Tanks are also conducted on pre-designed data collection tools through an android-based application on TABs. Monitoring evaluation surveys of WUAs and spot-checking surveys of the completed Watercourses and Water Storage Tanks are conducted by the same teams deputed to collect baseline and impact information for Watercourses and Water Storage Tanks. For PLL Impact Surveys, however, separate teams are formed to collect the required information.

2.3 Water Saving Estimation

Following section deals with water saving.

2.3.1 Water Saving on Watercourses

Water flow is measured on sample watercourses selected for the baseline and impact surveys. The flow is measured before and after the WC improvement at three points for 50% lined WCs i.e., close to water outlet, 50% and 75% distances from outlet (MOGHA). The measurements are carried out through current pigmy meters. Based on water savings on sample watercourses, total water savings are estimated for all project watercourses. The savings are reported per watercourse, per annum and aggregate for the project in LPS and Acre feet.

2.3.2 Water Savings on WSTs

Since WSTs are filled and emptied on a continuous basis, the water savings have to be assessed on the basis of water pumped from the tank to irrigate the fields. The assessment has to be done either by readings on the pump gauge or periodic interviewing the farmer. Based on water savings on sample WSTs, total water savings are estimated for all project WSTs. The savings are reported per WST, per annum and aggregate for the project in LPS and in Acre feet.

2.3.3 Water savings due to Precision Laser Land Leveling

Water savings at field level are assessed through Impact surveys on the basis of farmers' perception interviews. The impact survey form include questions to be asked from the farmers who got their land leveled: (a) In how much time an acre was irrigated before land leveling (b) In how much time an acre is irrigated after land leveling. The difference is water saving due to laser land leveling. Based on water savings on sample PLL units, total water savings are estimated for all project PLL units. The savings are reported per PLL unit, per annum and aggregate for the project in LPS and in Acre feet.

2.4 Impact Evaluation on the Economy

The results of the baseline and impact surveys are used to quantify the impact on the economy. Additional food produced due to the project is estimated. It is benefit towards food security. Project costs and benefits are compared in economic and financial terms to carry out economic and financial analysis. Project Economic Evaluation Tools including Internal Rate of Return (IRR), Net Present Value (NPV) and Benefit Cost Ratios (BCR) are also estimated.

2.5 Impact Evaluation on the Stakeholders

Impact Evaluation Analysis is also be carried out with reference to various stakeholders, like community, government, farmers, etc.

3. RESULTS & DISCUSSION

The section discusses the results.

3.1 Progress Monitoring

In this section, Project overall physical targets progress has been evaluated. Project physical construction activities started in July 2019 in KP and AJ&K, in September 2019 in the Punjab and Balochistan, in April 2021 in Islamabad Capital Territory and in March 2020 in GB. Component wise detail of work completed by end December 2022 is given below:

3.3.1 Improving Watercourses

During the Project period (5 years), a total number of 47,278 watercourses were targeted to be improved. By the end of June 2023, 13,777 watercourses have been improved which are 29% of total project 5 years targets. Obviously, mid-term target achievement is much behind the targets particularly in Khyber Pakhtunkhwa, Balochistan, Gilgit Baltistan and in Capital Territory of Islamabad where the achievement is even less than one-third or 33% of the Project targets. Further zone wise / unit wise detail may be seen in **Table 4** and **Figure 1** below:

Table 4: Improving Watercourses: Achievements Versus Project Targets by the end of June 2023

Zone/Unit	Project Targets	Target Achievements up to end June 2023	
		Physical Achievements	Per cent Achievement
Punjab	10,000	4,063	41%
Khyber Pakhtunkhwa	13,000	3,187	25%
Baluchistan	20,389	5,202	26%
Gilgit Baltistan	2,500	809	32%
AJ&K	1,165	482	41%
ICT	224	34	15%
Total	47,278	13,777	29%

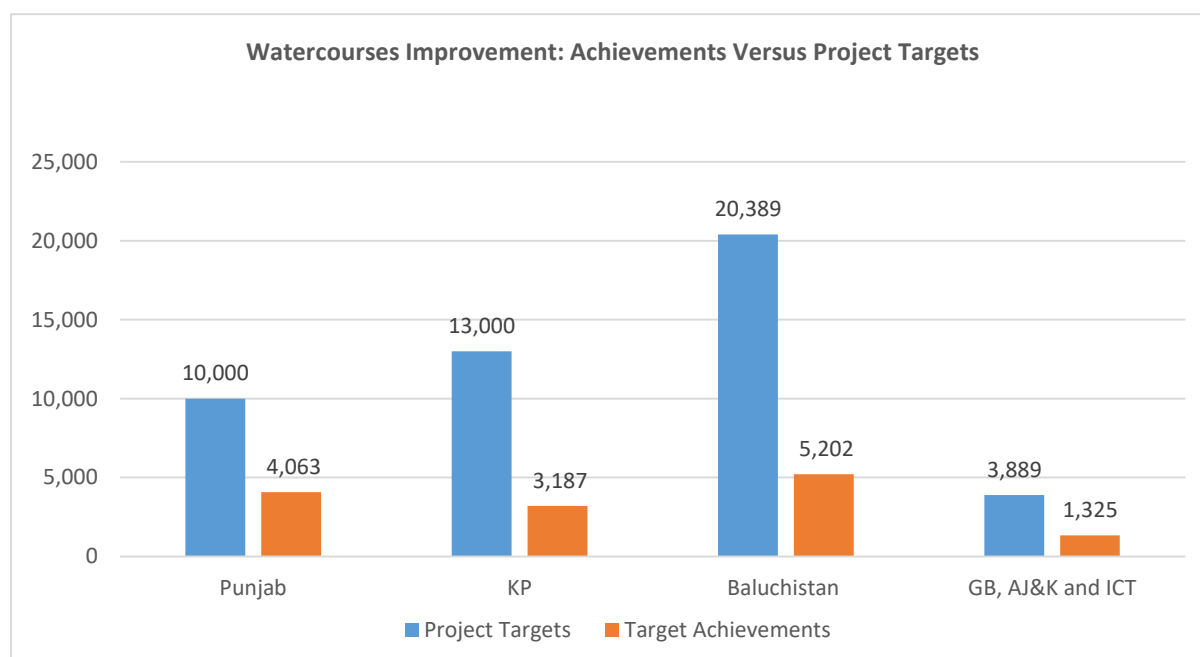


Figure 1: Watercourses Improvement: Achievements versus Project Targets

3.3.2 Constructing Water Storage Tanks (WSTs)

During the Project period (5 years), a total number of 14,932 Water Storage Tanks were targeted to be constructed. By the end of June 2023, 5,390 WSTs have been constructed which are 36% of total project 5 years targets. Thus, mid-term target achievement is much behind the targets particularly in Khyber Pakhtunkhwa and in Punjab, where the achievement is only 24% and 34% of the Project targets. Further zone wise / unit wise detail target short falls may be seen in **Table 5** and **Figure 2** below:

Table 5: Construction of WSTs: Achievements Versus Project Targets by the end of June 2023

Zone/Unit	Project Targets	Targets Achievement up to end June 2023	
		Physical Achievement	Per cent Achievement
Punjab	3,000	1,021	34%
Khyber Pakhtunkhwa	5,000	1,188	24%
Balochistan	5,507	2,499	45%
Gilgit Baltistan	825	328	40%
AJ&K	600	354	59%
Total	14,932	5,390	36%

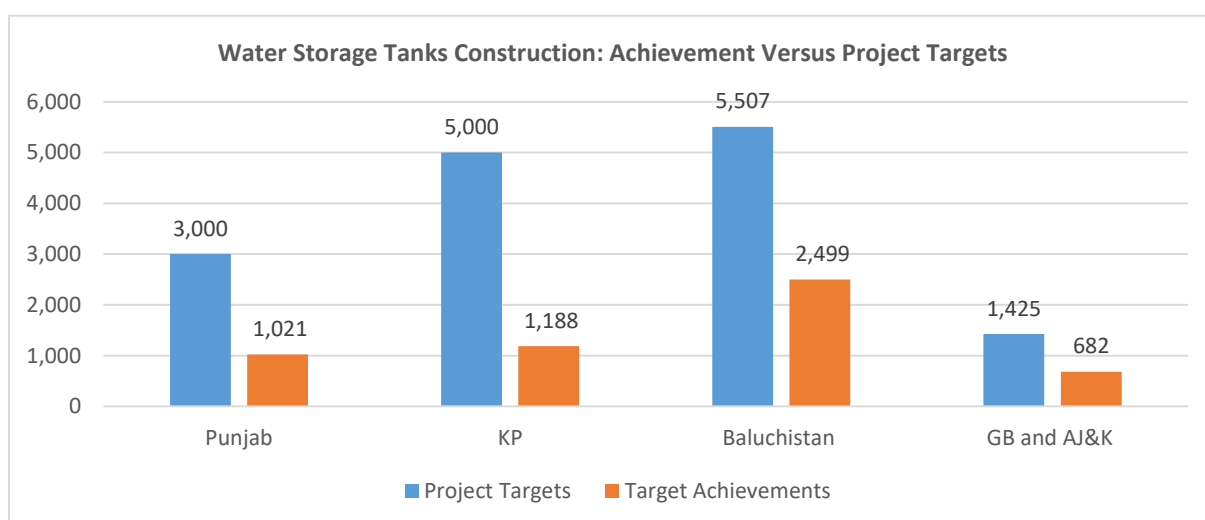


Figure 2: Construction of WST: Achievements versus Project Targets

Delivery of Precision Laser Land Leveling (PLL) Units

During the Project period (5 years), a total number of 11,610 Precision Laser Land Leveling (PLL) Units were targeted to be delivered. By the end June 2023, 5,928 PLL Units have been delivered which are 51% of total project 5 years targets. This short fall is only 38% (100%-62%) in Punjab but 98% in Balochistan, 100% in GB and AJ&K and 92% (100%-8%) in Khyber Pakhtunkhwa province. Further zone wise / unit wise detail target achievements may be seen in **Table 6** and **Figure 3** below:

Table 6: Provision of PLL Units: Achievements versus Project Targets by the End of June. 2023

Zone/Unit	Project Targets	Targets Achievement by the end of June 2023	
		Physical Achievement	Per cent Achievement of
Punjab	9,500	5,844	62%
Khyber Pakhtunkhwa	600	50	8%
Balochistan	1,500	34	2%
Gilgit Baltistan	5	0	0%
AJ&K	5	0	0%

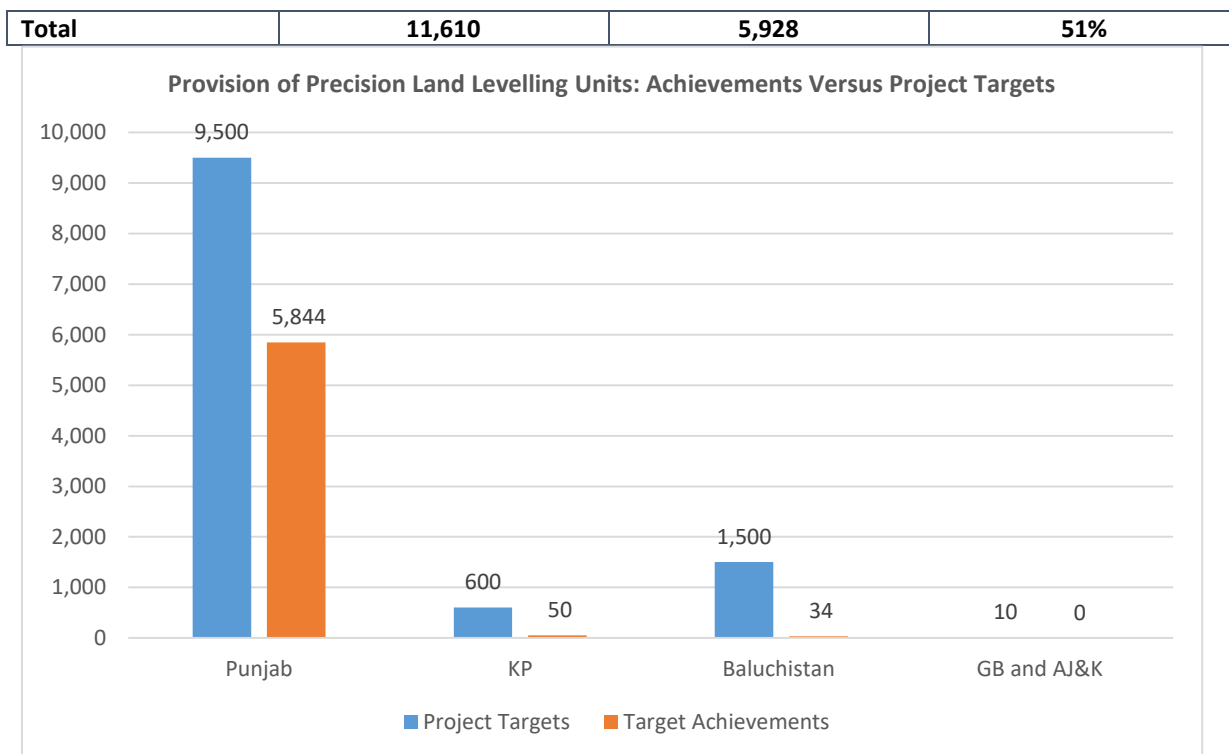


Figure 3: Delivery of PLL Units: Achievements versus Project Targets

4. IMPACT EVALUATION OF COMPONENT C2

For conducting Impact Evaluation of Component C2 and in order to assess the agro-Economic impacts of Watercourses Improvement, before and after approach has been used as given in the inception report. Information for this component has been collected through **ANNEX-L**. For this purpose, baseline and midline / end line impact survey/ studies have to be conducted @ 5% sample of completed schemes under revised methodology. Thus, for 13,777 completed watercourses, baseline and impact sample size works out 669. By now (end of June, 2023), baseline has been completed on 422 watercourses in two phases. The consolidated baseline report covering these 422 watercourses has already been submitted. However, impact surveys have been carried out on 421 watercourses (as in GB no impact survey has been conducted) up to the end of June, 2023. Thus, the midline impact has been calculated for 421 and not for 422 watercourses.

As mentioned above, baseline sample calculates / requires as 669, however, actual sample size taken for baselines surveys (in 2 phases) is 422 and for Impact surveys (in two phases) is 421, which are obviously less than the required one. The remaining sample would be completed shortly. A complete profile of the impact 421 sample watercourses is given below:

Profile of Sample Watercourses

For studying profile of sample Watercourses, Monitoring Template MT-01 was used.

Baseline Sample Size

Up to the end of June 2023, total Water Courses improved are 13,777. The required Sample size for these watercourses @ 5%, calculates 669 watercourses, however, actual baseline sample drawn is 422 watercourses and midline impact surveys sample is 421 as mentioned above. Zone / Unit wise distribution of this sample is shown in **Table 7**.

Table 7: Baseline and Midline/ Impact Sample Size for Monitoring Evaluation of Watercourses

Zone/ Unit	Completed Schemes	5% Sample	Baseline Surveys			Impact Surveys		
			Phase I	Phase II	Total	Phase I	Phase II	Total
Punjab	4,063	203	19	146	165	19	146	165
KP	3,187	159	17	135	152	17	135	152
Balochistan	5,202	260	11	50	61	11	50	61
GB	809	40	1	0	1	0	0	0
AJ&K	482	24	4	32	36	4	32	36
ICT	34	2	2	5	7	2	5	7
Overall	13,777	689	54	368	422	53	368	421

Sample Respondent Farmers

At the second stage, on each watercourse, respondent farmers were selected at random; 2 each at head, middle and tail reaches of each watercourse. However, where the number of farmers on a watercourse was less than 6, all the farmers were selected. The total number of farmers interviewed in Midline/Impact surveys were 2,174 and average respondents per watercourse were 5.16 detail of which is given in **Table 8** below.

Table 8: Respondent Sample Farmers on 421 Sample Watercourses

Zone/Unit	Impact/MLS-1	Impact/MLS-2	Impact/MLS (Total)	Average Respondents per WC
Punjab	114	876	990	6.00
KP	102	675	777	5.11
Balochistan	66	150	216	3.54
AJK	24	160	184	5.11

Zone/Unit	Impact/MLS-1	Impact/MLS-2	Impact/MLS (Total)	Average Respondents per WC
ICT	2	5	7	1.00
Total	308	1,866	2,174	5.16

Types of Sample Watercourses

There are three types of watercourses to be lined under NPIWC-II. These are (1) regular (new) watercourses, (2) 20 years old lined watercourses and (3) additional watercourses to be extended from 30% to 50%. Out of the 421 Sample watercourses, 273 are regular (New), 8 are 20 Years old and 140 come under additional lining. Zone / Unit wise break up is shown in **Table 9** below.

Table 9: Types of Sample Watercourses

Zone / Unit	Regular (New)	20 years old	Additional Lining	Total
Punjab	36	0	129	165
KP	142	0	10	152
Balochistan	60	1	0	61
AJK	28	7	1	36
ICT	7	0	0	7
Overall	273	8	140	421

Types of Lining of Sample Watercourses

There are seven major types of lining adopted under the Project. Rectangular /Bricks lining, PCP lining, PVC Pipe lining, PCC Pipe lining, HDPE Pipe lining, Stone Masonry lining and mixed lining. Out of total 421 Midline/ Impact sample watercourses, 26 are rectangular /bricks lined, 259 are PCP lined, 47 PVC Pipe lined, 39 PCC Pipe lined, 42 HDPE Pipe lined, 1 Stone masonry lined and 7 mixed lining type. Zone / Unit wise sample distribution has been shown in **Table 10** below:

Table 10: Sample Watercourses According to Type of Lining

Punjab	165	0	165	0	0	0	0	0
KP	152	0	78	30	1	41	1	1
Balochistan	61	26	0	10	25	0	0	0
AJK	36	0	16	0	13	1	0	6
ICT	7	0	0	7	0	0	0	0
Overall	421	26	259	47	39	42	1	7

Water Source of Sample Watercourses

Mainly there are three sources of water to the watercourses in the Project Area: Perennial Canals, Non-Perennial Canals and Non-Canal sources. In the sample drawn, 216 watercourses take water from Perennial Canal, 17 watercourses from Non-Perennial Canal and 188 Watercourses from other (Non-canal) sources. Zone / Unit wise break up is given in **Table 11** below.

Table 11: Impact/Midline Sample Watercourses According to Water Source

Zone/Unit	Total Sample WC	Perennial Canal WC	Non-Perennial Canal WC	Total Canal WC	Non-Canal Water
Punjab	165	152	13	165	0
KP	152	45	0	45	107
Balochistan	61	19	3	22	39
AJK	36	0	1	1	35
ICT	7	0	0	0	7
Overall	421	216	17	233	188

Water Source of Sample Non-Canal Watercourses

Non-Canal sources include Tube wells, Nallahs, Streams, springs, Lift pumps, Water Storage Tanks etc. Out of total 180 non-canal watercourses, 140 (74%) take water from tube wells, 24 (13%) from Nallahs, 7 from streams, 5 from springs, 2 from lift pump, 6 from WSTs and 4 from other sources. Zone / Unit wise and source wise detail of the baseline sample non-canal watercourses according to water source is given in **Table 12**.

Table 12: Non-Canal Sample Watercourses According to Water Source

Zone/Unit	Total Non-Canal Watercourses	Source of Water						
		Tube wells	Nallahs	Streams	Springs	Lift pump	WST/WHs	Others
Punjab	0	0	0	0	0	0	0	0
KP	107	87	6	5	3	1	5	0
Balochistan	39	39	0	0	0	0	0	0
AJK	35	14	15	2	2	1	1	0
ICT	7	0	3	0	0	0	0	4
Overall	188	140	24	7	5	2	6	4

Location of Sample Canal Watercourses

Location wise distribution of sample watercourse on head, middle and tail of the minors / distributaries is given in **Table 13** below. Out of total 233 watercourses flowing from canals, 88 (38%) are located at head, 81 (35%) in the middle and 64 (27%) at tail of their minors / distributaries.

Table 13: Location of Sample Canal WC on Minor / Distributary

Zone/Unit	Sample Canal WC	Head	Middle	Tail
Punjab	165	45	61	59
KP	45	28	14	3
Balochistan	22	14	6	2
AJK	1	1	0	0
ICT	0	0	0	0
Overall	233	88	81	64

Quality of Ground Water

Out of 421 sample watercourses, 362 (86%) fall in the sweet water area and 59 (14%) in Brackish water zone. Zone / Unit wise break up is given in **Table 14** below.

Table 14: Quality of Ground Water in Sample Watercourses

Zone/Unit	Total Sample Watercourses	Sweet Water	Brackish Water
Punjab	165	109	56
KP	152	149	3
Balochistan	61	61	0
AJK	36	36	0
ICT	7	7	0
Overall	421	362	59

Culturable Command Area on Sample Watercourses

Total Culturable Command Area of the sample watercourses is 78,808 acres or 177.7 acres per sample watercourse. Zone / unit wise detail is given in **Table 15** below:

Table 15: Culturable Command Area (CCA) on Sample WC

Zone/Unit Wise	Total Sample WC	Total CCA	Per WC Average CCA
Punjab	165	63,269	383.4
KP	152	6,990	46.0
Balochistan	61	3,874	63.5
AJK	36	651	18.1
ICT	7	24	3.4
WC Type Wise			
Regular (New) WC	273	19,174	70.2
20 Years Old WC	8	216	27.0
Additional Lined WC	140	55,418	395.8
Overall	421	74,808	177.7

Profile of Sample Farmers

Distribution According to Size of Holding and Tenorial Status

During the selection, due consideration was given to the farm sizes and tenure of the farmers. Distribution of respondent growers according to size of holdings is given in **Table 16** and that of tenure in **Table 17**.

Table 16: Table 16: Distribution of Farmers According to Size of Holding

Zone/Unit	Total Respondents	Distribution of Sample Farmers According to Size of Holding		
		Less than 12.5 acres	12.5 to 25 acres	More than 25 acres
Punjab	990	720 (73%)	167 (17%)	103 (10%)
KP	777	717 (92%)	53 (7%)	7 (1%)
Balochistan	216	172 (80%)	21 (10%)	23 (10%)
AJK	184	184 (100%)	0	0
ICT	7	7 (100%)	0	0
Grand Total	2,174	1800 (83%)	241 (11%)	133 (6%)

Table 17: Distribution of Sample Farmers According to Tenure

Zone/Unit	Total Respondents	Distribution of Sample Farmers According to Tenure		
		Owners	Owner / Tenants	Tenants
Punjab	990	834 (84%)	113 (11%)	43 (4%)
KP	777	622 (80%)	31 (4%)	124 (16%)
Balochistan	216	216 (100%)	0 (0%)	0(0%)
AJK	184	184(100%)	0(0%)	0 (0%)
ICT	7	7 (100%)	0 (0%)	0 (0%)
Grand Total	2,174	1863 (85%)	144 (7%)	167 (8%)

Location of the Respondents at the Watercourses

Location of the respondents at the watercourses was also kept in view while selecting the sample. About 42% were at the head of the watercourses, 32% in the middle reaches and the rest 26% were located at tail reaches. Details are given in **Table 18** below.

Table 18: Table 18: Farmer's Location on Watercourses

Zone/Unit	Total Respondents	Head	Middle	Tail
Punjab	990	300 (30%)	334 (34%)	357 (36%)
KP	777	358 (46%)	253 (33%)	165 (21%)

Balochistan	216	77 (36%)	93 (43%)	46 (21%)
AJK	184	168 (91%)	8 (4%)	8 (4%)
ICT	7	7 (100%)	0 (0%)	0 (0%)
Grand Total	2,174	910 (42%)	688 (32%)	576 (26%)

Average Farm Size at Sample Farms

In agriculture, Farm Size or Size of Holding means average farm area operated by the farmers (either owned or rented in by him). Thus, the Size of Holding is calculated as Area Owned plus Area Rented in minus Area Rented out. Zone / Unit wise average farm size or size of holding of our respondent farmers is shown in **Table 19** and depicted in **Figure 4**. It may be seen from **Table 19** that average farm size among the sample farms is 9.48 acres in Punjab, 5.21 acres in KP, 10.50 acres in Balochistan, 1.41 acres in AJK and 3.43 acres in ICT and 7.35 acres on an overall basis.

Table 19: Total and Average Farm Area or Size of Holding (Acres) on Sample Farms

Zone / Unit	Total Farm Area	Number of Farmers	Average Farm Size
Punjab	9389.8	990	9.48
KP	4046.1	777	5.21
Balochistan	2268.6	216	10.50
AJK	258.5	184	1.41
ICT	22.3	7	3.43
Overall	15,985.3	2,174	7.35

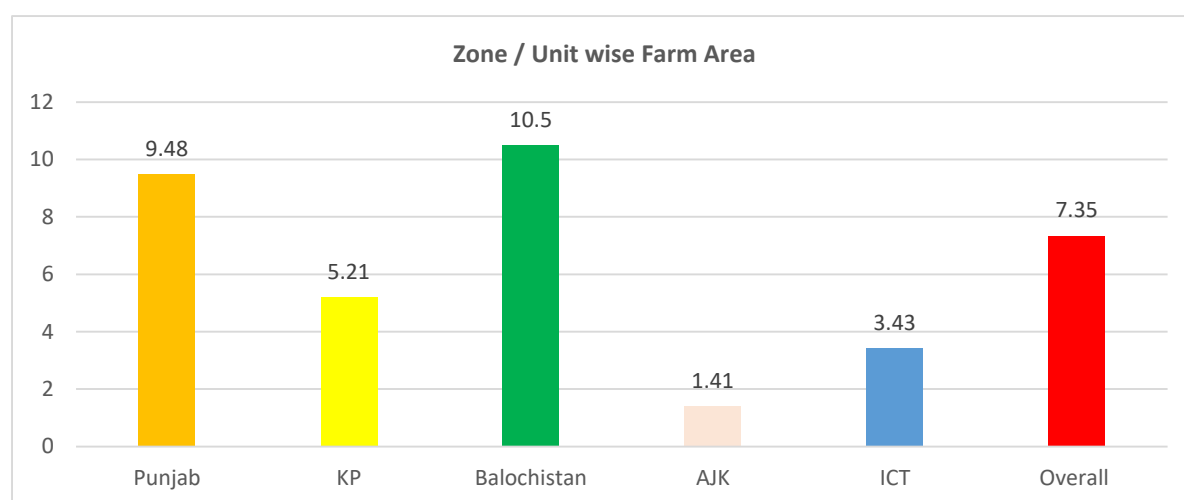


Figure 4: Average Farm Area of Watercourse Sample Farms

Agro Economic Impact of Watercourses Improvement

Impact of Watercourses Improvement on Land Use

Impact on Cultivated Area

Cultivated area is defined as that part of the farm area which is under cultivation by the farmer or on which crops are / can be sown by the farmers. A part of the farmland or farm area is not often available for cultivation. This land may include land for human residence, land for rearing the livestock, land for water pond meant for watering the farm livestock, land used for watercourses and paths and some other land not available for cultivation or non-cultivable lands. Thus, by definition cultivated area is always less than or equal

to the Farm area. Additional availability of the water or saved water can increase the area under cultivation. Thus, the impact of additional availability of water or saved water on cultivated area both on sample farms and at all farms on all Completed Watercourses have been given in **Table 20**:

Table 20: Table 20: Impact of WC Improvement on Cultivated Area (In acres)

Zone/Unit	Cultivated Area on Sample Farms			Cultivated Area on all Farms on all Completed WC			Per cent Increase
	Before WC Improvement	After WC Improvement	Increase/ Impact	Before WC Improvement	After WC Improvement	Increase/ Impact	
Punjab	8,869	9,026	156	1,058,164	1,076,788	18,624	1.8%
KP	3,696	3,803	107	169,270	174,171	4,901	2.9%
Balochistan	1,621	2,008	387	105,661	130,874	25,213	23.9%
AJ&K	233	237	5	11,609	11,834	225	2.1%
ICT	18	20	2	92	102	10	11.1%
Overall	14,437	15,093	656	1,344,796	1,405,940	61,144	4.5%

Impact on Overall Land Use Intensities

As the land use intensity is defined as ratio of cultivated area and farm area and the cultivated area is always less than or equal to farm area, hence, by definition land use intensity is always less than or equal to one or 100%. It can never exceed unity or 100%. While analyzing the land use pattern of the respondent farms, it was found that land use intensity has increased on an overall basis from 90.3% to 94.4%. Zone / Unit wise break up / detail has been given in **Table 21** and depicted in **Figure 5**. The highest increases of 17.0%age points and 8.7%age points have been noted in Balochistan and ICT whereas the lowest have been in AJ&K (1.8%age point) and in Punjab (1.6%age points).

Table 21: Impact of WC Improvement on Overall Land Use Intensities on Sample Farms

Zone/Unit	Total Farm Area of Sample Farms (Acres)	Total Cultivated Area of Sample Farms (Acres)		Land Use Intensity (%)		
		Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Increase/ Impact
Punjab	9,390	8,869	9,026	94.5%	96.1%	1.60%
KP	4,046	3,696	3,803	91.3%	94.0%	2.70%
Balochistan	2,269	1,621	2,008	71.5%	88.5%	17.00%
AJ&K	259	233	237	89.9%	91.7%	1.80%
ICT	22	18	20	80.1%	88.8%	8.70%
Overall	15,985	14,437	15,093	90.3%	94.4%	4.10%

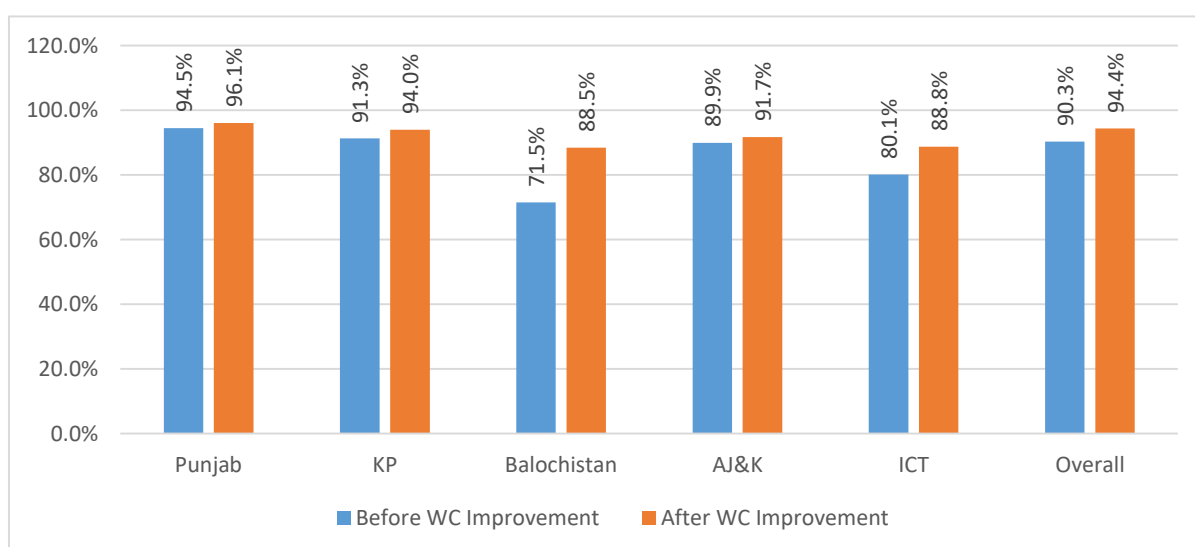


Figure 5: Impact of Watercourses Improvement on Land Use Intensities on Sample Farms

Impact on Land Use on Canal Command Sample Farms

On canal command areas, Impact on land use has been shown in **Table 22**. Average increase in land use intensity on canal command areas has been noted 3.7%.

Table 22: Impact of WC Improvement on Land Use on Canal Command Sample Farms

Zone /Unit	Farm Area (Acres)	Before WC Improvement		After WC Improvement		Impact of Improvement	
		Cultivated Area (Acres)	Land Use Intensity (%)	Cultivated Area (Acres)	Land Use Intensity (%)	Cultivated Area (Acres)	Land Use Intensity (%)
Punjab	9,390	8,869	94.5%	9,025	96.1%	156	1.6%
KP	809	771	95.2%	788	97.4%	17	2.2%
Balochistan	1,134	854	75.3%	1,099	96.9%	245	21.6%
AJ&K	0	0	0.0%	-	0.0%	0	0.0%
ICT	0	0	0.0%	-	0.0%	0	0.0%
Overall	11,333	10,494	92.6%	10,912	96.3%	418	3.7%

Impact on Land Use on Non-Canal Command Sample Farms

On non-canal command areas, Impact on land use has been shown in **Table 23**. Average increase in land use intensity on non-canal command areas has been noted 5.1%:

Table 23: Impact of WC Improvement on Land Use on Non-Canal Command Sample Farms

Zone /Unit	Farm Area (Acres)	Before WC Improvement		After WC Improvement		Impact of Improvement	
		Cultivated Area (Acres)	Land Use Intensity (%)	Cultivated Area (Acres)	Land Use Intensity (%)	Cultivated Area (Acres)	Land Use Intensity (%)
Punjab	-	-	0.0%	-	0.00%	0	0.0%
KP	3,237	2,925	90.4%	3,014	93.12%	89	2.7%
Balochistan	1,134	767	67.6%	910	80.19%	143	12.6%
AJ&K	259	233	89.9%	237	91.70%	4	1.8%
ICT	22	18	80.3%	20	88.75%	2	8.4%
Overall	4,652	3,943	84.8%	4,181	89.87%	238	5.1%

Impact of Watercourses Improvement on Crops

Impact on Overall Cropped Area

Another indicator used to measure agricultural efficiency is the number of crops grown during the crop year on a single piece of cultivated land. It is quite possible that during the year, all the cultivated area might not be cultivated and some of it is left fallow (unplanted) due to shortage of water or non-availability of some other critical factor. On the other hand, it is also possible that the farmer might be getting two or even three crops from the same tract of cultivated land during the year if sufficient water is available to him to grow the additional crops. The impact of additional water saved through watercourses improvement both on sample farms and on all farms on all completed watercourses is shown in **Table 24** below.

Table 24: Impact of WC Improvement on Overall Cropped Area

Zone/Unit	Cropped Area on Sample Farms				Cropped Area on all Farms on all Completed Watercourses		
	Before WC Improvement	After WC Improvement	Increase/ Impact		Before WC Improvement	After WC Improvement	Increase/ Impact
			Acres	%			
Punjab	16,732	17,458	726	4.3%	1,996,200	2,082,815	86,615
KP	3,766	4,619	853	22.7%	172,504	211,576	39,072
Balochistan	1,825	2,887	1,062	58.2%	118,897	188,085	69,188
AJ&K	397	425	28	7.1%	19,832	21,231	1,399
ICT	27	33	6	22.2%	138	169	31
Overall	22,747	25,422	2,675	11.8%	2,307,571	2,503,876	196,304

Impact on Overall Cropping Intensities on Sample Farms

By definition the cropping intensity (the ratio between the cropped area and cultivated area) may be less than, equal to or greater than unity or 100%. The impact of watercourses improvement on cropping intensities is given in Table 54 below. On an overall basis, cropping intensity has increased by 10.9%age point. Zone wise Impact or increases in cropping intensities has been given in **Table 25** and shown in **Figure 6**. The highest increase of 31.2%age point has been recorded in Balochistan whereas lowest increase of 4.5%age point found in the Punjab:

Table 25: Impact of WC Improvement on Overall Cropping Intensities on Sample Farms

Zone/Unit	Total Cultivated Area of Sample Farms		Total Cropped Area of Sample Farms		Cropping Intensities		
	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Increase/ Impact
Punjab	8,869	9,026	16,732	17,458	188.6%	193.4%	4.8%
KP	3,696	3,803	3,766	4,619	101.9%	121.5%	19.6%
Balochistan	1,621	2,008	1,825	2,887	112.5%	143.7%	31.2%
AJ&K	233	237	397	425	170.8%	179.3%	8.4%
ICT	18	20	27	33	149.7%	167.8%	18.1%
Overall	14,437	15,093	22,747	25,422	157.6%	168.4%	10.9%

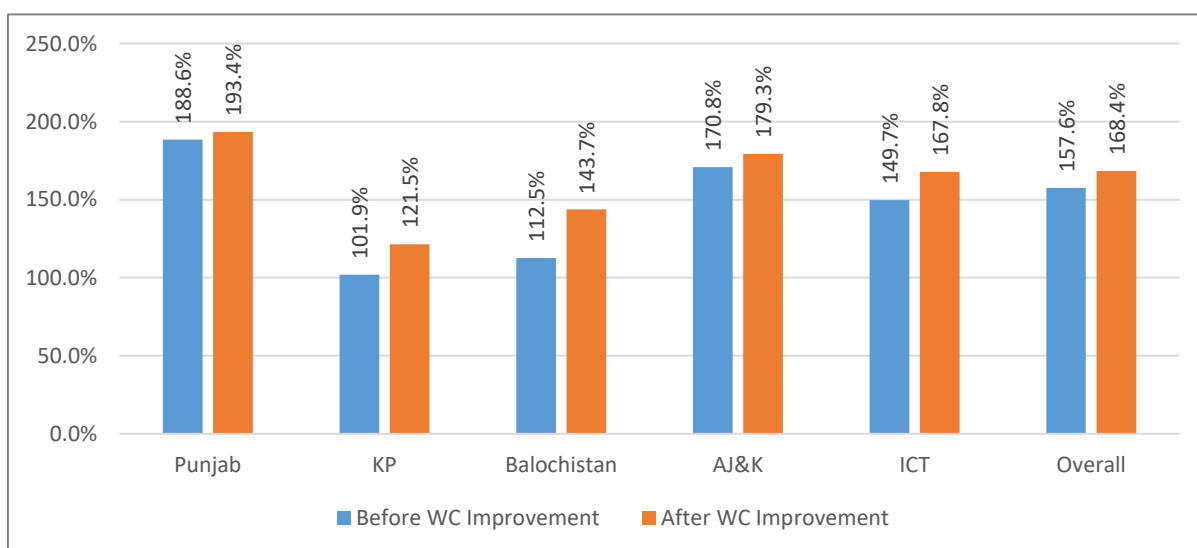


Figure 6: Impact of Watercourses Improvement on Cropping Intensities on Sample Farms

Impact on Cropping Intensities on Canal Command Sample Farms

On canal command areas, Impact on cropping intensity has been shown in **Table 27**. Average increase in cropping intensity on canal command areas has been noted 8.4%:

Table 27: Impact of WC Improvement on Cropping Intensities on Canal Command Sample Farms

Zone/Unit	Total Cultivated Area of Sample Farms		Total Cropped Area of Sample Farms		Cropping Intensities		
	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Increase / Impact
Punjab	8,869	9,026	16,732	17,458	188.7%	193.4%	4.8%
KP	771	788	794	1,016	103.0%	128.9%	26.0%
Balochistan	854	1,099	982	1,684	115.0%	153.2%	38.2%
AJ&K	0	0	0	0	0.0%	0.0%	0.0%
ICT	0	0	0	0	0.0%	0.0%	0.0%
Overall	10,494	10,912	18,508	20,158	176.4%	184.7%	8.4%

Impact on Cropping Intensities on Non-Canal Command Sample Farms

On non-canal command areas, Impact on cropping intensity has been shown in **Table 28**. Average increase in cropping intensity on non-canal command areas has been noted 18.4%.

Table 22: Impact of WC Improvement on Cropping Intensities on Non-Canal Sample Farms

Zone/Unit	Total Cultivated Area of Sample Farms		Total Cropped Area of Sample Farms		Cropping Intensities		
	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Increase /Impact
Punjab	0	0	0	0	0.0%	0.0%	0.0%
KP	2,925	3,015	2,972	3,603	101.6%	119.5%	17.9%
Balochistan	767	909	843	1,203	109.8%	132.2%	22.5%
AJ&K	233	237	397	425	170.8%	179.3%	8.4%
ICT	18	20	27	33	150.0%	165.0%	15.0%
Overall	3,943	4,181	4,239	5,264	107.5%	125.9%	18.4%

Impact of Watercourses Improvement on Crop Yields

Increased water avail-abilities either add to the cultivated area which is reflected in increased land use intensities, or it increases cropping intensities (which have already been shown in above sections) reflecting crop area under various crops. Moreover, it also increases the productivity of land often indicated by increases in crop yields or the crop production per unit of land; say maunds per acre or quintal per hectare. In this section, the impact of improving watercourses on crop yields has been shown. These impacts have been given in **Table 29** and in **Figures 7, 8 and 9** below. It may be seen from **Table 29** that yield of various crops has increased by 4.2% in the case of Kharif Fodder to 49% in case of other vegetables. However, the average weighted impact of watercourses improvement on overall crop Yields has been around 11.4%.

Table 23: Impact of Watercourse Improvement on Crop Yields on Sample Farms

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	30.1	32.4	2.3	7.5%
Rice	28.0	30.9	2.9	10.2%
Cotton	26.4	28.9	2.5	9.6%
Maize	47.9	52.9	5.0	10.4%

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
Sugarcane	716.3	764.3	48.0	6.7%
Oil Seeds	11.3	12.6	1.3	11.2%
Pulses	6.0	6.3	0.3	4.7%
Tobacco	60.5	64.4	3.9	6.4%
Okra	113.4	124.6	11.2	9.9%
Onions	167.0	190.0	23.0	13.8%
Potato	214.8	240.5	25.7	12.0%
Tomato	93.1	115.1	22.0	23.6%
Other Vegetables	93.4	139.1	45.7	49.0%
Apple	76.6	86.0	9.4	12.3%
Peach	82.0	90.0	8.0	9.8%
Other Fruits	66.7	73.9	7.2	10.8%
Rabi Fodder	399.8	423.2	23.4	5.9%
Kharif Fodder	339.3	353.4	14.1	4.2%
Weighted Average of Yield Impact				11.4%

Zone / Unit wise breakup of the Impact on Crop Yields has given in **ANNEX-D**.

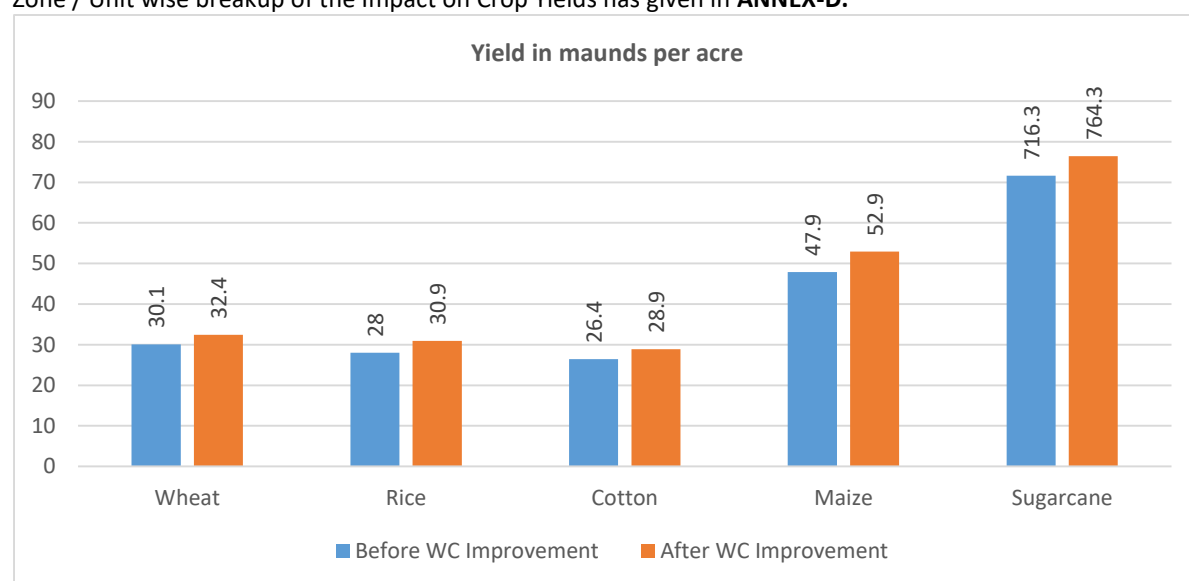


Figure 7: Impact of WC improvement on Major Crop Yields on Sample Farms

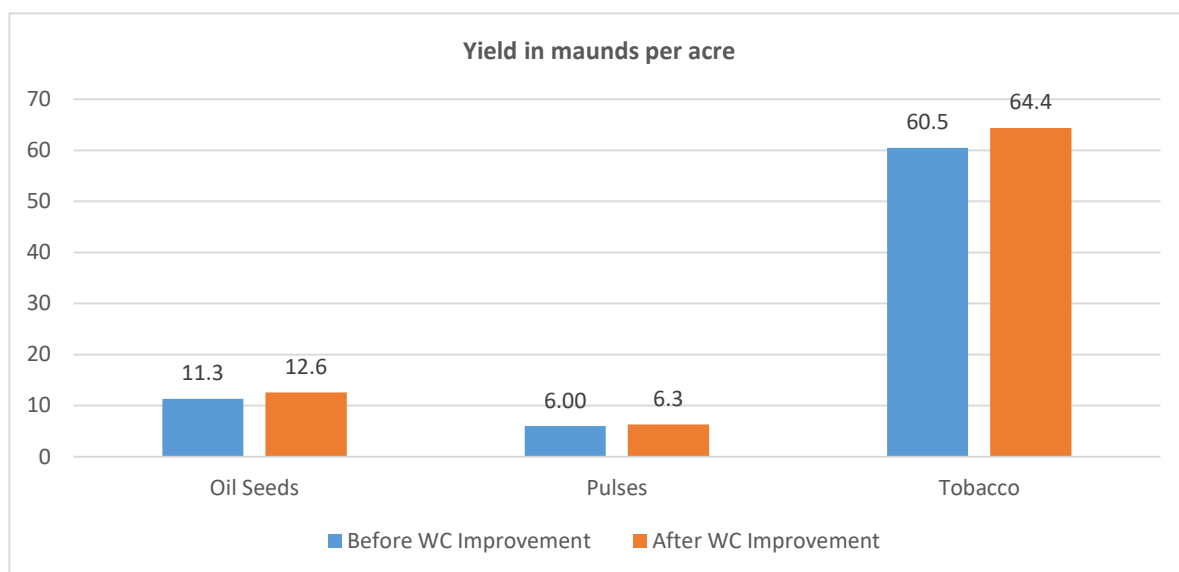


Figure 8: Impact of WC improvement on Minor Crop Yields on Sample Farms

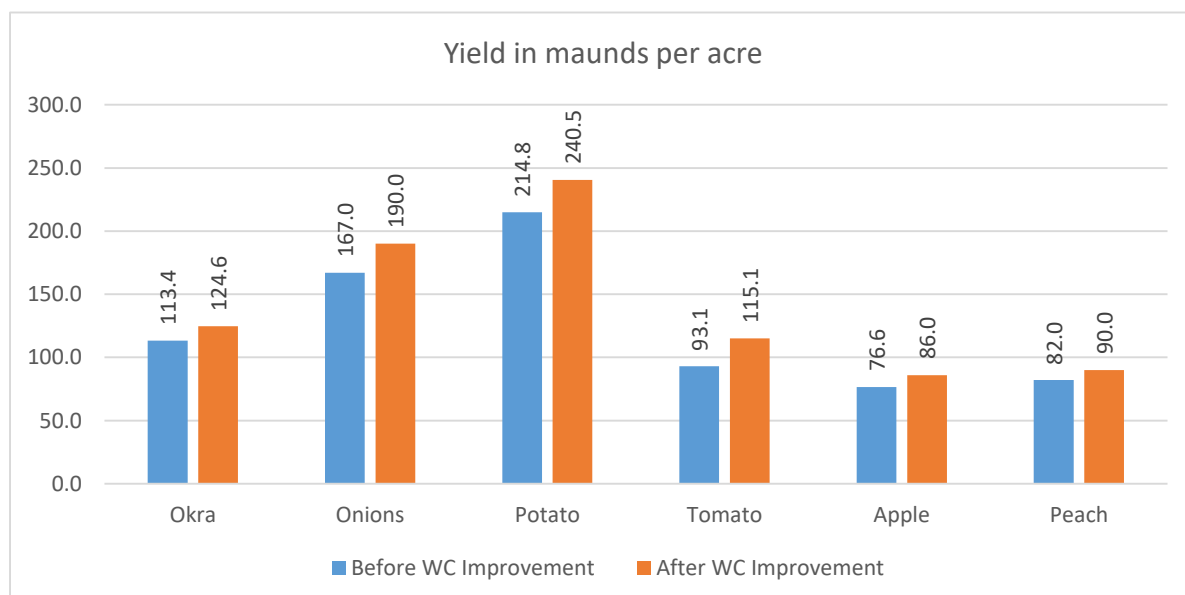


Figure 9: Impact of WC improvement on Fruit Vegetables Yields on Sample Farms

WC Improvement Impact on Crop Area /Cropping Patterns (Crop Share)

The primary impact of watercourses improvement is the saving in water losses. These losses have been estimated through water flow measurements in section 5.4. The saved water enhances crop yields on the one hand and increases crop area under various crops on the other. Impact of the saved water on crop yields has already been described in section 5.3.3. In this section impact on cropped area has been estimated. The area impact varies from crop to crop and averages 11.8% for all crops. Crop wise detail is given in **Table 29** and depicted in **Figures 10, 11 and 12**.

Table 24: Impact of WC Improvement on Crop Area and Cropping Pattern on Sample Farms

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Crop Share (%)	Crop Acres	Crop Share (%)	Crop Acres	Percent Increase

Wheat	10,679	46.9%	11,145	43.8%	466	4.4%
Rice	4,724	20.8%	4,942	19.4%	218	4.6%
Cotton	2,793	12.3%	2,985	11.7%	192	6.9%
Maize	1,214	5.3%	1,288	5.1%	75	6.2%
Sugarcane	708	3.1%	973	3.8%	265	37.4%
Oil Seeds	102	0.4%	207	0.8%	105	103.0%
Pulses	344	1.5%	815	3.2%	472	137.3%
Tobacco	151	0.7%	210	0.8%	59	39.1%
Okra	11	0.0%	13	0.1%	2	16.4%
Onions	28	0.1%	43	0.2%	15	52.5%
Potato	459	2.0%	543	2.1%	84	18.2%
Tomato	153	0.7%	275	1.1%	122	79.3%
Other Vegetables	99	0.4%	267	1.0%	167	168.5%
Apple	197	0.9%	212	0.8%	15	7.6%
Peach	150	0.7%	153	0.6%	2	1.6%
Other Fruits	119	0.5%	165	0.7%	46	38.6%
Rabi Fodder	494	2.2%	749	2.9%	254	51.5%
Kharif Fodder	320	1.4%	437	1.7%	117	36.6%
Overall	22,747	100.0%	25,422	100.0%	2,676	11.8%

Zone/ Unit wise breakup of the Improvement on Crop Area and Cropping Pattern on Sample Farms has given in **ANNEX-C**.

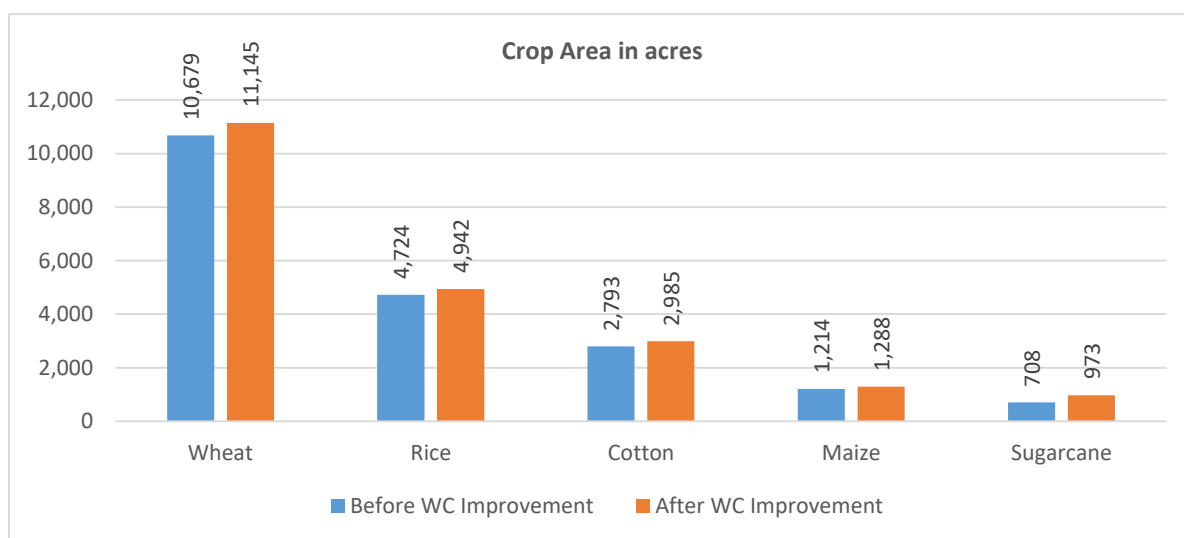


Figure 10: Impact of WC Improvement on Major Crop Area of Major Crops

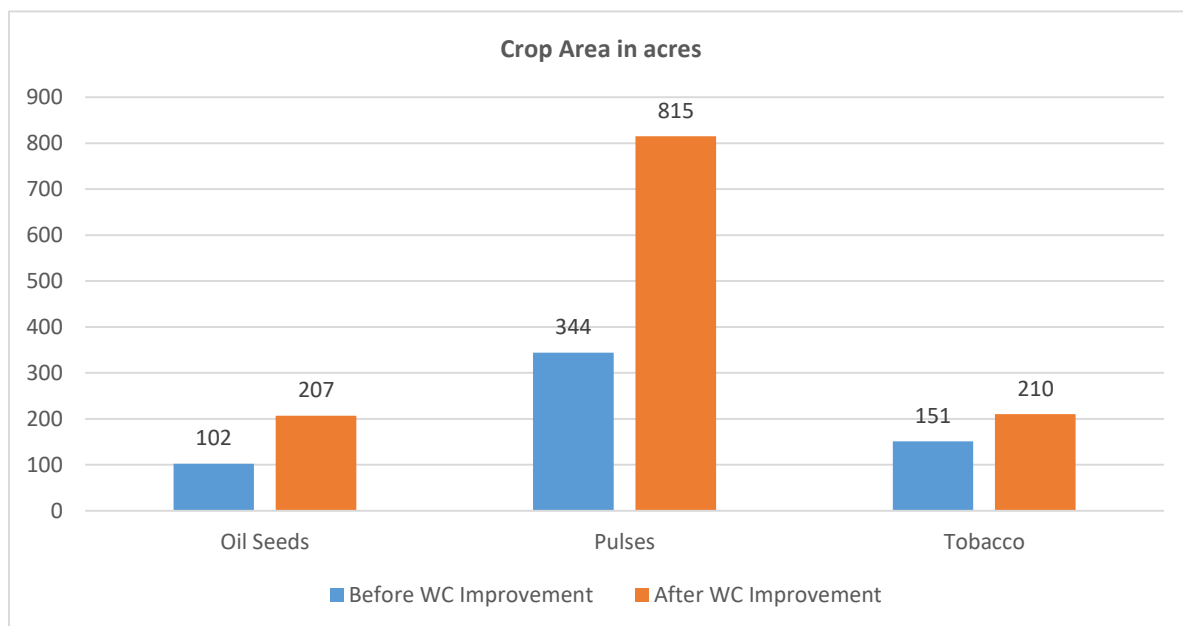


Figure 11: Impact of WC Improvement on Minor Crop Area of Major Crops

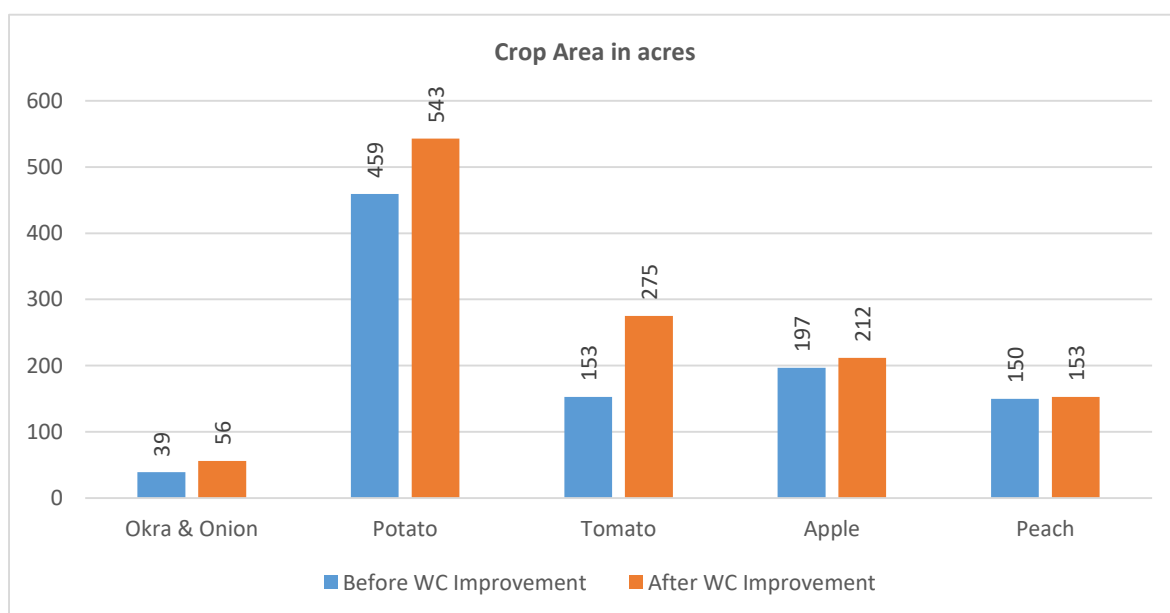


Figure 12: Impact of WC Improvement on Crop Area under Fruit Vegetables on Sample Farms

Watercourse Improvement Impact on Crop Production

Cumulative impact of Watercourses Improvement is reflected in total production of various crops. Production of various crops has increased at different rates varying from 11.6% in the case of peaches to 317.6% in the case of other vegetables. However, weighted average impact calculates at 24.5% (11.4% due to yield increase and 11.8% due to area increase and 1.3 percent due interaction between the two). Crop-wise production impact is given in **Table 30** and shown graphically in **Figures 13, 14 and 15**.

Table 25: Impact of Watercourse Improvement on Crop Production on Sample Farms

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	321,776	360,682	38,906	12.1%
Rice	132,611	152,450	19,839	15.0%
Cotton	73,837	86,395	12,558	17.0%
Maize	58,225	68,113	9,888	17.0%
Sugarcane	507,395	744,013	236,618	46.6%
Oil Seeds	1,148	2,598	1,450	126.3%
Pulses	2,066	5,116	3,050	147.6%
Tobacco	9,137	13,535	4,398	48.1%
Okra	1,263	1,617	354	28.0%
Onions	4,699	8,156	3,457	73.6%
Potato	100,064	130,635	30,571	30.6%
Tomato	14,266	31,619	17,353	121.6%
Other Vegetables	9,590	40,044	30,454	317.6%
Apple	15,056	18,195	3,139	20.8%
Peach	12,306	13,728	1,422	11.6%
Other Fruits	7,968	12,228	4,260	53.5%
Rabi Fodder	197,558	316,849	119,291	60.4%
Kharif Fodder	108,660	154,583	45,923	42.3%
Weighted Average of Production Impact				23%

Zone/ Unit wise breakup of the Impact on Crop production has given in **ANNEX-E**.

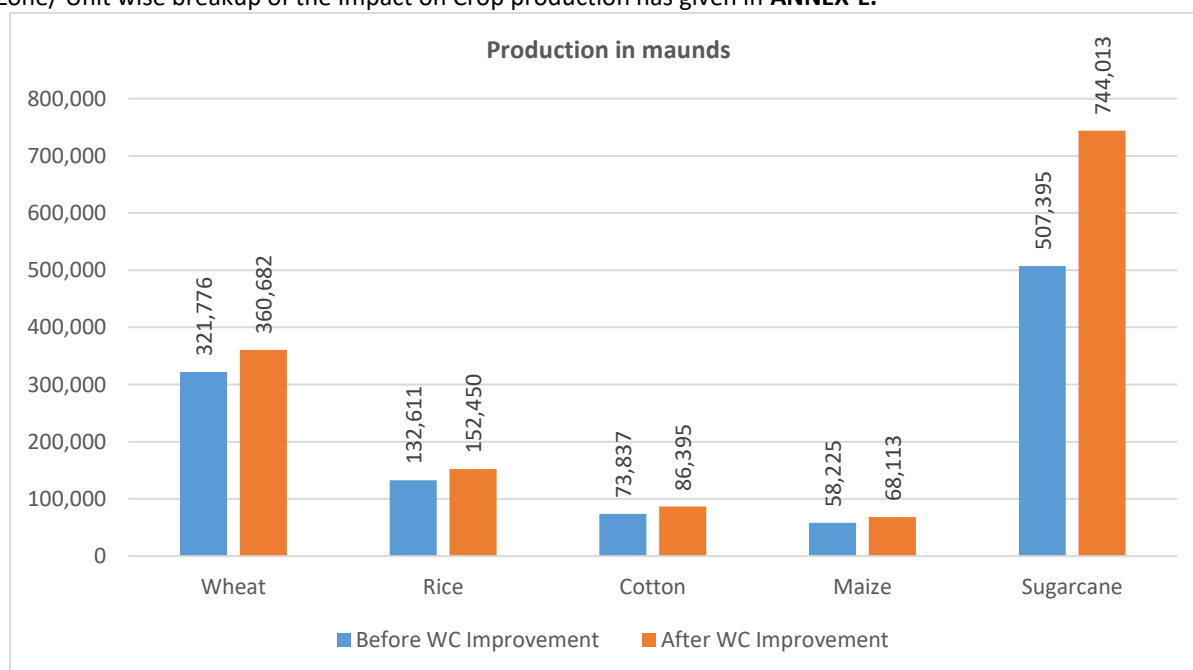


Figure 13: Impact of WC Improvement on Production of Major Crops on Sample Farms

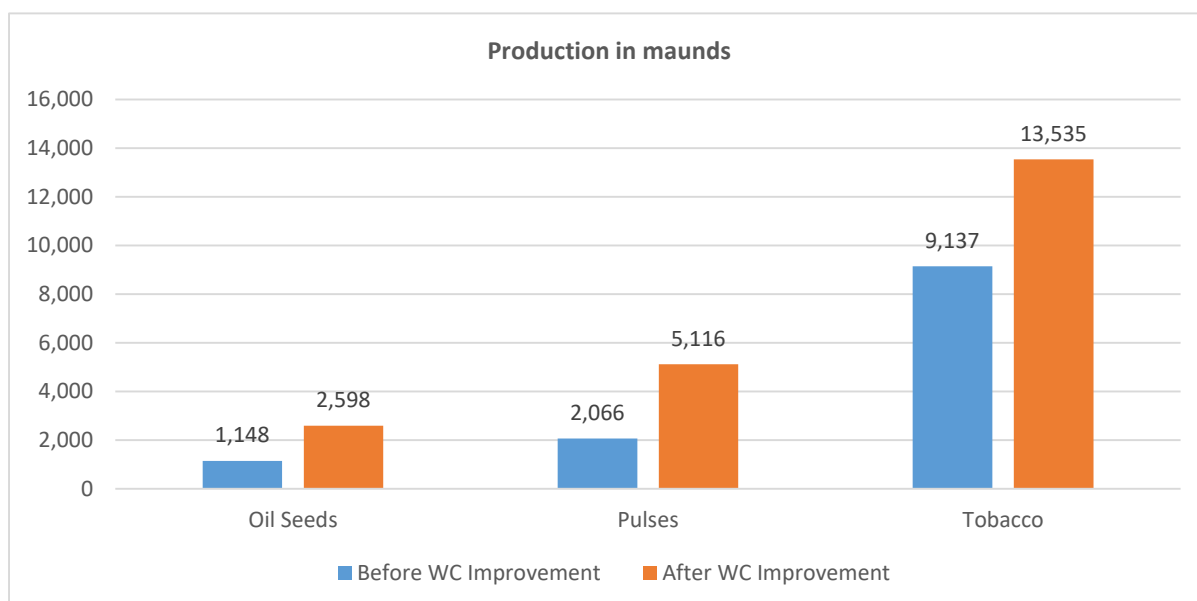


Figure 14: Impact of WC Improvement on Production of Minor Crops on Sample Farms

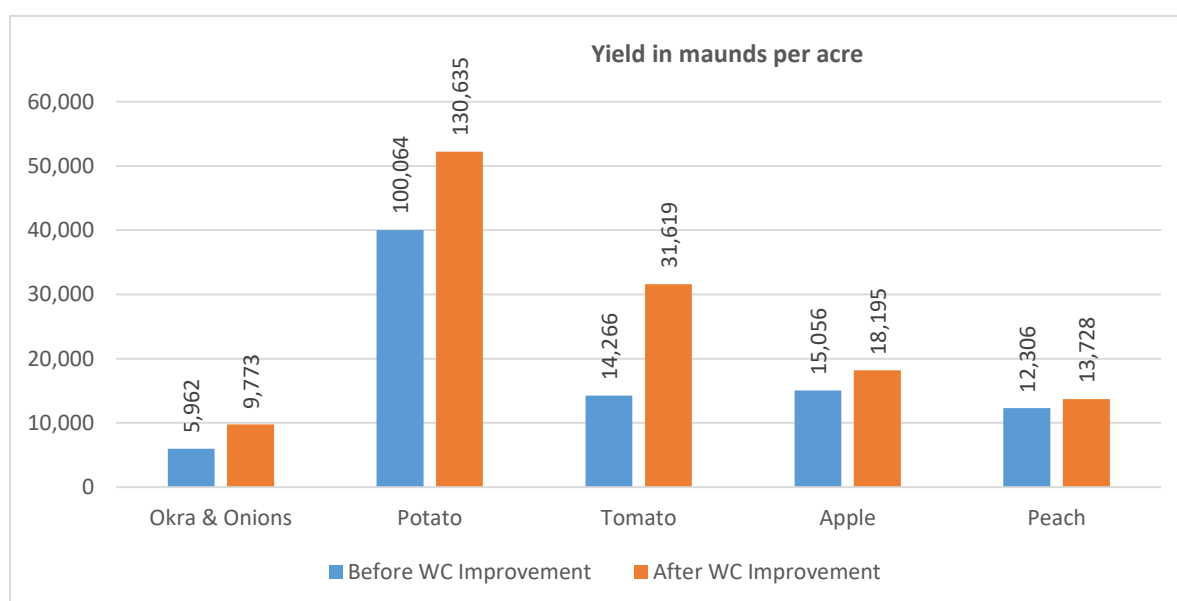


Figure 15: Impact of WC on Production of Vegetables on Sample Farms

Watercourse Improvement Impact on Agriculture Employment

The impact of watercourse Improvement on agriculture employment has also been significant. Labor man days at the farm have increased ranging from 2 percent to more than 169% after WC Improvement. Crop-wise use of labor on farms has been given in **Table 31**. On an overall basis, employment at farms has increased by 16% due to increase in crop area, crop yields and crop production.

Table 31: Impact of Watercourse Improvement on Agriculture Employment

Crops	Agricultural Employment		Change
	Before WC	After WC	

	Improvement	Improvement		
	Labor Man Days			Percent
Wheat	276,366	288,423	12,058	4%
Rice	149,290	156,171	6,881	5%
Cotton	164,866	176,220	11,354	7%
Maize	55,001	58,387	3,386	6%
Sugarcane	40,619	55,819	15,201	37%
Oil Seeds	1,044	2,803	1,759	169%
Pulses	1,691	1,819	129	8%
Tobacco	6,994	12,543	5,549	79%
Okra	609	709	100	16%
Onions	1,822	2,779	957	53%
Potato	30,019	35,486	5,467	18%
Tomato	6,822	9,491	2,669	39%
Other Vegetables	20,089	30,433	10,344	51%
Apple	6,646	13,489	6,843	103%
Peach	24,261	57,560	33,299	137%
Other Fruits	19,215	26,245	7,030	37%
Rabi Fodder	4,442	4,515	73	2%
Kharif Fodder	2,346	3,251	906	39%
Total	812,140	936,143	124,003	15%
Average per crop acre	36	37	1	3%
Average per farm	374	431	57	15%

Zone / Unit wise Impact on Agricultural Employment is given in ANNEX-F.

WC Improvement Impact on Agriculture Household Income

Impact of WC Improvement on per acre net income varies from crop to crop. It varies from PKR 1,093 for pulses to PKR 37,905 for other vegetables per acre averaging at PKR 4,053 for all crops. Crop-wise detail is given in **Table 32**.

Table 26: Impact of Watercourse Improvement on Agriculture Household Income

Crops	Before WC Improvement			After WC Improvement			Increase in Net Income
	Gross Income	Cost of Production	Net Income	Gross Income	Cost of Production	Net Income	
	PKR per Acre						
Wheat	69,428	31,520	37,908	74,569	35,377	39,192	1,284
Rice	86,432	46,860	39,572	94,985	53,814	41,171	1,599
Cotton	76,440	43,275	33,165	83,677	49,504	34,173	1,008
Maize	91,885	52,645	39,240	101,256	60,624	40,632	1,392
Sugarcane	146,188	66,124	80,064	155,987	73,732	82,255	2,191
Oil Seeds	69,041	24,782	44,259	76,979	28,875	48,104	3,845
Pulses	46,275	21,256	25,019	48,295	22,183	26,113	1,093
Tobacco	511,500	217,397	294,103	544,677	241,915	302,762	8,659
Okra	183,740	126,243	57,497	201,987	144,025	58,962	1,465
Onions	135,876	79,711	56,165	154,589	94,771	59,819	3,653
Potato	289,787	121,871	167,916	320,033	140,648	179,385	11,469
Tomato	143,714	68,862	74,852	177,608	88,933	88,675	13,823
Other Vegetables	129,438	37,927	91,511	186,531	57,115	129,416	37,905
Apple	175,375	67,930	107,445	196,970	79,728	117,242	9,797
Peach	236,500	71,579	164,921	259,573	82,097	177,476	12,555
Other Fruits	241,500	123,925	117,575	267,408	143,395	124,013	6,438
Rabi Fodder	109,506	20,381	89,125	115,934	22,548	93,386	4,261
Kharif Fodder	83,018	11,448	71,570	86,468	12,461	74,007	2,437
Average	89,373	42,170	47,203	99,680	48,424	51,256	4,053

Impact on Farmers' Gross and Net Incomes under Completed Schemes

In the previous sub sections of this Chapter, we had been evaluating the impact on gross and net incomes of the 2,174 sample farms located on 421 sample watercourses. In this sub section, sample results have been super imposed on all the farms located on all 13,777 improved watercourses. Total gross and net incomes of all the farms on 13,777 improved watercourses has been estimated at 206,235 and 108,924 million rupees respectively. Zone wise / unit wise detail has been shown in **Table 33**. Gross increase has increased by PKR 43,352 million and Net Income by PKR 19,414 million due to improvement of watercourses under all completed schemes.

Table 27: Impact on Total Gross and net Income of all the farms under completed Watercourses

Zone / Unit	Impact on Gross Income of All Farms under Completed Schemes			Impact on Net Income of All Farms under Completed Schemes		
	Gross Income			Net Income		
	Before WC Improvement	After WC Improvement	Increase/ Impact	Before WC Improvement	After WC Improvement	Increase/ Impact
	<i>Million Rupees</i>					
Punjab	178,406	207,615	29,209	94,227	106,756	12,530
KP	15,417	21,090	5,673	8,143	10,844	2,702
Balochistan	10,626	18,748	8,122	5,612	9,640	4,028
AJ&K	1,772	2,116	344	936	1,088	152
ICT	12	17	5	7	9	2
Overall	206,235	249,586	43,352	108,924	128,338	19,414

Water Saving Impact of Watercourses Improvement

In order to measure and evaluate the impact / reduction in water conveyance losses due to Watercourse Improvement / Lining, the ME&IE Consultants planned to measure water flows in sample watercourses under NPIWC-II before and after their improvement. So far about 285 before lining and after lining measurements have been taken on open watercourses. In addition, 136 piped watercourses have been also surveyed to get basic information about their capacity and annual flowing day. The work of measuring the water flows is further going on. Final Estimation / Evaluation of losses and reduction therein will only be possible once the before and after water flow measurements are complete for all sample watercourses. Types of these watercourses are given in **Table 34**.

Table 34: Number and Type of Sample Watercourses

Sample Watercourses		No of WC
50% lined Watercourses	Perennial Canal Watercourses	150
	Non perennial Watercourses	13
	Non Canal Watercourses	50
	Sub Total	213
20% lined Watercourses	Perennial Canal Watercourses	66
	Non perennial Watercourses	4
	Non Canal Watercourses	2
	Sub Total	72
100% lined PVC, PPC, HDPE etc., Watercourses		136
Grand Total Lined Sample Watercourses		421

Water Flows Before and After Improvement / Lining

Average water flows recorded in Liters per second at 3 points i.e., at MOGHA, 50% distance and 75% distance from MOGHA before and after the watercourse improvement have been shown in **Table 35**.

Table 35: Average Water Flows Recorded at 3 Points

TYPE OF WATER COURSES	TIME OF TAKING WFM	WATER FLOWS IN LITERS PER SECOND (LPS) AT THE DISTANCE FROM MOGHA		
		0%	50%	75%
50% Lined 213 Watercourses	Before Lining	27.23	18.45	14.18
	After Lining	28.25	27.60	22.58
20% Lined 72 Watercourses	Before Lining	29.35	24.72	19.75
	After Lining	27.95	27.43	22.50

Water Conveyance Efficiency

Water Conveyance Efficiencies have been calculated assuming Head level discharges as 100%. Since flow was measured at three points i.e., at the head measuring inlet discharge, at 50% and 75% distance from head. Water conveyance efficiencies and water conveyance losses have been computed at these three points. *A priori*, efficiency will always be 100% or conversely losses will always be 0% before and after lining at the head. On 213 new 50% Lined Watercourses, average Water Conveyance Efficiency (WCE) has been calculated 68% before and 98% after lining hence an increase of 30% at 50% distance from the head. At the distance of 75%, the respective figures are 52% and 80% for before and after situations and the increase in WCE is 28%. On 72 Additional 20% Lined Watercourses, average WCE has been calculated 84% before and 98% after lining, hence an increase of 14% at 50% distance from the head. At the distance of 75%, the respective figures are 67% and 81% for before and after situations and the increase in WCE is 14%. Details are given in **Table 36**.

Table 36: Average Water Conveyance Efficiency (WCE) at 50% and 75% distances from MOGHA

TYPE OF WATER COURSES	TIME OF TAKING WFM	AVERAGE WATER CONVEYANCE EFFICIENCY AT THE DISTANCE FROM MOGHA		
		0%	50%	75%
213 new 50% Lined Watercourses	Before Lining	100%	68%	52%
	After Lining	100%	98%	80%
Increase in Water Conveyance Efficiency (WCE) after Lining		00%	30%	28%
72 Additional 20% Lined Watercourses	Before Lining	100%	84%	67%
	After Lining	100%	98%	81%
Increase in Water Conveyance Efficiency (WCE) after Lining		00%	14%	14%

Water Conveyance Losses

Water conveyance losses are converse to watercourse conveyance efficiencies. These can be calculated by just subtracting the WCE from unity or 100%. These have been calculated for the sake of convenience and shown in **Table 37** for ready reference:

Table 37: Average Water Conveyance Losses (WCL) at 50% and 75% distances from MOGHA

TYPE OF WATER COURSES	TIME OF TAKING WFM	AVERAGE WATER CONVEYANCE LOSSES AT THE DISTANCE FROM MOGHA		
		0%	50%	75%
213 new 50% Lined Watercourses	Before Lining	0%	32%	48%
	After Lining	0%	2%	20%
Decrease in Water Conveyance Losses (WCL) after Lining		0%	30%	28%
72 Additional 20% Lined Watercourses	Before Lining	0%	16%	33%
	After Lining	0%	2%	19%
Decrease in Water Conveyance Losses (WCL) after Lining		0%	14%	14%

Annual Water Saved (AF) per Watercourse

Based on our sample of 421 watercourses, annual water saving per watercourse has been calculated as 139 Acre Feet. Calculations may be seen in **Table 38**.

Table 38: Water Saving Estimates as per 421 sample watercourses

Sample Watercourses on		No of WC	Annual Flowing Days	Average WC Capacity (Cusecs)	AF per Cusec Per Day	Water Use before WC lining in AF	Water Saving (%)	Water Saved in AF
50% lined Watercourses	Perennial Canal	141	330	1.0	1.98	92,129	29%	26,718
	Non perennial	13	165	1.0	1.98	4,574	29%	1,326
	Non Canal	59	300	1.0	1.98	35,046	29%	10,163
20% lined Watercourses	Perennial Canal	66	330	1.0	1.98	43,124	14%	6,037
	Non perennial	4	165	1.0	1.98	980	14%	137
	Non Canal	2	300	1.0	1.98	1,188	14%	166
PVC, PPC and HDPE Lined		136	300	0.5	1.98	40,392	50%	20,196
Total Sample Watercourses		421				217,434	30%	64,744
Annual Water Use saved Per Watercourse in AF						516	30%	154

5. IMPACT EVALUATION OF COMPONENT C3

For conducting Impact Evaluation of Component C3 and in order to assess the agro-Economic impacts of WSTs constructed, before and after approach has been used as given in the inception report. Information for this component has been collected through **ANNEX-L**. For this purpose, baseline and midline / end line impact survey/ studies have to be conducted @ 5% sample of completed schemes under revised methodology. Thus, for 5,390 constructed WSTs, baseline and impact sample size works out 270. By now (end of June, 2023), baseline has been completed on 223 WSTs in two phases. The consolidated baseline report covering these 223 WSTs has already been submitted. However, impact surveys have been carried out on 222 WSTs (as in GB no impact survey has been conducted) up to the end of June, 2023. Thus, the midline impact has been calculated for 222 and not for 223 WSTs.

As mentioned above baseline sample calculates / requires as 270, however, actual sample size taken for baselines surveys (in 2 phases) is 223 and for Impact surveys (in two phases) is 222, which are obviously less than the required one. The remaining sample would be completed shortly. A complete profile of the baseline of 222 sample Water Storage Tank is given below:

Profile of Sample Water Storage Tanks

Sample Size

Up to the end of June 2023, total WSTs constructed are **5,390**. The required Sample size for these WSTs @ 5%, calculates 270 WSTs, however, actual sample drawn is 223 WSTs. The zone / Unit wise distribution of this sample is shown in **Table 39**.

Table 28: Baseline and Midline/ Impact Sample Size for Monitoring Evaluation of WSTs

Zone/ Unit	Completed Schemes	5% Sample	Baseline Surveys			Impact Surveys		
			Phase I	Phase II	Total	Phase I	Phase II	Total
Punjab	1,021	52	9	51	60	9	51	60
KP	1,188	59	6	50	56	6	50	56
Balochistan	2,499	125	21	67	88	21	67	88
GB	328	16	1	0	1	0	0	0
AJ&K	354	18	0	18	18	0	18	18
Overall	5,390	270	37	186	223	36	186	222

Area Operated Under Sample WSTs

The total area operated under these 222 WSTs is 2,353.3 acres or 10.6 acre per WST. Zone / Unit wise total and average operated area is shown in **Table 40** and **Figure 16**.

Table 40: Area Operated under Sample WSTs

Zone / Unit	No. of WST	Area Operated (Acres)	Avg. Area (Acres)
Punjab	60	636	10.6
KP	56	673.3	12.0
Balochistan	88	792	9.0
AJ&K	18	252	14.0
Overall	222	2353.3	10.6

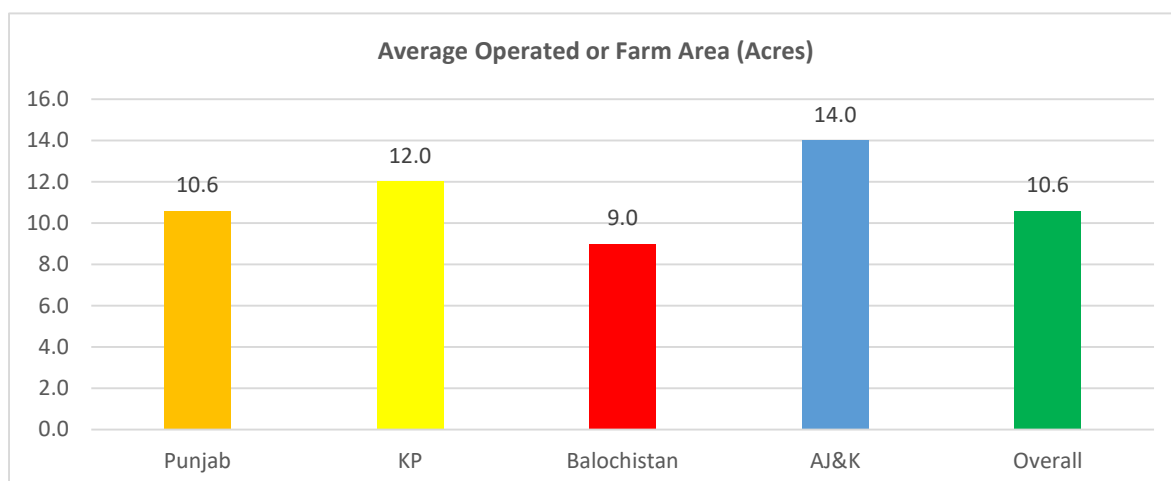


Figure 16: Average Size of Holding or Farm Size of Sample WSTs' Farms

Sources of Irrigation Water for WSTs

Like watercourses, WSTs have also many sources of water. These sources include Perennial canals, non-perennial canals, Tube wells, Tail water recovery ditches, Nullah, Streams, Springs and Dug wells etc. However, unlike watercourses, WSTs have multiple sources of water i.e., one WST may have two or more than two water sources. Most common water source is tube well. Out of 222 sample WSTs, 164 (74%) draw water from tube wells, 15 (7%) from perennial canals, 13 (6%) from non-perennial canals and 30 (13%) from other sources. Source wise and zone /unit wise distribution is given in **Table 41** below.

Table 41: Source of Irrigation Water of Water Storage Tanks (Multiple Sources)

Zone / Unit	Total Responses	Perennial Canal	Non-perennial canal	Tube well	Tail Water Recovery Ditch	Nullah	Streams	Spring	Dug well	Total others than canal & Tube wells
Punjab	60	15	8	37	0	0	0	0	0	0
KP	56	0	0	38	1	4	3	4	6	18
Balochistan	88	0	5	81	0	0	2	0	0	2
AJ&K	18	0	0	8	0	6	2	2	0	10
Overall	222	15	13	164	1	10	7	6	6	30

Topography of WSTs

During the survey, information on land topography of the WST areas was also collected. On an overall basis, 80% WSTs were located on even surfaces, 15% on uneven surfaces and the rest 5% on slightly sloped surfaces. Information on zone / unit wise topography of the area where WSTs were located is given in **Table 42**.

Table 42: Land Topography of the Area Served by Sample Water Storage Tanks

Zone / Unit	Total Responses	Even	Un-Even	Slightly Sloped
Punjab	60	48 (80%)	12 (20%)	0 (0%)
KP	56	46 (81%)	6 (10%)	4 (9%)
Balochistan	88	69 (78%)	15 (17%)	4 (5%)

AJ&K	18	15 (86%)	0 (0%)	3 (14%)
Overall	222	178 (80%)	33 (15%)	11 (5%)

Feedback Information on WSTs

During the survey it was noted that the procedure for processing applications for the WSTs was 100% prompt, the process of survey & design was 100% fast tracked and the behavior of 75% OFWM staff was friendly and supportive in dealing with the WSTs cases. Eighty-two (82) percent of farmers reported that the maintenance of WSTs is easy. Details of feedback are given in **Table 43**.

Table 43: Feed Back on Water Storage Tanks Construction

Zone/Unit	Total Respondents	Processing Applications	Survey & Design Process	Behavior of OFWM Staff		Maintenance of WST	
		Prompt	Fast track	Friendly / Supportive	Professional & Interactive	Easy	Difficult
Punjab	60	100%	100%	65%	35%	73%	27%
KP	56	100%	100%	100%	0%	100%	0%
Balochistan	88	100%	100%	61%	39%	73%	27%
AJ&K	18	100%	100%	100%	0%	100%	0%
Overall	222	100%	100%	75%	25%	82%	18%

Perception of Farmers on Cropping Intensity and Crop Yields

About 70 percent farmers have a perception that WSTs have positive impact on Cropping intensity to the extent of 22% and 67 farmers were of the view that WSTs increase crop yields to the extent of 27%. Zone / Unit wise farmers' perceptions are shown in **Table 44**.

Table 29: Farmer's Perception on Increase in Cropping Intensity and Crop Yields

Zone/Unit	Total Respondents	On Cropping Intensity			On Crop Yield Per Acre		
		Yes	No	Average Increase	Yes	No	Average Increase
Punjab	60	73%	27%	25%	76%	24%	32%
KP	56	95%	5%	23%	88%	12%	28%
Balochistan	88	66%	34%	19%	61%	39%	23%
AJ&K	18	0%	100%	20%	0%	100%	0%
Overall	222	70% (155)	30% (67)	22%	67% (148)	33% (74)	27%

Perception of Farmers on Cultivated Area and No of Irrigation

When the farmers were asked about the impact of Water Storage Tanks on the increase in cultivated area and number of irrigations, 68% of them responded that WSTs increase the cultivated area while 87% were of the view that number of irrigations also increases. Zone Unit wise responses of the farmers are summarized in **Table 45**.

Table 45: Farmer's Perception on Increase in Cultivated Area and No of Irrigations

Zone/Unit	Total Respondents	On Cultivated Area		On No of Irrigation	
		Yes	No	Yes	No
Punjab	60	73%	27%	100%	0%
KP	56	81%	19%	100%	0%
Balochistan	88	70%	30%	68%	32%
AJ&K	18	0%	100%	100%	0%
Overall	222	68% (152)	32% (70)	87% (194)	13% (28)

Average Sample Respondents per WST

On the above 222 WSTs there were total 222 growers or one grower per WST. Zone / Unit wise detail of 222 respondent growers is given in **Table 46** below.

Table 46: Baseline and Impact Sample Respondents

Zone/Unit	Total WSTs	Total Respondents	Average Respondents /WST
Punjab	60	60	1
KP	56	56	1
Balochistan	88	88	1
AJ&K	18	18	1
Total	222	222	1

Distribution Sample WST Farms according to Farm Size and Tenancy

During the selection, due consideration was given to the farm sizes and tenure of the farmers. Distribution of respondent growers according to size of holdings is given in **Table 47** and that of tenure in **Table 48**.

Zone/Unit	Total 47 Respondents	Distribution of Sample Farmers According to Size of Holding		
		Less than 12.5 acres	12.5 to 25 acres	More than 25 acres
Punjab	60	44 (73%)	12 (20%)	4 (7%)
KP	56	40 (71%)	12 (21%)	4 (8%)
Balochistan	88	44 (50%)	12 (14%)	32 (36%)
AJ&K	18	14 (78%)	3 (17%)	1 (5%)
Overall	222	142 (64%)	39 (17%)	41 (19%)

Table 30: Distribution of Farmers According to Tenure

Zone/Unit	Total Respondents	Distribution of Sample Farmers According to Tenure		
		Owners	Owner / Tenants	Tenants
Punjab	60	59 (98%)	1 (2%)	0
KP	56	44 (79%)	1 (2%)	11 (19%)
Balochistan	88	84 (96%)	3(1%)	1 (1%)
AJ&K	18	18 (100%)	0	0
Overall	222	205 (92%)	5 (3%)	12 (5%)

Since the M&E teams have to visit each of the selected farmers two times (i.e., at the time of baseline and end line impact survey), the availability of the respondent farmers in the village was also considered while taking the household as sample.

Agro-Economic Impact of Water Storage Tanks Construction

Impact of WSTs Construction on Land Use

Impact on Cultivated Area

Cultivated area is defined as that part of the farm area which is under cultivation by the farmer or on which crops are / can be sown by the farmers. A part of the farmland or farm area is not often available for cultivation. This land may include land for human residence, land for rearing the livestock, land for water pond meant for watering the farm livestock, land used for watercourses and paths and some other land not available for cultivation or non-cultivable lands. Thus, by definition cultivated area is always less than or equal to the Farm area. Additional availability of the water or saved water can increase the area under cultivation.

Thus, the impact of additional availability of water or saved water due to WST construction on cultivated area has been summarized in **Table 49** and graphically depicted in **Figure 17**.

Table 31: Impact of WST Construction on Cultivated Area

Zone/Unit	Cultivated Area on Sample Farms			Cultivated Area on all Improved WC		
	Before WST Construction	After WST Construction	Increase/ Impact	Before WST Construction	After WST Construction	Increase/ Impact
Punjab	587	611	25	9,982	10,402	420
KP	582	619	37	12,345	13,138	793
Balochistan	512	574	63	14,531	16,312	1,781
AJ&K	192	216	24	3,784	4,250	466
Overall	1,873	2,021	149	40,642	44,102	3,460

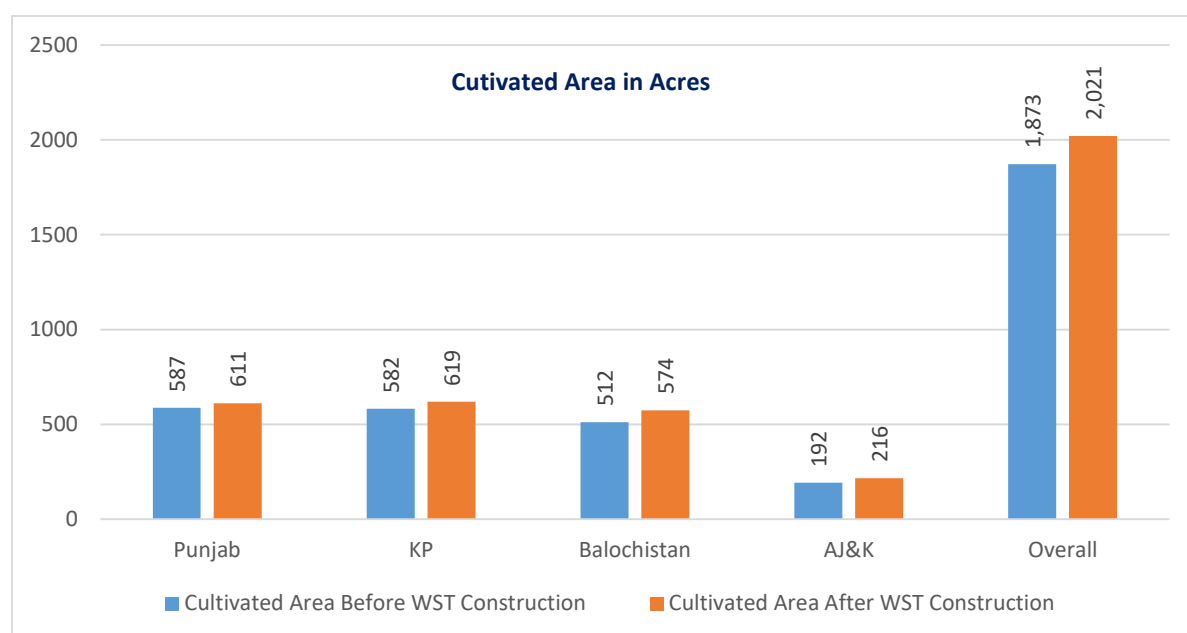


Figure 17: Impact of WST Construction on Cultivated Area on Sample Farms

Impact on Land Use Intensities

As the land use intensity is defined as ratio of cultivated area to farm area and the cultivated area is always less than or equal to farm area, hence, by definition land use intensity is always less than or equal to one or 100%. It can never exceed unity or 100%. While analyzing the land use pattern of the respondent farms, it has been found that land use intensity has increased on an overall basis from 79.6% to 85.9%. Zone / Unit wise break up / detail has been given in **Table 50** and depicted in **Figure 18**. The highest increases of 9.5%age points and 7.8%age points have been noted in AJ&K and Balochistan whereas the lowest have been in Punjab (3.8%age point).

Table 50: Impact of WST Improvement on Land Use Intensities

Zone/Unit	Total Farm Area of Sample Farms	Total Cultivated Area of Sample Farms		Land Use		
		Before WC Improvement	After WC Improvement	Before WC Improvement	After WC Improvement	Increase/ Impact
Punjab	636.0	587	611	92.3%	96.1%	3.8%
KP	673.3	582	619	86.4%	91.9%	5.5%
Balochistan	792.0	512	574	64.6%	72.5%	7.8%

AJ&K	252.0	192	216	76.2%	85.7%	9.5%
Overall	2353.3	1,873	2,021	79.6%	85.9%	6.3%

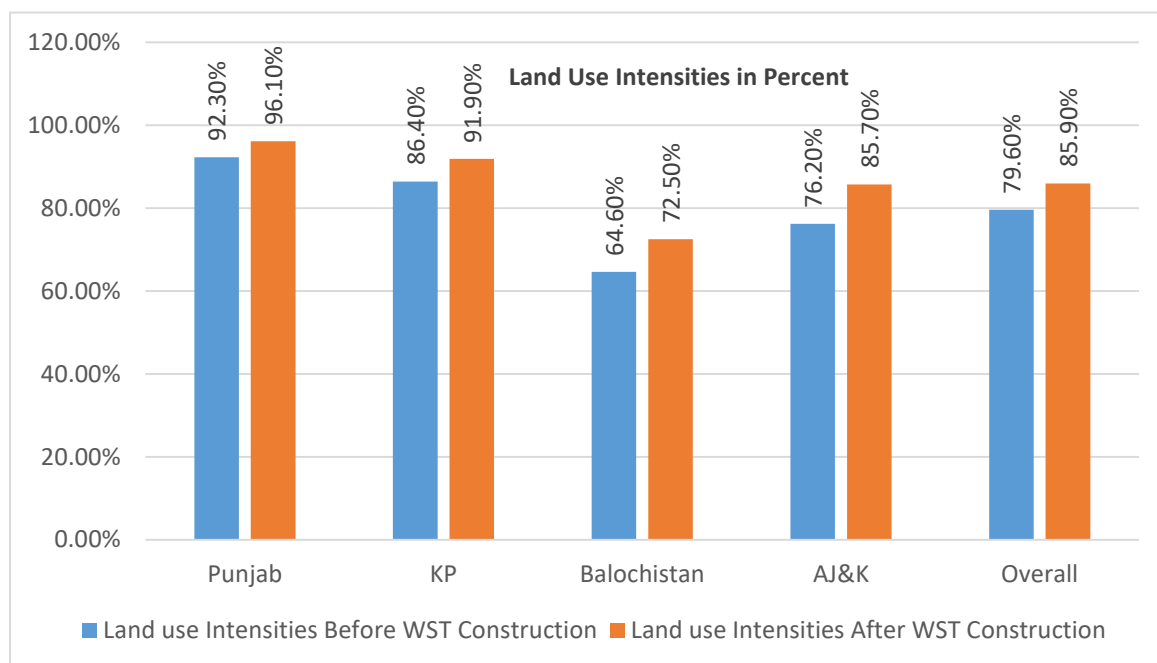


Figure 18: Impact of WST Construction on Land Use Intensities on Sample Farms

Impact Watercourses Improvement on Crops

Impact on Cropped Area

Another indicator used to measure agricultural efficiency is the number of crops grown during the crop year on a single piece of cultivated land. It is quite possible that during the year, all the cultivated area might not be cultivated and some of it is left fallow (unplanted) due to shortage of water or non-availability of some other critical factor. On the other hand, it is also possible that the farmer might be getting two or even three crops from the same tract of cultivated land during the year if sufficient water is available to him to grow the additional crops. The impact of additional water saved through WSTs construction on cropped area is shown in Table 51 and depicted in Figure 19.

Table 32: Impact of WST Construction on Cropped Area

Zone/Unit	Cropped Area on Sample Farms			Cropped Area on all Farms on all Constructed WSTs		
	Before WST Construction	After WST Construction	Increase/ Impact	Before WST Construction	After WST Construction	Increase/ Impact
Punjab	943.7	1094.0	150.3	16,059	18,616	2,558
KP	575.0	714.3	139.3	12,198	15,153	2,955
Balochistan	517.8	653.8	136.0	14,704	18,566	3,862
AJ&K	199.5	262.0	62.5	3,924	5,153	1,229
Overall	2236.0	2724.1	488.1	46,885	57,489	10,604

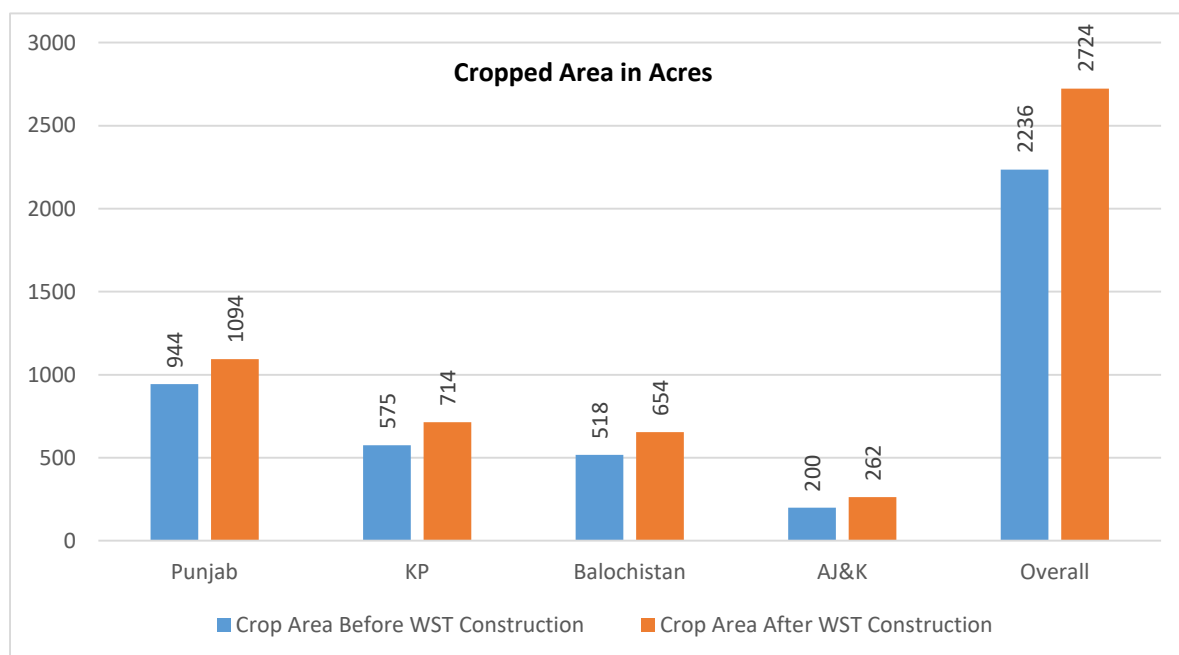


Figure 19: Impact of WST Construction on Cropped Area on Sample Farms

Impact on Cropping Intensities

By definition the cropping intensity (the ratio between the cropped area and cultivated area) may be less than, equal to or greater than unity or 100%. The impact of watercourses improvement on cropping intensities is shown in Table 86 below. On an overall basis, cropping intensity has increased by 15.4%age point. Zone wise Impact or increases in cropping intensities has been given in **Table 52** and shown in **Figure 20**. The highest increase of 18.1%age point has been recorded in Punjab whereas lowest increase of 12.6%age point found in Balochistan.

Table 332: Impact of WST Improvement on Land Use Intensities

Zone/ Unit	Total Cultivated Area of Sample Farms		Total Cropped Area of Sample Farms		Cropping Intensities		
	Before WC Improve ment	After WC Improve ment	Before WC Improve ment	After WC Improve ment	Before WC Improve ment	After WC Improve ment	Increase/ Impact
Punjab	587	611	943.7	1094.0	160.9%	179.0%	18.1%
KP	582	619	575.0	714.3	98.8%	115.3%	16.5
Balochistan	512	574	517.8	653.8	101.2%	113.8%	12.6
AJ&K	192	216	199.5	262.0	103.7%	121.3%	17.6
Overall	1,873	2,021	2236.0	2724.1	119.4%	134.8%	15.4

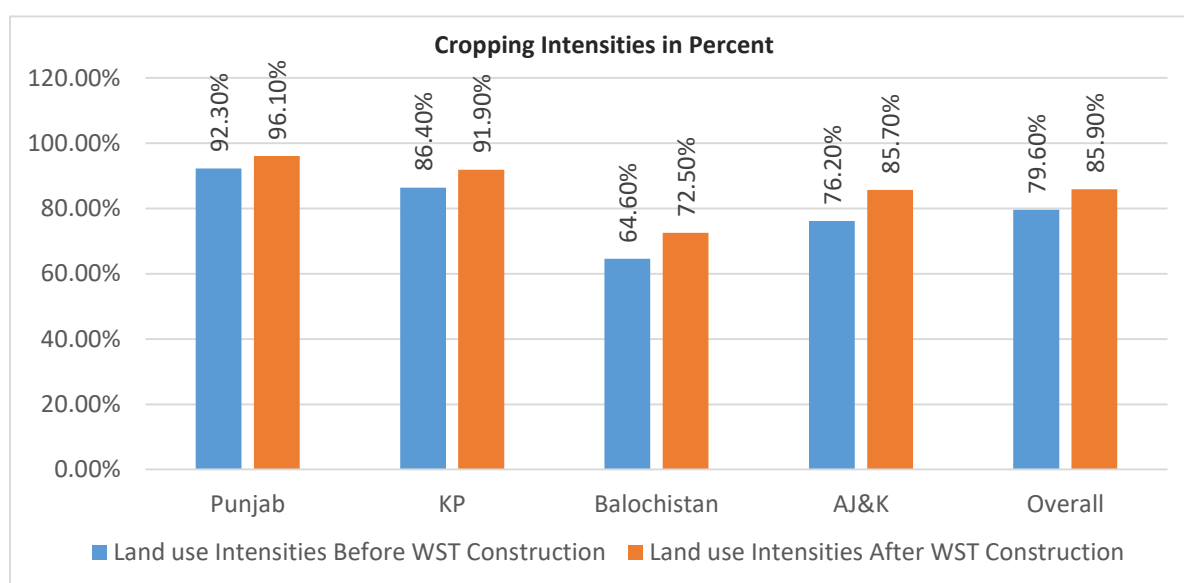


Figure 20: Impact of WST Construction on Cropping Intensities on Sample Farms

Impact of Watercourses Improvement on Crop Yields

Increased water availabilities either add to the cultivated area which is reflected in increased land use intensities, or it increases cropping intensities (which have already been shown in sections 6.2.1 and 6.2.2 above) reflecting crop area under various crops. Moreover, it also increases the productivity of land often indicated by increases in crop yields or the crop production per unit of land; say maunds per acre or quintal per hectare. In this section, the impact of improving watercourses on crop yields has been shown. These impacts have been given in **Table 53** and in **Figures 21 and 22**. It may be seen from **Table 54** that yield of various crops has increased by 6.6% in the case of other Rabi Fodder to 16.7% in case of pulses. However, the average weighted impact of watercourses improvement on overall crop Yields has been 10.2%.

Table 53: Impact of WST Construction on Crop Yields on Sample Farms

Crops	Crop Yields			
	Before WST Construction	After WST Construction	Impacts of WST Construction	
	Maunds (40 Kgs) per Acre			Percent
Wheat	31.3	34.6	3.2	10.4%
Rice	27.4	29.9	2.5	9.0%
Cotton	26.5	28.9	2.4	9.1%
Maize	70.9	78.1	7.2	10.2%
Sugarcane	740.6	815.0	74.4	10.0%
Pulses	6.0	7.0	1.0	16.7%
Onions	167.0	185.0	18.0	10.8%
Tomato	90.0	100.4	10.4	11.5%
Other Vegetables	166.5	180.2	13.7	8.2%
Apple	76.6	85.0	8.4	11.0%
Other Fruits	61.7	70.2	8.5	13.8%
Rabi Fodder	369.8	394.1	24.3	6.6%
Kharif Fodder	340.3	367.2	26.9	7.9%
Weighted Average of Yield Impact				10.2

Crops	Crop Yields		
	Before WST Construction	After WST Construction	Impacts of WST Construction

Zone / Unit wise breakup of the Impact on Crop Yields has given in ANNEX-H.

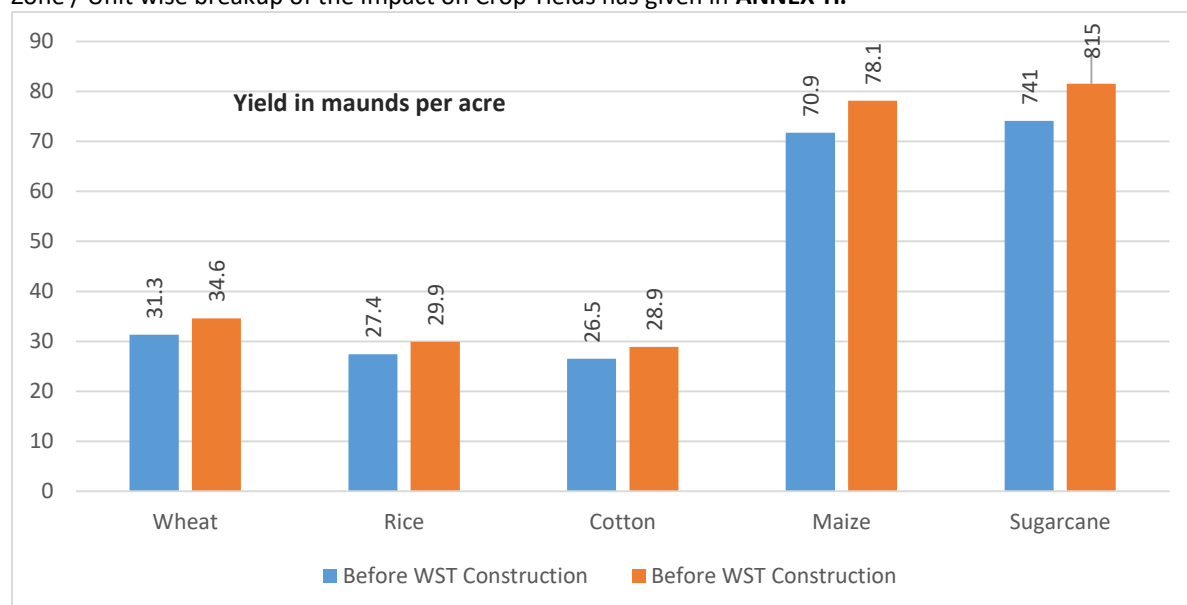


Figure 21: Impact of WST Construction on Major Crop Yields on Sample Farms

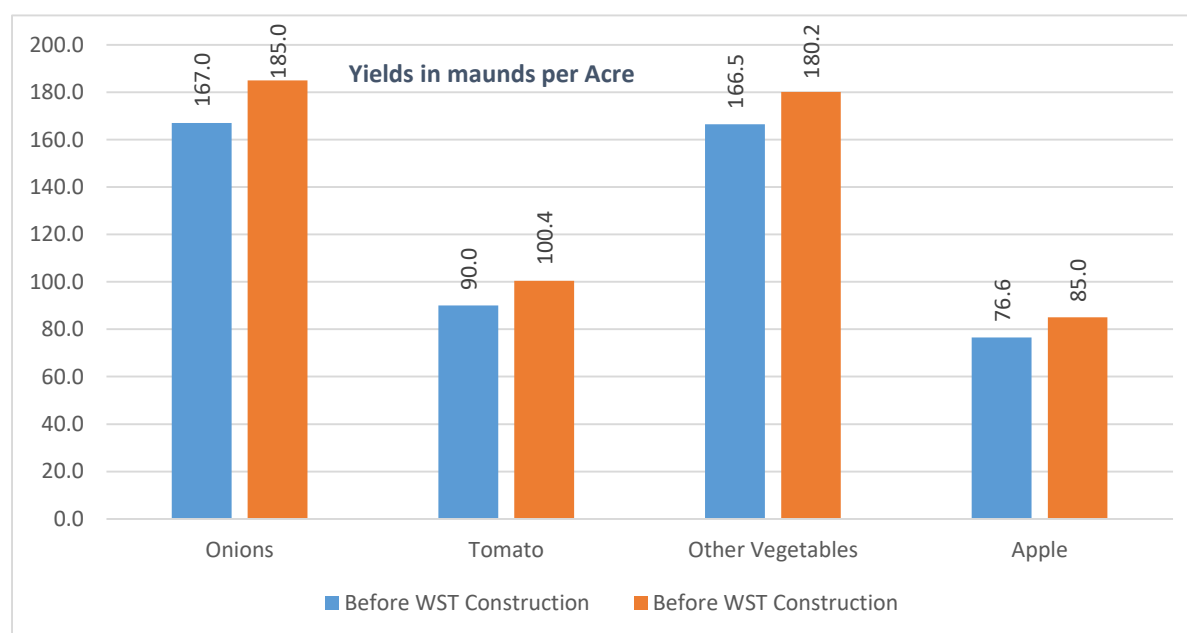


Figure 22: Impact of WST Construction on Fruit Vegetables Yields on Sample Farms

WST Construction Impact on Crop Area /Cropping Patterns on Sample Farms

The primary impact of WST construction is the saving in water losses. These losses have been estimated in section 6.3. The saved water enhances crop yields on the one hand and increases crop area under various crops on the other. Impact of the saved water on crop yields has already been described in section 6.2.3. In

this section impact on cropped area has been estimated. The area impact varies from crop to crop and averages 21.8% for all crops. Crop wise detail is given in **Table 55** and depicted in **Figures 23 and 24**.

Table 34: Impact of WST Improvement on Crop Area and Cropping Pattern on Sample Farms

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Crop Share (%)	Crop Acres	Crop Share (%)	Crop Acres	Percent Increase
Wheat	744	33.3%	842	30.9%	98.3	13.2%
Rice	326	14.6%	371	13.6%	45.6	14.0%
Cotton	39	1.7%	43	1.6%	4.0	10.3%
Maize	178	8.0%	198	7.3%	19.6	11.0%
Sugarcane	22	1.0%	38	1.4%	15.4	68.7%
Pulses	49	2.2%	74	2.7%	24.3	49.1%
Onions	120	5.4%	153	5.6%	32.5	27.0%
Tomato	56	2.5%	71	2.6%	14.6	25.8%
Other Vegetables	235	10.5%	337	12.4%	102.7	43.8%
Apple	207	9.2%	230	8.4%	23.4	11.3%
Other Fruits	180	8.1%	251	9.2%	70.3	38.9%
Rabi Fodder	27	1.2%	36	1.3%	9.2	34.5%
Kharif Fodder	52	2.3%	81	3.0%	28.4	54.3%
Overall	2,236	100.0%	2,724	100.0%	488.3	21.8%

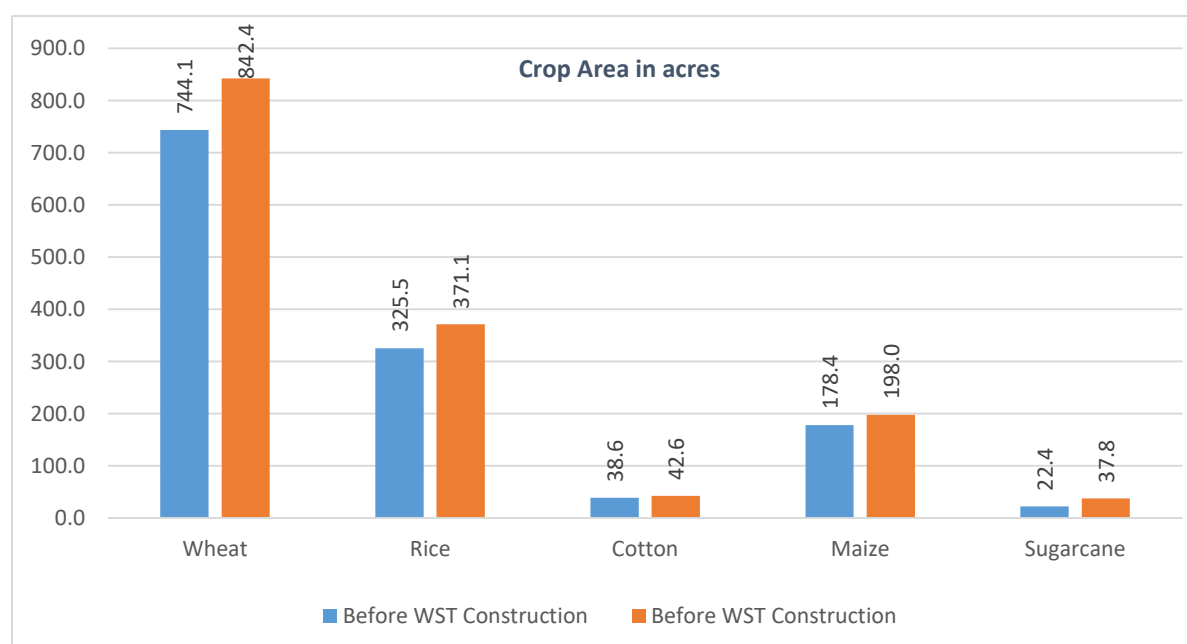


Figure 23: Impact of WST Construction on Crop Area of Major Crops on Sample Farms

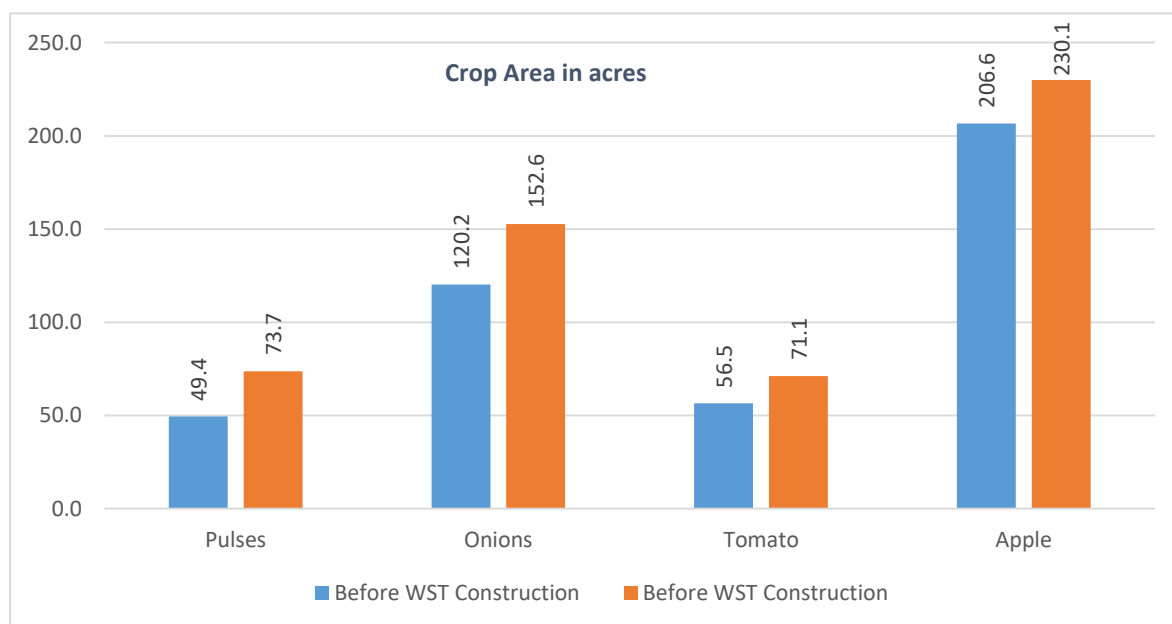


Figure 24: Impact of WST Construction on Area under Pulses, Fruit Vegetables on Sample Farms

WST Construction Impact on Crop Production on Sample Farms

Cumulative impact of Watercourses Improvement is reflected in total production of various crops. Production of various crops has increased at different rates varying from 20% in the case of cotton to 86% in the case of sugarcane. However, weighted average impact calculates at 35% (11% due to yield increase and 22% due to area increase and 2 percent due interaction between the two). Crop-wise production impact is given in Table 56 and shown graphically in Figures 25 and 26.

Table 56: Impact of WST Improvement on Crop Production on Sample Farms

Crops	Crop Production		Impacts of WST Construction	
	Before WST Construction	After WST Construction	Maunds (40 Kgs)	Percent
Wheat	23,321	29,135	5,814	25%
Rice	8,927	11,089	2,162	24%
Cotton	1,024	1,232	208	20%
Maize	12,796	15,472	2,677	21%
Sugarcane	16,583	30,785	14,202	86%
Pulses	297	516	220	74%
Onions	20,072	28,239	8,167	41%
Tomato	5,082	7,134	2,052	40%
Other Vegetables	39,065	60,768	21,704	56%
Apple	15,823	19,555	3,732	24%
Other Fruits	11,134	17,605	6,471	58%
Rabi Fodder	9,843	14,110	4,267	43%
Kharif Fodder	17,845	29,700	11,856	66%
Weighted Average of Production Impact				35%

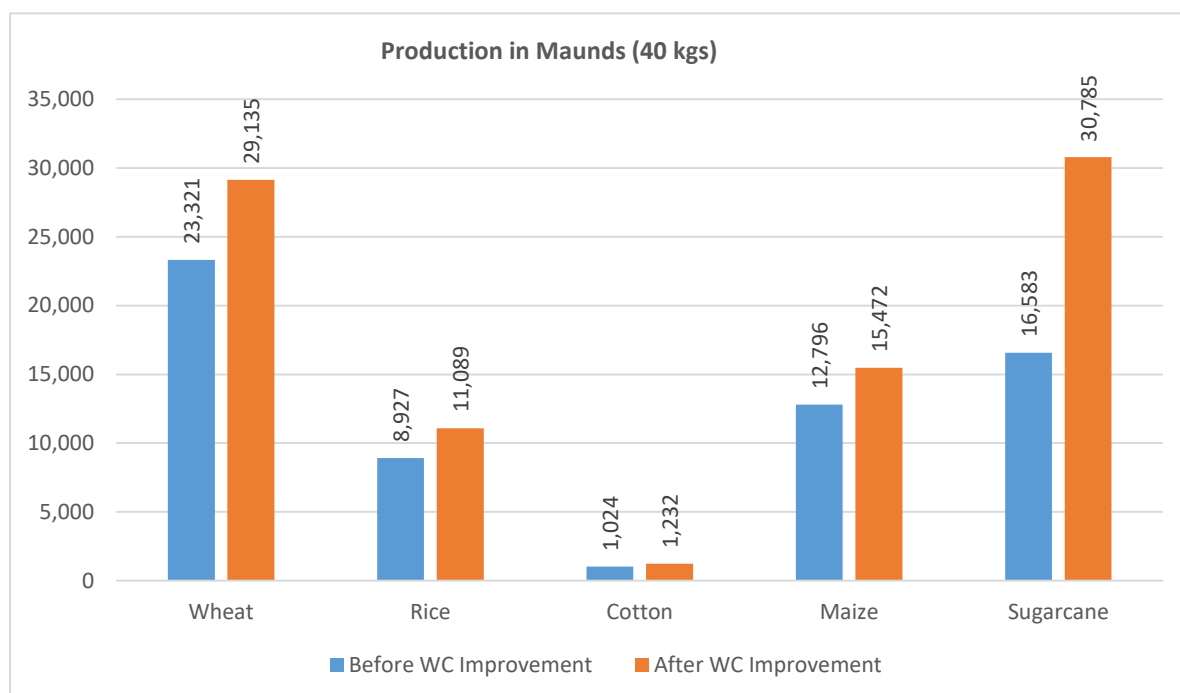


Figure 25: Impact of WST Construction on Major Crops Production on Sample Farms

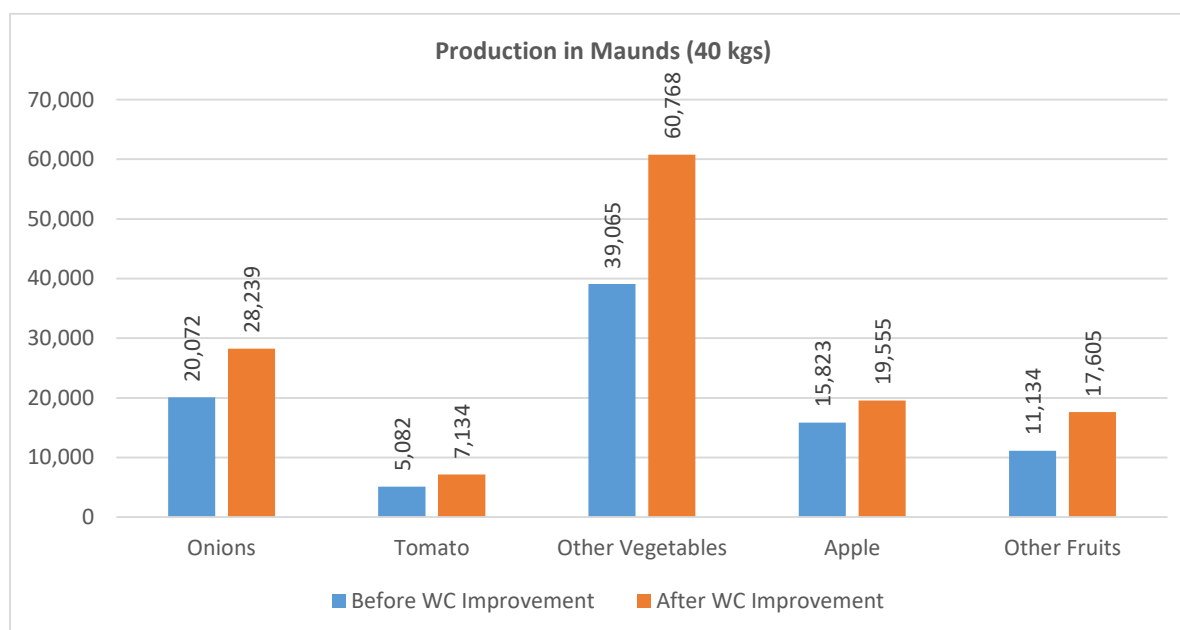


Figure 26: Impact of WST Construction on Fruit & Vegetable Production on Sample Farms

WST Construction Impact on Agriculture Employment

The impact of WST construction on agriculture employment has also been significant. Labor man days at the farm have increased ranging from 10 percent to more than 69% after WST construction. Crop-wise use of labor on farms has been given in **Table 57**. On an overall basis, employment at farms has increased by 22% due to increase in crop area, crop yields and crop production.

Table 57: Impact of WST Construction on Agriculture Employment

Crops	Agricultural Employment	Change Impact
-------	-------------------------	---------------

	Before WST Construction	After WST Construction		
	Labor Man Days			Percent
Wheat	19,257	21,802	2,545	13%
Rice	10,286	11,727	1,441	14%
Cotton	2,281	2,517	236	10%
Maize	8,084	8,975	891	11%
Sugarcane	1,284	2,166	882	69%
Pulses	425	634	209	49%
Onions	7,781	9,882	2,101	27%
Tomato	2,550	3,209	659	26%
Other Vegetables	9,536	13,710	4,174	44%
Apple	13,479	15,006	1,527	11%
Other Fruits	10,828	15,043	4,215	39%
Rabi Fodder	788	1,060	272	35%
Kharif Fodder	1,030	1,589	559	54%
Total	88,180	107,320	19,710	22%
Average per crop acre	37	46	9	24%
Average per farm	393	483	91	23%

Zone / Unit wise Impact on Agricultural Employment is given in **ANNEX-J**.

WST Construction Impact on Agriculture Household Income

Impact of WST construction on per acre net income varies from crop to crop. It varies from PKR. 1,093 for pulses to PKR. 37,905 for other vegetables per acre averaging at PKR. 22,262 for all crops. Crop-wise detail is given in **Table 58**.

Table 58: Impact of WST Construction on Agriculture Household Income

Crops	Before WST Construction			After WST Construction			Increase in Net Income
	Gross Income	Cost of Production	Net Income	Gross Income	Cost of Production	Net Income	
	PKR per Acre						
Wheat	69,428	31,520	37,908	74,569	35,377	39,192	1,284
Rice	86,432	46,860	39,572	94,985	53,814	41,171	1,599
Cotton	76,440	43,275	33,165	83,677	49,504	34,173	1,008
Maize	91,885	52,645	39,240	101,256	60,624	40,632	1,392
Sugarcane	146,188	66,124	80,064	155,987	73,732	82,255	2,191
Pulses	46,275	21,256	25,019	48,295	22,183	26,113	1,093
Onions	135,876	79,711	56,165	154,589	94,771	59,819	3,653
Tomato	143,714	68,862	74,852	177,608	88,933	88,675	13,823
Other Vegetables	129,438	37,927	91,511	186,531	57,115	129,416	37,905
Apple	175,375	67,930	107,445	196,970	79,728	117,242	9,797
Other Fruits	241,500	123,925	117,575	267,408	143,395	124,013	6,438
Rabi Fodder	109,506	20,381	89,125	115,934	22,548	93,386	4,261
Kharif Fodder	83,018	11,448	71,570	86,468	12,461	74,007	2,437
Average	89,373	42,170	47,203	129,866	60,401	69,465	22,262

Impact on Farmers' Gross and Net Incomes under Completed Schemes

In the previous sub sections of this Chapter, we had been evaluating the impact on gross and net incomes of the 222 sample farms/ WSTs. In this sub section, sample results have been super imposed on all the 5,062 farms located on all 5,062 constructed Water Storage Tanks (except GB). Total gross and net incomes of all the farms on

5,062 constructed WSTs has been estimated at 4,190 and 2,213 million rupees respectively before the WST construction. Zone wise / unit wise detail is given in **Table 59**. The total Gross increase has increased by PKR 3,275 million and Net Income by PKR 1,780 million due to improvement of watercourses under all completed schemes.

Table 535: Impact on Total Gross and net Income of all the farms under completed Watercourses

Zone / Unit	Impact on Gross Income of All Farms under Completed Schemes					
	Gross Income			Net Income		
	Before WST Construction	After WST Construction	Increase/ Impact	Before WST Construction	After WST Construction	Increase/ Impact
	Million Rupees					
Punjab	1,435	2,418	982	758	1,293	535
KP	1,090	1,968	878	576	1,053	477
Balochistan	1,314	2,411	1,097	694	1,290	596
AJ&K	351	669	318	185	358	173
Overall	4,190	7,466	3,275	2,213	3,993	1,780

Water Saving Impact of WSTs Construction

A Water Storage Tank is a structural best management practice that enables to capture and store canal water, surface water runoff during the rainy season, Tube well water, Tail water Recovery Ditches, Nullah, Steams, Springs, and dug wells waters etc., so that it may be used subsequently at required time for irrigation. The tanks are constructed at the locations where canal water can be collected and stored under gravity and adequate runoff can be accessible for the fields that will be irrigated using the stored water.

As before the construction of tank, there was no such saving of water losses. The total water storage capacity from above mentioned sources of tanks along with the reported filing up frequency leads to calculate the water saving impact. On overall basis, saving in water losses calculates to 7.31 AF per Water Storage Tank per annum. For the 5,062 completed schemes (excepting GB) total Savings calculates at 37,004 Acre Feet. Zone wise detail is given **Table 60** below.

Table 60: Zone wise Impact of Water Storage Tanks Construction on Water Saving

Zone / Unit	Completed Schemes	Savings in Water (AF)
Punjab	1,021	7,464
KP	1,188	8,684
Balochistan	2,499	18,268
AJ&K	354	2,588
Total	5,062	37,004
Average per WST		7.31

Spot Checking of Sample WSTs

While collecting information for baseline of Water Storage Tanks, 222 WSTs were also spot checked. The profile of the WSTs and results there from are summarized below:

Profile of Spot-Checked WSTs

Out of 222 spot checked WSTs, 89 (40%) were rectangular, while 133 (60%) were square in shape. Zone / Unit wise break up is given in **Table 60** below:

Table 60: Structure and Type of WST

Zone / Unit	No. of WST	Rectangular	Square
Punjab	60	60 (100.0%)	0 (0%)

KP	56	11 (20%)	45 (80%)
Balochistan	88	0	88 (100%)
AJ&K	18	18 (100%)	0
Overall	222	89 (40%)	133 (60%)

Results of Spot Checking

About 77% (171) WSTs were completed before receiving the subsidy amount. The rest 51 (23%) were completed after receiving the subsidy from the department. Details have been given in **Table 61**.

Table 61: WST Completed by Farmers Before Subsidy Paid

Zone / Unit	No. of WST	Yes	No
Punjab	60	58 (96%)	2 (4%)
KP	56	45 (80%)	11 (20%)
Balochistan	88	50 (56%)	38 (44%)
AJ&K	18	18 (100%)	0
Overall	222	171 (77%)	51 (23%)

Out of total 222 spot checked WSTs, on over all basis, 203 (91%) have been completed as per approved standards and specifications. Zone / Unit wise detail has been given in **Table 62** below.

Table 36: WST Completed as per Approved Standards and Specifications

Zone / Unit	No. of WST	Yes	No
Punjab	60	53 (88%)	7 (12%)
KP	56	53 (95%)	3 (5%)
Balochistan	88	79 (90%)	9 (10%)
AJ&K	18	18 (100%)	0
Overall	222	203 (91%)	19 (9%)

Out of 222 spot checked WSTs, satisfactory Excavation Certificates were issued by the Consultants to 192 (87%) WSTs. Zone / Unit wise detail has been given in **Table 63** below:

Table 37: Issuance of Excavation Certificate by the Consultant

Zone / Unit	No. of WST	Yes	No
Punjab	60	52 (87%)	8 (13%)
KP	56	52 (93%)	4 (7%)
Balochistan	88	70 (79%)	18 (21%)
AJ&K	18	18 (100%)	0
Overall	222	192 (87%)	30 (13%)

Out of 222 spot checked WSTs, in case of 23 WSTs the variations were found in the specifications of the material used. Zone / Unit wise detail has been given in **Table 64** below:

Table 64: Variation in Specifications of Material Used

Zone / Unit	No. of WST	According Specifications	Not According to Specifications
Punjab	60	13 (21%)	47 (79%)
KP	56	1 (2%)	55 (98%)
Balochistan	88	9 (10%)	79 (90%)
AJ&K	18	0	18 (100%)
Overall	222	23 (10%)	199 (90%)

Out of 222 spot checked WSTs, in case of 192 WSTs, subsidy was paid as per cost estimates. Zone / Unit wise detail has been given in **Table 65** below:

Table 38: Subsidy Paid as per Cost Estimates

Zone / Unit	No. of WST	Yes	No
Punjab	60	54 (90%)	6 (10%)
KP	56	48 (85%)	8 (15%)
Balochistan	88	72 (82%)	16 (18%)
AJ&K	18	18 (100%)	0
Overall	222	192 (87%)	30 (13%)

6. IMPACT EVALUATION OF COMPONENT C4

For conducting Impact Evaluation of Component C4 i.e., Delivery of Precision (Laser) Land Levelers (PLL), a sample of 160 PLL recipients was drawn randomly. In order to assess the agro- Economic impacts of PLL Units, Monitoring and Impact surveys were conducted after one year of their delivery using monitoring tool in **ANNEX-O**. For this purpose, these Monitoring and Impact surveys have to be conducted on a 5% sample basis under revised methodology. Thus, for **5,928** delivered PLL units up to June 2023, Monitoring and Impact sample size works out 296 PLL units out of which only 160 units completed one year after their delivery. Thus, survey covered 160 PLL and the remaining sample of 132 PLL would covered under Phase II. A complete profile of these 160 sample PLL and their owners is given below:

Sample Size

For conducting Impact Evaluation Survey of Component C4 i.e., Precision (Laser) Land Leveling, a sample of 160 beneficiaries was drawn at random. Sample required as per 5% of the delivered PLL, calculated 296 beneficiaries. However, as mentioned above 160 PLL covered one year after their delivery. Further details are given in **Table 61**.

Table 61: Sample Size for Monitoring Evaluation of Precision Land Levelers

Zone	Mid-term Lined WSTs	% Sample Required	Sample Required	Actual Sample Drawn
Punjab	5,844	5%	292	148
KP	50	5%	3	5
Balochistan	34	5%	2	7
Overall	5,928	5%	296	160

Land Levelled during the last Rabi and Kharif Cropping Seasons

Total laser land levelled by the 160 respondent PLL owners during last Rabi and Kharif cropping seasons was **40,711** acres or 254 acres per PLL. Out of these total **40,711** acres, 4,092 acres (26 acres per equipment) was owned land, and **36,619** acres (229 acres per equipment) were laser levelled on rent of other fellow farmers. Further detail may be seen in **Table 62** below.

Table 62: Land Levelled during last Rabi and Kharif cropping Seasons

Zone/Unit	PLL Numbers	Own Land levelled (acres)		Other Farmers Land Levelled (acres)		Total Land Levelled (Acres)	
		Total	Per PLL	Total	Per PLL	Total	Per PLL
Punjab	148	3,685	25	35,675	241	39,360	266
KP	5	48	10	294	59	342	68
Balochistan	7	359	51	650	93	1,009	144
Overall	160	4,092	26	36,619	229	40,711	254

PLL Beneficiaries

Total annual PLL beneficiaries calculates to 11,331 farmers including the owners themselves or 71 farmers per equipment. Details are given in **Table 63** below:

Table 63: PLL Beneficiaries

Zone/Unit	Owner Beneficiaries		Other Beneficiaries		Total Beneficiaries	
	Total	Average Per PLL	Total	Average Per PLL	Total	Average Per PLL
Punjab	148	1	11,033	75	11,181	76
KP	5	1	92	18	97	19
Balochistan	7	1	46	7	53	8
Overall	160	1	11,171	70	11,331	71

Impact of PLL on Crop yields

Impact of PLL on crop yield was also assessed through the farmers' perception. The growers were of the view that laser leveling increases yields of various crops ranging from 8% to 14% averaging at 11% on the whole. Crop-wise detail is given in **Table 64**.

Table 64: Impact of PLL on Crop yields

Crops	Crop Yields Before PLL	Crop Yields After PLL	Increase in Crop Yields Due to PLL	
	Maunds / Per acre			Percent Increase
Wheat	35.59	39.04	3.45	10%
Sugarcane	734.72	790.28	55.56	8%
Rice	41.64	46.4	4.76	11%
Cotton	16.23	18.31	2.08	13%
Maize	92.41	100.25	7.84	8%
Vegetables	502.21	550.42	48.21	10%
Other Crops	83.89	95.56	11.67	14%
Weighted average increase in crop yields				11%

Impact of PLL on Net Income / Benefits

Benefits of PLL, have also been estimated on basis yield increases at the same rate as estimated under watercourses improvement. Details are given in **Table 65** Total Annual Net income or benefits of all the delivered PLL are estimated as 3,091 million PKR whereas, per PPL unit these works out as 521 thousand PKR annum.

Table 65: Impact of PLL on Annual Net Income or Benefits

Total PLL delivered	No.	5,928
Area Levelled per PLL	Acres	254
Total area Levelled	1000 Acres	1,506
Net Benefits per acre as under watercourses improvement	PKR	4,053
Less Operating cost per acre	PKR	2,000
Net Benefits per PLL	1000 PKR	521
Total Net Benefits due to 5,928 delivered PLL	Million PKR	3,091

Water Saving Impact of PLL Units

Information was also asked for from the growers regarding the saving of water due to Precision Land Leveling. On an average 0.38 to 0.94 hours were reported per acre to be saved of water due to Precision Land Leveling. Overall weighted average per cent saving in water has been estimated as 25%. Crop-wise detail is given in **Table 66**.

Table 66:: Crop wise average irrigation time per acre (Hrs.)

Crops	Before PLL	After PLL	Saving	
	Hours / Acre			%
Wheat	3.19	2.25	0.94	29%
Sugarcane	3.78	2.85	0.93	25%
Rice	3.35	2.62	0.73	22%
Cotton	2.15	1.65	0.50	23%
Maize	2.29	1.91	0.38	17%
Vegetables	1.69	1.20	0.49	29%
Other Crops	2.17	1.78	0.39	18%
Weighted Average increase saving in water				25%

Annual Water Savings due to Laser Land Levelling

Based on information, obtained through field surveys annual water savings due to Laser Land Levelling has been estimated and given in **Table 67**. Total water saved due to all 5,928 PLL units is estimated as 903,427 acre-feet (AF), whereas it calculates as 127 AF per PLL unit.

Table 39: Annual Water Savings due to Laser Land Levelling

PLL delivered	5,928
Area Levelled per PLL	254
Total Acres Levelled	1,505,712
Average Annual Water Requirement per acre (1inches)	24
Average Annual Water Requirement per acre (AF)	3,011,424
Saving due to Laser levelling (%)	25%
Total Saving due to Laser levelling under completed activities (AF)	752,856
Saving due to Laser levelling per PLL (AF)	127

REFERENCES

1. *Umbrella PC-I of NPIWC-II*
2. *Feasibility Study*
3. *Consolidated Baseline Survey Report*
4. *Various Monitoring and Impact Evaluation Surveys*
5. *SIAPEP Mid-term Impact Assessment*
6. *Various SIAPEP FFS Studies*
7. *Various SIAPEP KG Kits Studies*
8. *Various SIAPEP Baseline Studies on Watercourses Lining*
9. *Various SIAPEP Baseline Studies on High Efficiency Irrigation Systems*
10. *PLL SIAPEP Monitoring and Impact Report*
11. *PLL SIAPEP Monitoring and Impact Report*
12. *Various SIAPEP Flow Measurement Reports*
13. *Pakistan Economic Survey-----Various Issues*
14. *Agricultural Statistics of Pakistan-----Various Issues*

ANNEXURE 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 labor 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 was 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	a) Establishment of 47,278 Water users'	a) 47,278 WCAs were established. b) 47,278 WCAs	a) Conveyance losses for improved	a) Increase in cropping intensity on	a) Increase in farm income. b) Increase in	a) The water flow measurements will be carried

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
	cost sharing basis: 40% farmers in terms of labor, and 60% funded by project.	associations (WUAs); b) Registration of 47,278 WUAs. c) Improvement and realignment of earthen section of 47,278 watercourses. d) Lining of up to 50% length of 47,278 watercourse either by: • Precast concrete parabolic lining (PCPL) segments, or • Rectangular brick masonry, or any other method as approved by the project.	registered. c) 47,278 watercourses improved and lined.	watercourses decreased by about 15 percentage points. b) 1.654 million households benefited from the activity. c) 11.347 million acres served with improved watercourses	improved watercourses by 5-24%. b) Increase in crop yields. c) Increase in irrigated area. d) Increase in agriculture output per unit of water by about 37%	employment for farm labor. c) Reduction in poverty. d) Enhanced food security for the country.	out before and after watercourse improvement on 2-5% sample basis. b) Agriculture survey before and after watercourse improvement on 2-5% sample basis. c) The survey will determine: • Cropping pattern before and after the improvement. • Cropping intensities before and after improvement. • Before and after crop yields. • Before and

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
							after employment. d) The difference between before and after will be considered the result of the intervention after netting out the contribution of the growth pattern of the crop sector otherwise.
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	a) 14,932 WSTs were constructed. b) 14,932 WSTs operated and maintained	a) Water which was otherwise largely going to be wasted is saved. b) Irrigation is 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

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
		funds and then received subsidy at 40% on issuance of FCR					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 farmers and service providers on a cost sharing basis: 50% by farmer / service provider and 50% by the project.	a) 11,610 laser units provided to farmers / service providers. b) Farmers trained in using the units.	a) 11,610 farmers / service providers received PLL units. b) Farmers / service providers received training in using the units.	a) Land levelled on Farmers' / service providers' farms. b) Land levelled on fellow farmers on rent. c) Total 3.483million acres levelled by 11,610 units.	a) Water application efficiency increased at field level. b) Even germination of seed. c) Field application losses reduced by 10 percentage points. d) Water productivity increased by 24%	e) Increased area under irrigated crops. f) Enhanced crop yields g) Increased farm income	a) The land leveling is expected to save irrigation 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. b) 2-4% of sample units will be visited by ME&IE

Project subcomponents	Targets	Activities	Outputs	Outcome-1	Outcomes-2	Goals / Impact	Methodology for measuring results
							<p>Consultants teams after one year 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>

ANNEXURE B: FIELD SURVEY SCHEDULE - ZONE/UNIT WISE

WATER COURSES FIELD SURVEY SCHEDULE - ZONE/UNIT WISE

Impact Survey Date	Team. #	WC ID	Zone	District	Watercourse Scheme Name	Category of WC Improvement	Type of Lining	Type of Irrigation Source	Non Canal Source
25/07/2022	2	11051532010	Punjab	Gujranwala	58622/TL	Additional Lining	PCPL	Canal Command Area	
26/07/2022	2	11051532006	Punjab	Gujranwala	12445/R	Additional Lining	PCPL	Canal Command Area	
26/07/2022	2	11051532026	Punjab	Gujranwala	18715/L	Additional Lining	PCPL	Canal Command Area	
28/07/2022	2	11051232001	Punjab	Gujranwala	21600/R	Additional Lining	PCPL	Canal Command Area	
28/07/2022	2	11051432001	Punjab	Gujranwala	125800/R	Additional Lining	PCPL	Canal Command Area	
28/07/2022	1	11051412001	Punjab	Gujranwala	73300/R	Regular (New)	PCPL	Canal Command Area	
03/08/2022	1	11051432013	Punjab	Gujranwala	63100/L	Additional Lining	PCPL	Canal Command Area	
25/07/2022	1	11012232008	Punjab	Kasur	11430/R	Additional Lining	PCPL	Canal Command Area	
25/07/2022	1	11012112001	Punjab	Kasur	3854/L	Regular (New)	PCPL	Canal Command Area	
20/07/2022	3	11093532013	Punjab	Muzaffargarh	26590/L	Additional Lining	PCPL	Canal Command Area	
21/07/2022	3	11093532049	Punjab	Muzaffargarh	17600/L	Additional Lining	PCPL	Canal Command Area	
21/07/2022	3	11093512013	Punjab	Muzaffargarh	26338/R	Regular (New)	PCPL	Canal Command Area	
22/07/2022	3	11093532012	Punjab	Muzaffargarh	94934/L	Additional Lining	PCPL	Canal Command Area	

22/07/2022	3	11093532021	Punjab	Muzaffargarh	211073/R	Additional Lining	PCPL	Canal Command Area	
23/07/2022	3	11093532022	Punjab	Muzaffargarh	46922/L	Additional Lining	PCPL	Canal Command Area	
19/07/2022	1	11032232016	Punjab	Okara	10483/L	Additional Lining	PCPL	Canal Command Area	
20/07/2022	1	11032232005	Punjab	Okara	67700/L	Additional Lining	PCPL	Canal Command Area	
20/07/2022	1	11032212020	Punjab	Okara	20100/L	Regular (New)	PCPL	Canal Command Area	
21/07/2022	1	11032232045	Punjab	Okara	18000/L	Additional Lining	PCPL	Canal Command Area	
01/09/2022	3	12031116011	KP	Abbottabad	Bagotar Doga	Regular (New)	HDPE	Non-Canal Command Area	Spring
02/09/2022	2	12011313019	KP	Bannu	Habib Ullah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
02/09/2022	3	12032116003	KP	Battagram	Badiuzzaman Khan	Regular (New)	HDPE	Non-Canal Command Area	Stream
07/09/2022	1	12072332008	KP	Charsadda	3077-R	Additional Lining	PCPL	Canal Command Area	
05/09/2022	2	12021412079	KP	Dera Ismail Khan	Naimat Ullah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
16/07/2022	2	12021412080	KP	Dera Ismail Khan	Sona Khan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
31/08/2022	3	12033113007	KP	Haripur	Nazakat Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
31/08/2022	3	12033113013	KP	Haripur	Shakir Ali	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
01/09/2022	2	12041113054	KP	Kohat	Asim Altaf	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
03/09/2022	2	12012113042	KP	Lakki Marwat	Gulo Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well

02/09/2022	3	12036113010	KP	Mansehra	Ashique Hussain	Regular (New)	PVC Pipe	Non-Canal Command Area	WST
31/08/2022	1	12061112019	KP	Mardan	Ali Sarwar	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
07/09/2022	1	12073113016	KP	Nowshera	Muhammad Tahir Shah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
06/09/2022	1	12071118001	KP	Peshawar	Shad Muhammad	Regular (New)	Mix	Non-Canal Command Area	Tube Well
05/09/2022	1	12062132002	KP	Swabi	026-L	Additional Lining	PCPL	Canal Command Area	
05/09/2022	1	12062113002	KP	Swabi	Baz Muhammad	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
03/09/2022	3	12037215005	KP	Torghar	Jaaga Bala	Regular (New)	PCC	Non-Canal Command Area	Stream
10/10/2022	3	230	Balochistan	Kalat	Abdul Hameed	Regular (New)	PCC	Non-Canal Command Area	Tube Well
11/10/2022	2	1899	Balochistan	Killa Abdullah	Haji Rehmatullah	Regular (New)	PCC	Non-Canal Command Area	Tube Well
18/07/2022	2	2711	Balochistan	Killa Saifullah	Malik Muhammad Youns	Regular (New)	PCC	Non-Canal Command Area	Tube Well
18/07/2022	2	2750	Balochistan	Killa Saifullah	Mr. Muhammad Gulab	Regular (New)	PCC	Non-Canal Command Area	Tube Well
21/07/2022	2	926	Balochistan	Loralai	Abdul Ghafar	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
20/07/2022	2	678	Balochistan	Mastung	Abdul Ghani	Regular (New)	Bricks	Non-Canal Command Area	Tube Well
24/07/2022	1	b7162410	Balochistan	Nasirabad	Muhammad Safar	Regular (New)	Bricks	Canal Command Area	
11/11/2022	2	0fb002d3	Balochistan	Nasirabad	Muhammad Munawar	Regular (New)	Bricks	Canal Command Area	
23/07/2022	1	1812	Balochistan	Sohbatpur	Khalil Ahmad	Regular (New)	Bricks	Canal Command Area	
23/07/2022	1	1803	Balochistan	Sohbatpur	Shahzad Ali	Regular (New)	Bricks	Canal Command Area	
24/07/2022	2	1801	Balochistan	Sohbatpur	Muhammad Bakhsh	Regular (New)	Bricks	Canal Command Area	

15/11/2022	1	15033112046	AJK	Mirpur	Lehri-6	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
15/11/2022	1	15033112064	AJK	Mirpur	New Sunian	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
08/08/2022	1	15011125011	AJK	Muzaffarabad	Mera Dopatta	20 Years Old	PCC	Non-Canal Command Area	Nallah
08/09/2022	1	15011126001	AJK	Muzaffarabad	Dhani Mai Sahiba	Regular (New)	Mix	Non-Canal Command Area	Nallah
16/08/2022	1	16110116002	ICT	ICT	Misbahuddin Chohan	Regular (New)	PVC Pipe	Non-Canal Command Area	Nallah
16/08/2022	1	16110116020	ICT	ICT	Sher Bahadar Zada Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Other Source
02/08/2023	3	11082132001	Punjab	Bahawalnagar	55980/L	Additional Lining	PCPL	Canal Command Area	
03/08/2023	3	11082112006	Punjab	Bahawalnagar	13880/R	Regular (New)	PCPL	Canal Command Area	
04/08/2023	3	11082532021	Punjab	Bahawalnagar	56830/L	Additional Lining	PCPL	Canal Command Area	
05/08/2023	3	11082532002	Punjab	Bahawalnagar	173540/L	Additional Lining	PCPL	Canal Command Area	
08/08/2023	3	11082132023	Punjab	Bahawalnagar	77560/L	Additional Lining	PCPL	Canal Command Area	
08/08/2023	3	11082612006	Punjab	Bahawalnagar	26066/L	Regular (New)	PCPL	Canal Command Area	
09/08/2023	3	11082132017	Punjab	Bahawalnagar	17132/R	Additional Lining	PCPL	Canal Command Area	
09/08/2023	3	11082532053	Punjab	Bahawalnagar	57890/L	Additional Lining	PCPL	Canal Command Area	
10/08/2023	3	11082632004	Punjab	Bahawalnagar	22600/L	Additional Lining	PCPL	Canal Command Area	
10/08/2023	3	11082612007	Punjab	Bahawalnagar	10666/R	Regular (New)	PCPL	Canal Command Area	
21/06/2023	3	11081132021	Punjab	Bahawalpur	4320/L	Additional Lining	PCPL	Canal Command Area	

16/01/2023	1	11042132003	Punjab	Bhakkar	26750/L	Additional Lining	PCPL	Canal Command Area	
16/01/2023	3	11042132043	Punjab	Bhakkar	74750/R	Additional Lining	PCPL	Canal Command Area	
17/01/2023	3	11042312003	Punjab	Bhakkar	34000/TL	Regular (New)	PCPL	Canal Command Area	
17/07/2023	1	11022132002	Punjab	Chiniot	17006/R	Additional Lining	PCPL	Canal Command Area	
21/12/2022	2	11091432008	Punjab	Dera Ghazi Khan	11470/L	Additional Lining	PCPL	Canal Command Area	
22/12/2022	2	11091412002	Punjab	Dera Ghazi Khan	19288/L	Regular (New)	PCPL	Canal Command Area	
23/12/2022	2	11091132008	Punjab	Dera Ghazi Khan	59100/TR	Additional Lining	PCPL	Canal Command Area	
13/07/2023	1	11021332010	Punjab	Faisalabad	18985/L	Additional Lining	PCPL	Canal Command Area	
14/07/2023	1	11021332001	Punjab	Faisalabad	30694/R	Additional Lining	PCPL	Canal Command Area	
15/07/2023	1	11021432017	Punjab	Faisalabad	47007/L	Additional Lining	PCPL	Canal Command Area	
06/06/2023	2	11061132004	Punjab	Gujrat	9136/L	Additional Lining	PCPL	Canal Command Area	
07/06/2023	2	11061112002	Punjab	Gujrat	30000/L	Regular (New)	PCPL	Canal Command Area	
08/06/2023	2	11061112001	Punjab	Gujrat	7132/R	Regular (New)	PCPL	Canal Command Area	
09/06/2023	2	11061132003	Punjab	Gujrat	12884/R	Additional Lining	PCPL	Canal Command Area	
10/06/2023	2	11061132002	Punjab	Gujrat	46895/L	Additional Lining	PCPL	Canal Command Area	
12/06/2023	2	11061132005	Punjab	Gujrat	30000/L	Additional Lining	PCPL	Canal Command Area	
25/04/2022	2	11062232026	Punjab	Hafizabad	28495/L	Additional Lining	PCPL	Canal Command Area	

26/04/2022	2	11062132003	Punjab	Hafizabad	6990/R	Additional Lining	PCPL	Canal Command Area	
26/04/2022	1	11062132017	Punjab	Hafizabad	655/L	Additional Lining	PCPL	Canal Command Area	
26/04/2022	1	11062112003	Punjab	Hafizabad	8210/L	Regular (New)	PCPL	Canal Command Area	
10/12/2022	2	11062232019	Punjab	Hafizabad	41350/TL	Additional Lining	PCPL	Canal Command Area	
11/12/2022	2	11062132025	Punjab	Hafizabad	22447/L	Additional Lining	PCPL	Canal Command Area	
11/12/2022	2	11062232010	Punjab	Hafizabad	15404/R	Additional Lining	PCPL	Canal Command Area	
16/12/2022	2	11062232024	Punjab	Hafizabad	4256/R	Additional Lining	PCPL	Canal Command Area	
18/01/2023	2	11062132036	Punjab	Hafizabad	6730/L	Additional Lining	PCPL	Canal Command Area	
25/04/2023	2	11062212003	Punjab	Hafizabad	7224/R	Regular (New)	PCPL	Canal Command Area	
10/07/2023	1	11023332018	Punjab	Jhang	35478/R	Additional Lining	PCPL	Canal Command Area	
11/07/2023	1	11023332015	Punjab	Jhang	43486/L	Additional Lining	PCPL	Canal Command Area	
12/07/2023	1	11023312002	Punjab	Jhang	17720/R	Regular (New)	PCPL	Canal Command Area	
13/07/2023	1	11023312005	Punjab	Jhang	88668/L	Regular (New)	PCPL	Canal Command Area	
05/08/2023	1	11012432002	Punjab	Kasur	45316/L	Additional Lining	PCPL	Canal Command Area	
04/07/2023	3	11072232014	Punjab	Khanewal	87400/R	Additional Lining	PCPL	Canal Command Area	
05/07/2023	3	11072232015	Punjab	Khanewal	11415/L	Additional Lining	PCPL	Canal Command Area	
06/07/2023	3	11072232001	Punjab	Khanewal	264704/L	Additional Lining	PCPL	Canal Command Area	

07/07/2023	3	11072232002	Punjab	Khanewal	24830/R	Additional Lining	PCPL	Canal Command Area	
08/07/2023	3	11072232003	Punjab	Khanewal	47460/R	Additional Lining	PCPL	Canal Command Area	
10/07/2023	3	11072412003	Punjab	Khanewal	1500/R	Regular (New)	PCPL	Canal Command Area	
11/07/2023	3	11072432019	Punjab	Khanewal	4050/R	Additional Lining	PCPL	Canal Command Area	
19/06/2023	1	11011232007	Punjab	Lahore	13600/L	Additional Lining	PCPL	Canal Command Area	
06/06/2023	3	11073132001	Punjab	Lodhran	33855/R	Additional Lining	PCPL	Canal Command Area	
07/06/2023	3	11073132002	Punjab	Lodhran	15750/L	Additional Lining	PCPL	Canal Command Area	
08/06/2023	3	11073132024	Punjab	Lodhran	63534/L	Additional Lining	PCPL	Canal Command Area	
09/06/2023	3	11073332002	Punjab	Lodhran	27405/L	Additional Lining	PCPL	Canal Command Area	
10/06/2023	3	11073312002	Punjab	Lodhran	18100/L	Regular (New)	PCPL	Canal Command Area	
12/06/2023	3	11073332004	Punjab	Lodhran	126231/R	Additional Lining	PCPL	Canal Command Area	
13/06/2023	3	11073332005	Punjab	Lodhran	49000/R	Additional Lining	PCPL	Canal Command Area	
14/06/2023	3	11073332006	Punjab	Lodhran	6900/R	Additional Lining	PCPL	Canal Command Area	
16/06/2023	3	11073332003	Punjab	Lodhran	2925/R	Additional Lining	PCPL	Canal Command Area	
16/06/2023	3	11073312006	Punjab	Lodhran	12702/L	Regular (New)	PCPL	Canal Command Area	
17/06/2023	3	11073312005	Punjab	Lodhran	52200/TF	Regular (New)	PCPL	Canal Command Area	
19/06/2023	3	11073312001	Punjab	Lodhran	43818/L	Regular (New)	PCPL	Canal Command Area	
20/06/2023	3	11073332001	Punjab	Lodhran	70978/TL	Additional Lining	PCPL	Canal Command Area	

20/06/2023	3	11073312015	Punjab	Lodhran	61450/TL	Regular (New)	PCPL	Canal Command Area	
21/06/2023	3	11073312004	Punjab	Lodhran	102970/R	Regular (New)	PCPL	Canal Command Area	
10/12/2022	2	11063332004	Punjab	Mandi Bahauddin	7000/R	Additional Lining	PCPL	Canal Command Area	
10/07/2023	2	11063232001	Punjab	Mandi Bahauddin	13726/L	Additional Lining	PCPL	Canal Command Area	
11/07/2023	2	11063312002	Punjab	Mandi Bahauddin	23014/L	Regular (New)	PCPL	Canal Command Area	
12/07/2023	2	11063212003	Punjab	Mandi Bahauddin	104720/R	Regular (New)	PCPL	Canal Command Area	
12/07/2023	3	11071432034	Punjab	Multan	10200/L	Additional Lining	PCPL	Canal Command Area	
13/07/2023	3	11071432018	Punjab	Multan	106200/TR	Additional Lining	PCPL	Canal Command Area	
14/07/2023	3	11071232013	Punjab	Multan	41440/L	Additional Lining	PCPL	Canal Command Area	
15/07/2023	3	11071232011	Punjab	Multan	27100/L	Additional Lining	PCPL	Canal Command Area	
17/07/2023	3	11071432024	Punjab	Multan	10516/L	Additional Lining	PCPL	Canal Command Area	
18/07/2023	3	11071232004	Punjab	Multan	43000/R	Additional Lining	PCPL	Canal Command Area	
19/07/2023	3	11071112002	Punjab	Multan	25957/L	Regular (New)	PCPL	Canal Command Area	
20/07/2023	3	11071432022	Punjab	Multan	16410/R	Additional Lining	PCPL	Canal Command Area	
21/07/2023	3	11071132012	Punjab	Multan	12936/L	Additional Lining	PCPL	Canal Command Area	
02/08/2023	1	11013132003	Punjab	Nankana Sahib	33400/TF	Additional Lining	PCPL	Canal Command Area	
03/08/2023	1	11013132005	Punjab	Nankana Sahib	24642/TL	Additional Lining	PCPL	Canal Command Area	

10/08/2023	1	11013132006	Punjab	Nankana Sahib	24642/TF	Additional Lining	PCPL	Canal Command Area	
13/07/2023	2	11052112001	Punjab	Narowal	18500/R	Regular (New)	PCPL	Canal Command Area	
06/06/2023	1	11032332012	Punjab	Okara	16125/R	Additional Lining	PCPL	Canal Command Area	
07/06/2023	1	11032212001	Punjab	Okara	48010/TL	Regular (New)	PCPL	Canal Command Area	
08/06/2023	1	11032332008	Punjab	Okara	12535/TR	Additional Lining	PCPL	Canal Command Area	
09/06/2023	1	11032232007	Punjab	Okara	81400/R	Additional Lining	PCPL	Canal Command Area	
10/06/2023	1	11032332009	Punjab	Okara	7550/L	Additional Lining	PCPL	Canal Command Area	
12/06/2023	1	11032232040	Punjab	Okara	23980/R	Additional Lining	PCPL	Canal Command Area	
13/06/2023	1	11032212004	Punjab	Okara	14100/R	Regular (New)	PCPL	Canal Command Area	
14/06/2023	1	11032232006	Punjab	Okara	4050/L	Additional Lining	PCPL	Canal Command Area	
15/06/2023	1	11032132001	Punjab	Okara	87000/TL	Additional Lining	PCPL	Canal Command Area	
16/06/2023	1	11032232004	Punjab	Okara	22627/R	Additional Lining	PCPL	Canal Command Area	
17/06/2023	1	11032212002	Punjab	Okara	90600/TR	Regular (New)	PCPL	Canal Command Area	
14/07/2023	2	11033132017	Punjab	Pakpattan	20440/R	Additional Lining	PCPL	Canal Command Area	
15/07/2023	2	11033112003	Punjab	Pakpattan	24763/L	Regular (New)	PCPL	Canal Command Area	
17/07/2023	2	11033112002	Punjab	Pakpattan	12996/R	Regular (New)	PCPL	Canal Command Area	
18/07/2023	1	11033232021	Punjab	Pakpattan	4393/L	Additional Lining	PCPL	Canal Command Area	
19/07/2023	2	11033132015	Punjab	Pakpattan	33500/R	Additional Lining	PCPL	Canal Command Area	

20/07/2023	2	11033132013	Punjab	Pakpattan	37030/L	Additional Lining	PCPL	Canal Command Area	
02/08/2023	2	11083232003	Punjab	Rahim Yar Khan	92500/R	Additional Lining	PCPL	Canal Command Area	
03/08/2023	2	11083232031	Punjab	Rahim Yar Khan	1560/L	Additional Lining	PCPL	Canal Command Area	
04/08/2023	2	11083232001	Punjab	Rahim Yar Khan	118915/TR	Additional Lining	PCPL	Canal Command Area	
04/08/2023	2	11083332031	Punjab	Rahim Yar Khan	20585/R	Additional Lining	PCPL	Canal Command Area	
05/08/2023	2	11083232002	Punjab	Rahim Yar Khan	95500/R	Additional Lining	PCPL	Canal Command Area	
05/08/2023	2	11083432003	Punjab	Rahim Yar Khan	58940/R	Additional Lining	PCPL	Canal Command Area	
06/08/2023	2	11083332035	Punjab	Rahim Yar Khan	93445/L	Additional Lining	PCPL	Canal Command Area	
06/08/2023	2	11083412005	Punjab	Rahim Yar Khan	9636/TR	Regular (New)	PCPL	Canal Command Area	
08/08/2023	2	11083312006	Punjab	Rahim Yar Khan	17635/R	Regular (New)	PCPL	Canal Command Area	
08/08/2023	2	11083412002	Punjab	Rahim Yar Khan	33100/R	Regular (New)	PCPL	Canal Command Area	
09/08/2023	2	11083412013	Punjab	Rahim Yar Khan	20245/R	Regular (New)	PCPL	Canal Command Area	
22/06/2023	3	11094132030	Punjab	Rajanpur	4000/L	Additional Lining	PCPL	Canal Command Area	
16/08/2022	1	11031132009	Punjab	Sahiwal	87112/L	Additional Lining	PCPL	Canal Command Area	
16/08/2022	1	11031132010	Punjab	Sahiwal	28240/R	Additional Lining	PCPL	Canal Command Area	

18/08/2022	1	11031132008	Punjab	Sahiwal	6300/L	Additional Lining	PCPL	Canal Command Area	
18/08/2022	1	11031232064	Punjab	Sahiwal	32150/L	Additional Lining	PCPL	Canal Command Area	
22/06/2023	1	11031232066	Punjab	Sahiwal	30470/R	Additional Lining	PCPL	Canal Command Area	
22/06/2023	1	11031232032	Punjab	Sahiwal	97580/L	Additional Lining	PCPL	Canal Command Area	
05/07/2023	2	11041532008	Punjab	Sargodha	49050/R	Additional Lining	PCPL	Canal Command Area	
06/07/2023	2	11041832002	Punjab	Sargodha	6473/R	Additional Lining	PCPL	Canal Command Area	
07/07/2023	2	11041632008	Punjab	Sargodha	28900/R	Additional Lining	PCPL	Canal Command Area	
08/07/2023	2	11041132021	Punjab	Sargodha	10990/L	Additional Lining	PCPL	Canal Command Area	
10/07/2023	1	11041132032	Punjab	Sargodha	56900/L	Additional Lining	PCPL	Canal Command Area	
18/07/2023	1	11014332011	Punjab	Sheikhupura	4735/R	Additional Lining	PCPL	Canal Command Area	
19/07/2023	1	11014332014	Punjab	Sheikhupura	25400/R	Additional Lining	PCPL	Canal Command Area	
20/07/2023	2	11014432004	Punjab	Sheikhupura	7600/TL	Additional Lining	PCPL	Canal Command Area	
21/07/2023	1	11014432007	Punjab	Sheikhupura	67919/TF	Additional Lining	PCPL	Canal Command Area	
22/07/2023	1	11014432017	Punjab	Sheikhupura	58292/R	Additional Lining	PCPL	Canal Command Area	
24/07/2023	1	11014532006	Punjab	Sheikhupura	935/R	Additional Lining	PCPL	Canal Command Area	

25/07/2023	1	11014332007	Punjab	Sheikhupura	20460/L	Additional Lining	PCPL	Canal Command Area	
26/07/2023	1	11014332006	Punjab	Sheikhupura	16800/R	Additional Lining	PCPL	Canal Command Area	
13/06/2023	2	11053332003	Punjab	Sialkot	29800/L	Additional Lining	PCPL	Canal Command Area	
14/06/2023	2	11053232001	Punjab	Sialkot	2000/R	Additional Lining	PCPL	Canal Command Area	
15/06/2023	2	11053332002	Punjab	Sialkot	131000/R	Additional Lining	PCPL	Canal Command Area	
16/06/2023	2	11053232002	Punjab	Sialkot	1980/L	Additional Lining	PCPL	Canal Command Area	
17/06/2023	2	11053232003	Punjab	Sialkot	24200/TL	Additional Lining	PCPL	Canal Command Area	
04/07/2023	1	11024332001	Punjab	Toba Tek Singh	443650/L	Additional Lining	PCPL	Canal Command Area	
05/07/2023	2	11024332005	Punjab	Toba Tek Singh	2500/L	Additional Lining	PCPL	Canal Command Area	
06/07/2023	1	11024132013	Punjab	Toba Tek Singh	58460/L	Additional Lining	PCPL	Canal Command Area	
07/07/2023	1	11024132007	Punjab	Toba Tek Singh	30896/R	Additional Lining	PCPL	Canal Command Area	
08/07/2023	1	11024232007	Punjab	Toba Tek Singh	445/L	Additional Lining	PCPL	Canal Command Area	
23/06/2023	1	11074132008	Punjab	Vehari	71750/L	Additional Lining	PCPL	Canal Command Area	
23/06/2023	1	11074212002	Punjab	Vehari	289500/R	Regular (New)	PCPL	Canal Command Area	
24/06/2023	1	11074232005	Punjab	Vehari	2000/R	Additional Lining	PCPL	Canal Command Area	
24/06/2023	1	11074232003	Punjab	Vehari	10780/R	Additional Lining	PCPL	Canal Command Area	

26/06/2023	1	11074132009	Punjab	Vehari	13020/R	Additional Lining	PCPL	Canal Command Area	
26/06/2023	1	11074432010	Punjab	Vehari	25178/L	Additional Lining	PCPL	Canal Command Area	
12/06/2023	3	12031116013	KP	Abbottabad	Abid Gul	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
27/06/2023	2	12011118002	KP	Bannu	Adhami Degan	Regular (New)	Mix	Canal Command Area	
26/06/2023	2	12011112001	KP	Bannu	Faisal Khan-2	Regular (New)	PCPL	Canal Command Area	
26/06/2023	2	12011112002	KP	Bannu	Faisal Khan-1	Regular (New)	PCPL	Canal Command Area	
27/06/2023	2	12011112003	KP	Bannu	Noor Naib Khan	Regular (New)	PCPL	Canal Command Area	
20/07/2023	1	12052216003	KP	Buner	Umer Wahid	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
20/07/2023	1	12052216004	KP	Buner	Amir Nawab Khan	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
20/07/2023	1	12052216022	KP	Buner	T/W WC wazir ali	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
21/07/2023	1	12052416007	KP	Buner	Rahat Shah	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
21/07/2023	1	12052616011	KP	Buner	Laiq Zada TWWC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
21/07/2023	1	12052616021	KP	Buner	Qayyum Zada TWWC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
12/07/2023	1	12072316002	KP	Charsadda	Fazal Subhan 1	Regular (New)	HDPE	Canal Command Area	
12/07/2023	1	12072316008	KP	Charsadda	Noor Ul Amin	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
12/07/2023	1	12072212001	KP	Charsadda	Khan Bacha	Regular (New)	PCPL	Canal Command Area	
13/07/2023	1	12072312002	KP	Charsadda	19195-L	Regular (New)	PCPL	Canal Command Area	
13/07/2023	1	12072312004	KP	Charsadda	11930-T.F	Regular (New)	PCPL	Canal Command Area	
13/07/2023	1	12072312008	KP	Charsadda	42200-R	Regular (New)	PCPL	Canal Command Area	
15/06/2023	2	12021112042	KP	Dera Ismail Khan	3500-L	Regular (New)	PCPL	Canal Command Area	

15/06/2023	2	12021112047	KP	Dera Ismail Khan	3800-L	Regular (New)	PCPL	Canal Command Area	
15/06/2023	2	12021112079	KP	Dera Ismail Khan	17600-R	Regular (New)	PCPL	Canal Command Area	
05/06/2023	2	12021412063	KP	Dera Ismail Khan	2900-R	Regular (New)	PCPL	Canal Command Area	
13/06/2023	2	12021512026	KP	Dera Ismail Khan	3143-R	Regular (New)	PCPL	Canal Command Area	
21/06/2023	2	12021112088	KP	Dera Ismail Khan	Gul Khan Tw	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
16/06/2023	2	12021112089	KP	Dera Ismail Khan	Ijaz U Din Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
21/06/2023	2	12021112090	KP	Dera Ismail Khan	Shah jahan Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
16/06/2023	2	12021112095	KP	Dera Ismail Khan	Ghulam Abbas shah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
19/06/2023	2	12021112096	KP	Dera Ismail Khan	Sabir Hussain Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
22/06/2023	2	12021112097	KP	Dera Ismail Khan	Ikram ullah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
20/06/2023	2	12021112098	KP	Dera Ismail Khan	Ali Muhammad	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
20/06/2023	2	12021112099	KP	Dera Ismail Khan	Saif ur rehman	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
19/06/2023	2	12021112101	KP	Dera Ismail Khan	Shahniwaz Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
19/06/2023	2	12021112103	KP	Dera Ismail Khan	Sana Ullah Tw wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
22/06/2023	2	12021112108	KP	Dera Ismail Khan	Abass Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well

12/06/2023	2	12021312012	KP	Dera Ismail Khan	Akhtar Ullah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
12/06/2023	2	12021312013	KP	Dera Ismail Khan	Muhammad Ayaz	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
12/06/2023	2	12021312014	KP	Dera Ismail Khan	Muhammad Haris	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
05/06/2023	2	12021412082	KP	Dera Ismail Khan	Allah Dad Tw	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
06/06/2023	2	12021412085	KP	Dera Ismail Khan	Malik Khurshid Tw	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
06/06/2023	2	12021412086	KP	Dera Ismail Khan	Malik Habibullah Tw	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
07/06/2023	2	12021412087	KP	Dera Ismail Khan	Ghulam Sadiq	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
07/06/2023	2	12021412089	KP	Dera Ismail Khan	Muhammad Akram Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
08/06/2023	2	12021412090	KP	Dera Ismail Khan	Ghulam Rabani	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
08/06/2023	2	12021412091	KP	Dera Ismail Khan	Nazeer Aehmad	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
08/06/2023	2	12021412093	KP	Dera Ismail Khan	Muhammad Sher Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
13/06/2023	2	12021512110	KP	Dera Ismail Khan	Sardar Malik Liaquat	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
13/06/2023	2	12021512112	KP	Dera Ismail Khan	Muhmmad Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
13/06/2023	2	12021512117	KP	Dera Ismail Khan	Sona Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
14/06/2023	2	12021512121	KP	Dera Ismail Khan	Muhammad Aftab Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well

14/06/2023	2	12021512123	KP	Dera Ismail Khan	Zameer Hussain Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
14/06/2023	2	12021512135	KP	Dera Ismail Khan	Umar farooq	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
14/06/2023	2	12021512137	KP	Dera Ismail Khan	Qayum nawaz Tw Wc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
21/06/2023	2	12021113002	KP	Dera Ismail Khan	Abdul Razaq	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
14/06/2023	2	12021513005	KP	Dera Ismail Khan	Hayat Ullah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
05/07/2023	3	12033233001	KP	Haripur	Muhammad Zareen	Additional Lining	PVC Pipe	Canal Command Area	
26/06/2023	3	12033316001	KP	Haripur	Shabir Muhammad Abbasi	Regular (New)	HDPE	Non-Canal Command Area	WST
04/07/2023	3	12033312002	KP	Haripur	Tahir Mehmood	Regular (New)	PCPL	Canal Command Area	
05/07/2023	3	12033113025	KP	Haripur	Ahsan Raza	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
23/06/2023	3	12033113027	KP	Haripur	Muhammad Zaman	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
26/06/2023	3	12033313002	KP	Haripur	Ghulam Asghar	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
04/07/2023	3	12033313001	KP	Haripur	Akhtar Zaman	Regular (New)	PVC Pipe	Non-Canal Command Area	WST
06/07/2023	2	12041112001	KP	Kohat	12400-R	Regular (New)	PCPL	Canal Command Area	
06/07/2023	2	12041113033	KP	Kohat	Hazrat Umar	Regular (New)	PVC Pipe	Canal Command Area	
05/07/2023	2	12041113026	KP	Kohat	Abdul Qadir	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
05/07/2023	2	12041113060	KP	Kohat	Ahsan Hayat	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
23/06/2023	2	12012312002	KP	Lakki Marwat	Vial Shahjee Wala	Regular (New)	PCPL	Canal Command Area	

23/06/2023	2	12012312004	KP	Lakki Marwat	Vail Nimzar	Regular (New)	PCPL	Canal Command Area	
15/06/2023	1	12054216001	KP	Lower Dir	171+500-L	Regular (New)	HDPE	Canal Command Area	
06/06/2023	1	12051116001	KP	Malakand	Asmatullah	Regular (New)	HDPE	Non-Canal Command Area	Lift Pump
06/06/2023	1	12051212006	KP	Malakand	32650-L	Regular (New)	PCPL	Canal Command Area	
06/06/2023	1	12051212012	KP	Malakand	10181-L	Regular (New)	PCPL	Canal Command Area	
06/05/2023	1	12051212017	KP	Malakand	Mogha 3593/R	Regular (New)	PCPL	Canal Command Area	
06/05/2023	1	12051212026	KP	Malakand	Mogha 1148/R	Regular (New)	PCPL	Canal Command Area	
06/05/2023	1	12051212029	KP	Malakand	Mogha 25461/ R	Regular (New)	PCPL	Canal Command Area	
14/06/2023	3	12036236001	KP	Mansehra	Perwaiz Khan	Additional Lining	HDPE	Canal Command Area	
14/06/2023	3	12036216017	KP	Mansehra	Batangi Timbri pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Nallah
14/06/2023	3	12036216018	KP	Mansehra	Kamad Bela Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Nallah
15/06/2023	3	12036216020	KP	Mansehra	Uddi Kassi Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Nallah
15/06/2023	3	12036216022	KP	Mansehra	Timbri kattha Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Nallah
20/06/2023	3	12036316017	KP	Mansehra	Kashtra PWC	Regular (New)	HDPE	Non-Canal Command Area	Nallah
21/06/2023	3	12036116020	KP	Mansehra	AKHTAR Zaib Khan Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Stream
20/06/2023	3	12036116005	KP	Mansehra	Moeen	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
19/06/2023	3	12036116010	KP	Mansehra	Hashir Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
21/06/2023	3	12036116016	KP	Mansehra	Batrairh Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
22/06/2023	3	12036116023	KP	Mansehra	Gulzar Ahmed Khan WC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well

16/06/2023	3	12036216015	KP	Mansehra	Naror Trangri Pipe WC	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
19/06/2023	3	12036212006	KP	Mansehra	51886-R	Regular (New)	PCPL	Canal Command Area	
16/06/2023	3	12036212009	KP	Mansehra	CPEC Bajnah Chowk WC	Regular (New)	PCPL	Non-Canal Command Area	Nallah
17/07/2023	1	12061132002	KP	Mardan	6550-R	Additional Lining	PCPL	Canal Command Area	
17/07/2023	1	12061512010	KP	Mardan	1700-L	Regular (New)	PCPL	Canal Command Area	
14/07/2023	1	12061112035	KP	Mardan	Fazal Subhan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
17/07/2023	1	12061313001	KP	Mardan	No. 1134/R	Regular (New)	PVC Pipe	Canal Command Area	
14/07/2023	1	12061113004	KP	Mardan	Muhammad Zeb	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
07/07/2023	1	12073132003	KP	Nowshera	9284.T.F	Additional Lining	PCPL	Canal Command Area	
04/07/2023	1	12073132004	KP	Nowshera	180300-R	Additional Lining	PCPL	Canal Command Area	
07/07/2023	1	12073232003	KP	Nowshera	Mogha No 19725/L	Additional Lining	PCPL	Canal Command Area	
04/07/2023	1	12073112009	KP	Nowshera	Sartaj	Regular (New)	PCPL	Canal Command Area	
04/07/2023	1	12073112016	KP	Nowshera	6600-L	Regular (New)	PCPL	Canal Command Area	
27/06/2023	1	12073312003	KP	Nowshera	3900-R	Regular (New)	PCPL	Canal Command Area	
27/06/2023	1	12073312004	KP	Nowshera	21000-L	Regular (New)	PCPL	Canal Command Area	
07/07/2023	1	12073112029	KP	Nowshera	Kashif Rafique	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
05/07/2023	1	12073112035	KP	Nowshera	Khadim Ali Twwc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
10/07/2023	1	12073212006	KP	Nowshera	Zahir shah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well

04/07/2023	1	12073113004	KP	Nowshera	Abdullah Khattak	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
05/07/2023	1	12073113015	KP	Nowshera	Shahin Shah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
10/07/2023	1	12073113018	KP	Nowshera	Muhammad Akbar	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
05/07/2023	1	12073113021	KP	Nowshera	Shahzad Gul	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
06/07/2023	1	12073113022	KP	Nowshera	Faid Gul	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
06/07/2023	1	12073113024	KP	Nowshera	Shahid	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
11/07/2023	1	12073213008	KP	Nowshera	Afsar khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
27/06/2023	1	12073313004	KP	Nowshera	Tayab khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
26/06/2023	1	12073313005	KP	Nowshera	Waseem Muhammad	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
19/06/2023	1	12071132004	KP	Peshawar	70000-L-Hazar Khwani	Additional Lining	PCPL	Canal Command Area	
19/06/2023	1	12071132008	KP	Peshawar	159000-L Wgc	Additional Lining	PCPL	Canal Command Area	
19/06/2023	1	12071116001	KP	Peshawar	Abdul Majeed	Regular (New)	HDPE	Canal Command Area	
20/06/2023	1	12071116011	KP	Peshawar	Adil zaman	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
21/06/2023	1	12071116012	KP	Peshawar	Zahir ul Amin	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
20/06/2023	1	12071216001	KP	Peshawar	Iqbal Hussain	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
20/06/2023	1	12071116003	KP	Peshawar	Rashid Zaman	Regular (New)	HDPE	Non-Canal Command Area	WST

21/06/2023	1	12071112042	KP	Peshawar	Ikram Ullah	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
21/06/2023	1	12071112045	KP	Peshawar	Tahir khan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
23/06/2023	1	12071112047	KP	Peshawar	Wajid khan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
19/06/2023	1	12071212001	KP	Peshawar	Kashif Twc	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
26/06/2023	1	12071412001	KP	Peshawar	Amjad Ali	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
18/07/2023	1	12062312003	KP	Swabi	13000-L	Regular (New)	PCPL	Canal Command Area	
18/07/2023	1	12062113007	KP	Swabi	WC NO.12320/R	Regular (New)	PVC Pipe	Canal Command Area	
09/06/2023	1	12056416019	KP	Swat	Muhammad ishaq	Regular (New)	HDPE	Non-Canal Command Area	Spring
13/06/2023	1	12056716071	KP	Swat	Wahid zada	Regular (New)	HDPE	Non-Canal Command Area	Spring
13/06/2023	1	12056616010	KP	Swat	Fawad Ullah	Regular (New)	HDPE	Non-Canal Command Area	Stream
13/06/2023	1	12056616013	KP	Swat	Khurshid Ali	Regular (New)	HDPE	Non-Canal Command Area	Stream
07/06/2023	1	12056216021	KP	Swat	Akbar shah	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
09/06/2023	1	12056416026	KP	Swat	Qadar Gul	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
12/06/2023	1	12056516030	KP	Swat	Sadam Hussain	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
12/06/2023	1	12056516060	KP	Swat	Abdullah	Regular (New)	HDPE	Non-Canal Command Area	Tube Well
12/06/2023	1	12056516071	KP	Swat	Bahader zeb	Regular (New)	HDPE	Non-Canal Command Area	Tube Well

08/06/2023	1	12056416024	KP	Swat	Asad Ali	Regular (New)	HDPE	Non-Canal Command Area	WST
01/12/2022	2	1488	Balochistan	Jaffarabad	Asadullah	Regular (New)	Bricks	Canal Command Area	
01/12/2022	2	1557	Balochistan	Jaffarabad	Khair Muhammad & others	Regular (New)	Bricks	Canal Command Area	
02/12/2022	2	1495	Balochistan	Jaffarabad	Muhib Ali Kandrani & others	Regular (New)	Bricks	Canal Command Area	
05/12/2022	1	1611	Balochistan	Jhal Magsi	Syed Safder Ali Shah S/O Ali Akber Shah	Regular (New)	Bricks	Non-Canal Command Area	Tube Well
07/12/2022	2	1691	Balochistan	Kachi	Rabia Maqbool	Regular (New)	PCC	Non-Canal Command Area	Tube Well
07/12/2022	1	1704	Balochistan	Kachi	Syed Khurshed Shah	Regular (New)	PCC	Non-Canal Command Area	Tube Well
10/10/2022	2	279	Balochistan	Kalat	Abdul Qayoum	Regular (New)	PCC	Non-Canal Command Area	Tube Well
10/10/2022	1	280	Balochistan	Kalat	Mir Mohammad	Regular (New)	PCC	Non-Canal Command Area	Tube Well
25/11/2022	1	380	Balochistan	Khuzdar	Arshad Aziz	Regular (New)	PCC	Non-Canal Command Area	Tube Well
25/11/2022	3	a61b3e6a	Balochistan	Khuzdar	Mohammad Tayyab	Regular (New)	PCC	Non-Canal Command Area	Tube Well
14/12/2022	1	334	Balochistan	Khuzdar	Noor Din	Regular (New)	PCC	Non-Canal Command Area	Tube Well
22/08/2022	2	1896	Balochistan	Killa Abdullah	Abdul Ghanni	Regular (New)	PCC	Non-Canal Command Area	Tube Well
23/08/2022	2	1905	Balochistan	Killa Abdullah	Sana Ullah	Regular (New)	PCC	Non-Canal Command Area	Tube Well
20/02/2023	3	2623	Balochistan	Killa Saifullah	Muhammad Younus	Regular (New)	PCC	Non-Canal Command Area	Tube Well
20/02/2023	2	2624	Balochistan	Killa Saifullah	Mulla Sadiq	Regular (New)	PCC	Non-Canal Command Area	Tube Well

21/07/2022	1	963	Balochistan	Loralai	Abdul Raziq	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
22/02/2023	2	1123	Balochistan	Loralai	Ahsan Ullah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
20/07/2022	1	35d86eb2	Balochistan	Mastung	Haji Mohammed alim	Regular (New)	Bricks	Non-Canal Command Area	Tube Well
19/12/2022	3	730	Balochistan	Mastung	Abdul khliq	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
19/12/2022	1	733	Balochistan	Mastung	Nasrullah	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
19/12/2022	2	741	Balochistan	Mastung	Rehmat Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
20/12/2022	1	1149	Balochistan	Musakhail	Abdul Rahim	Regular (New)	PCC	Non-Canal Command Area	Tube Well
21/12/2022	1	1743	Balochistan	Nasirabad	Abdul Quddus	Regular (New)	Bricks	Canal Command Area	
21/12/2022	2	1744	Balochistan	Nasirabad	Abdul Rehman	Regular (New)	Bricks	Canal Command Area	
21/12/2022	3	1750	Balochistan	Nasirabad	Asadullah	Regular (New)	Bricks	Canal Command Area	
22/12/2022	1	1733	Balochistan	Nasirabad	Khawand Bakhsh	Regular (New)	Bricks	Canal Command Area	
22/12/2022	2	1775	Balochistan	Nasirabad	Mureed	Regular (New)	Bricks	Canal Command Area	
22/12/2022	3	1778	Balochistan	Nasirabad	Naveed Ahmed	Regular (New)	Bricks	Canal Command Area	
23/12/2022	2	1781	Balochistan	Nasirabad	Sanaullah	Regular (New)	Bricks	Canal Command Area	
12/10/2022	3	2287	Balochistan	Nushki	Ameer Hamza	Regular (New)	Bricks	Non-Canal Command Area	Tube Well
12/10/2022	2	2315	Balochistan	Nushki	Shahnawaz Khan	Regular (New)	PCC	Non-Canal Command Area	Tube Well
07/11/2022	2	1994	Balochistan	Pishin	Muhammad Anwar	20 Years Old	PCC	Non-Canal Command Area	Tube Well
08/11/2022	2	1997	Balochistan	Pishin	Muhammad Munawar	Regular (New)	PCC	Non-Canal Command Area	Tube Well
19/07/2022	3	2099	Balochistan	Quetta	Abdul Malik	Regular (New)	PCC	Non-Canal Command Area	Tube Well

19/07/2022	2	2100	Balochistan	Quetta	Abdul Raziq	Regular (New)	PCC	Non-Canal Command Area	Tube Well
19/07/2022	1	2101	Balochistan	Quetta	Zubair Ahmed	Regular (New)	PCC	Non-Canal Command Area	Tube Well
13/10/2022	2	2784	Balochistan	Sherani	Mohammad Shah	Regular (New)	PCC	Non-Canal Command Area	Tube Well
13/10/2022	1	2806	Balochistan	Sherani	Rahmat shah	Regular (New)	PCC	Non-Canal Command Area	Tube Well
14/10/2022	3	2520	Balochistan	Sibi	Mohammad Saud Bugti	Regular (New)	PCC	Non-Canal Command Area	Tube Well
26/12/2022	1	1809	Balochistan	Sohbatpur	Abdul Bari	Regular (New)	Bricks	Canal Command Area	
26/12/2022	2	1806	Balochistan	Sohbatpur	Ghulam Haider	Regular (New)	Bricks	Canal Command Area	
16/01/2023	1	1814	Balochistan	Sohbatpur	Shafiq Ahmed	Regular (New)	Bricks	Canal Command Area	
17/02/2023	3	1830	Balochistan	Sohbatpur	Ms Tayaba	Regular (New)	Bricks	Canal Command Area	
17/02/2023	2	1831	Balochistan	Sohbatpur	Muhammad Ali	Regular (New)	Bricks	Canal Command Area	
17/02/2023	2	1836	Balochistan	Sohbatpur	Raheem Dad	Regular (New)	Bricks	Canal Command Area	
17/02/2023	1	e9565258	Balochistan	Sohbatpur	Shafi Muhammad	Regular (New)	Bricks	Canal Command Area	
19/10/2022	3	2812	Balochistan	Zhob	Abdul Wahid	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
19/10/2022	2	2824	Balochistan	Zhob	Fareed Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
20/10/2022	3	2557	Balochistan	Ziarat	Haji Raz Muhammad	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
14/03/2023	2	2561	Balochistan	Ziarat	Naik Muhammad	Regular (New)	PVC Pipe	Non-Canal Command Area	Tube Well
03/08/2023	1	15021115008	AJK	Bagh	Tach Banipassri	Regular (New)	PCC	Non-Canal Command Area	Nallah
04/08/2023	1	15021215005	AJK	Bagh	Kalsota Nathgran	Regular (New)	PCC	Non-Canal Command Area	Spring
05/06/2023	1	15031212030	AJK	Bhimber	Nawan Chak	Regular (New)	PCPL	Non-Canal Command Area	Other Source

06/06/2023	1	15031312003	AJK	Bhimber	Dara Bandi	Regular (New)	PCPL	Non-Canal Command Area	Stream
06/06/2023	1	15031112015	AJK	Bhimber	Dhandar Kalan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
07/06/2023	1	15031212005	AJK	Bhimber	Khokhran Gujran-1	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
07/06/2023	1	15031212001	AJK	Bhimber	Khokhran Gujran-2	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
14/06/2023	1	15031112023	AJK	Bhimber	Kachi 2	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
14/06/2023	1	15031112007	AJK	Bhimber	Machia-2	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
15/06/2023	1	15031212006	AJK	Bhimber	Malkay-4	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
15/06/2023	1	15031112035	AJK	Bhimber	Sokasan	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
12/06/2023	1	15012125001	AJK	Jhelum	Goharabad	20 Years Old	PCC	Non-Canal Command Area	Nallah
12/06/2023	1	15012125003	AJK	Jhelum	Kukarwara	20 Years Old	PCC	Non-Canal Command Area	Nallah
13/06/2023	1	15012318001	AJK	Jhelum	Chatkari	Regular (New)	Mix	Non-Canal Command Area	Nallah
20/06/2023	1	15032415008	AJK	Kotli	Maira Nakyal	Regular (New)	PCC	Non-Canal Command Area	Nallah
20/06/2023	1	15032415006	AJK	Kotli	Jandrot Kathar Zaireen	Regular (New)	PCC	Non-Canal Command Area	Stream
03/07/2023	1	15033111002	AJK	Mirpur	Daramir Shah Sehnsa	Regular (New)	PCC	Non-Canal Command Area	Tube Well
04/07/2023	1	15033112033	AJK	Mirpur	Mohri	Regular (New)	PCPL	Canal Command Area	
04/07/2023	1	15033112054	AJK	Mirpur	Chapran-2	Regular (New)	PCPL	Non-Canal Command Area	Other Source

05/07/2023	1	15033112014	AJK	Mirpur	Akbarabad	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
05/07/2023	1	15033112018	AJK	Mirpur	Dalyala	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
06/07/2023	1	15033112068	AJK	Mirpur	Raipur	Regular (New)	PCPL	Non-Canal Command Area	Tube Well
10/07/2023	1	15011125014	AJK	Muzaffarabad	Central Palhoter	20 Years Old	PCC	Non-Canal Command Area	Nallah
10/07/2023	1	15011125002	AJK	Muzaffarabad	Ghors Pine	20 Years Old	PCC	Non-Canal Command Area	Spring
11/07/2023	1	15011235001	AJK	Muzaffarabad	Palla To Karshan	Additional Lining	PCC	Non-Canal Command Area	Nallah
11/07/2023	1	15011218001	AJK	Muzaffarabad	Doba Upper Phagla	Regular (New)	Mix	Non-Canal Command Area	Nallah
12/07/2023	1	15011215005	AJK	Muzaffarabad	Meldi Kasi To Parla	Regular (New)	PCC	Non-Canal Command Area	Nallah
13/07/2023	1	15013125005	AJK	Neelum	Kanoor To Lawat Khawaja Seri	20 Years Old	PCC	Non-Canal Command Area	Nallah
14/07/2023	1	15013218002	AJK	Neelum	Shesha Pahar To Kiyani Muhalla	Regular (New)	Mix	Non-Canal Command Area	Nallah
25/07/2023	1	15023328001	AJK	Poonch	Upper Sawa	20 Years Old	Mix	Non-Canal Command Area	Nallah
26/07/2023	1	15023116001	AJK	Poonch	Lower Dhothan	Regular (New)	HDPE	Non-Canal Command Area	Nallah
24/07/2023	1	15024215001	AJK	Sudhnoti	Tarnoti To Dhok	Regular (New)	Mix	Non-Canal Command Area	Tube Well
17/08/2022	1	16110116008	ICT	ICT	Mohamad Hakeem Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Nallah
17/07/2023	1	16110116017	ICT	ICT	Muhammad Amjad Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Nallah

18/07/2023	1	16110116011	ICT	ICT	Ch.Khanzada Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Other Source
18/08/2022	1	16110116019	ICT	ICT	Omer Ali Khan	Regular (New)	PVC Pipe	Non-Canal Command Area	Other Source
19/08/2022	1	16110116012	ICT	ICT	Syed Zubair Hussain Shah	Regular (New)	PVC Pipe	Non-Canal Command Area	Other Source

WATER STORAGE TANKS FIELD SURVEY SCHEDULE - ZONE/UNIT WISE

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
19/07/2022	1	21103314025	Punjab	Chakwal	Muhammad Khan:Taj Muhammad
25/07/2022	1	21103314038	Punjab	Chakwal	Rizwan Haider:Malik Muhammad Afzal
13/09/2022	2	21051412001	Punjab	Gujranwala	Rana Jaleel:Naiq Muhammad
14/09/2022	2	21061112001	Punjab	Gujrat	Shamim Haider:Sultan Ali
15/09/2022	1	21012112001	Punjab	Kasur	M.Asgar Ali
16/09/2022	1	21012213001	Punjab	Kasur	Arif Masood Butt
23/07/2022	3	21093513002	Punjab	Muzaffargarh	Waheed Ahmad Bhatti:Ahmad Bakhsh Bhatti
23/07/2022	3	21093513001	Punjab	Muzaffargarh	Muhammad Tanveer Rasheed:Sheikh M. Rashid
08/06/2023	1	21032112003	Punjab	Okara	Rao Muhammad Farooq Khan:Abdul Majeed Khan
06/09/2022	1	22072332003	KP	Charsadda	Noshad
08/09/2022	3	22033232011	KP	Haripur	Abid Khan
31/08/2022	3	22033132002	KP	Haripur	Nazakat Khan
06/09/2022	2	22012132021	KP	Lakki Marwat	Ghulam Muhammad
06/09/2022	1	22073232001	KP	Nowshera	Rahaj Gul
13/09/2022	2	22022132009	KP	Tank	Mehtab Ahmad
24/08/2022	3	1259	Balochistan	Kalat	Ghulam Mustafa
10/10/2022	3	129	Balochistan	Kalat	Ghulam Raza
10/10/2022	2	180	Balochistan	Kalat	Muhammad Yousaf
11/10/2022	2	1078	Balochistan	Killa Abdullah	Abdul Qahar
18/07/2022	2	1616	Balochistan	Killa Saifullah	Mr. Abdul Rasheed
21/07/2022	2	668	Balochistan	Loralai	Allauddin
21/07/2022	1	683	Balochistan	Loralai	Mazakar Habib
20/07/2022	2	445	Balochistan	Mastung	Abdul Samad
20/07/2022	1	510	Balochistan	Mastung	Muhammad Salman
25/07/2022	1	1051	Balochistan	Nasirabad	Abdul Rehman
10/11/2022	1	1055	Balochistan	Nasirabad	Javid Ahmed
10/11/2022	2	1054	Balochistan	Nasirabad	Fareed Khan

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
11/11/2022	2	1056	Balochistan	Nasirabad	Muhammad Din
07/11/2022	3	1145	Balochistan	Pishin	Ainudeen
07/11/2022	3	1161	Balochistan	Pishin	Haji Abdul Manan
08/11/2022	3	1204	Balochistan	Pishin	Mohammad Yaseen
08/11/2022	3	1225	Balochistan	Pishin	Qari Mohammad Younas
06/06/2022	3	1283	Balochistan	Quetta	Watan Yar
19/07/2022	3	1243	Balochistan	Quetta	Abdul Majeed
19/07/2022	1	1282	Balochistan	Quetta	Waseem Mullah Khan
19/07/2022	2	1251	Balochistan	Quetta	Ahmed Yar
08/06/2022	1	21102316002	Punjab	Attock	Asad Ali Khan:Muhammad Amir Khan
08/06/2022	1	21102316007	Punjab	Attock	Zeeshan Ali Khan:Hairat Ali Khan
09/06/2022	1	21102112014	Punjab	Attock	Nisar Bibi:W/O Muhammad Aslam
09/06/2022	1	21102116002	Punjab	Attock	Malik Rizwan:Sikander Khan
14/06/2022	1	21102316003	Punjab	Attock	Saqib Javed:Muhammad Javed Khan
21/07/2023	1	21102112009	Punjab	Attock	Mian Muhammad Raza:Main Altaf Hussain
02/08/2023	3	21082213001	Punjab	Bahawalnagar	Abdul Waheed:M.Sharif
03/08/2023	3	21082513002	Punjab	Bahawalnagar	M.Rizwan Anjum:Ahsaan Ul Haq
04/08/2023	3	21082513003	Punjab	Bahawalnagar	Saif Ullah.:Rahmar Ali
22/06/2023	3	21081312004	Punjab	Bahawalpur	Muhammad Parvaiz:Ch. Muhammad Yousuf
16/01/2023	1	21042312001	Punjab	Bhakkar	Ahmad Nawaz:Jindu
16/01/2023	3	21041412003	Punjab	Bhakkar	Mian Rehmat Ullah:Ghulam Mustafa
17/01/2023	1	21042412008	Punjab	Bhakkar	Muhammad Riaz:Muhammad Rafiq
17/01/2023	3	21042112001	Punjab	Bhakkar	Muhammad Shahid:Mushtaq Ahmad
18/01/2023	3	21042412009	Punjab	Bhakkar	Nazeer Ahmad:Muhammad Sardar
21/12/2022	2	21091214002	Punjab	Dera Ghazi Khan	Muhammad Zareef:Muhammad Ibrahim
22/12/2022	2	21091212004	Punjab	Dera Ghazi Khan	M. Babar Ashraf:Muhammad Ashraf
23/12/2022	2	21091214001	Punjab	Dera Ghazi Khan	Muhammad Sharif:Muhammad Ibrahim
14/07/2023	1	21021412002	Punjab	Faisalabad	Aftab Iftikhar:Iftikhar Ali

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
05/06/2023	2	21062113001	Punjab	Hafizabad	Ghanzfar Ghayas:Muhammad Mohsin
06/06/2023	2	21062213005	Punjab	Hafizabad	Nusrat Tahira:W/O Fyaz Ahmad
07/06/2023	2	21062213003	Punjab	Hafizabad	Muhammad Afzal:Bashir Ahmad
11/07/2023	1	21023210005	Punjab	Jhang	Tahir Sabtain:Ghulam Jaffer Khan
22/06/2023	1	21104212008	Punjab	Jhelum	Muhammad Abbas:Jahan Muhammad
14/07/2023	3	21071114002	Punjab	Khanewal	Muhammad Hamid Nawaz:Muhammad Nawaz Malik
16/01/2023	2	21043314006	Punjab	Khushab	Syed Jaffar Abbas:Syed Farukh Abbas
07/08/2023	2	21092312003	Punjab	Layyah	Muhammad Aslam:Ameer Ud Din
07/06/2023	3	21073112002	Punjab	Lodhran	Muhammad Arif:Khoshi Muhamad
11/07/2023	2	21063312001	Punjab	Mandi Bahauddin	Khalid Pervaiz:Rasheed Ahmad
12/07/2023	2	21063312002	Punjab	Mandi Bahauddin	Zubaida Bibi:Ahmad
17/07/2023	3	21071114001	Punjab	Multan	Amir Sohail:Malik Muhammad Aslam
18/07/2023	3	21071313001	Punjab	Multan	Khawaja Maqbool Mustafa:Khawaja Muhammad Yousaf
19/07/2023	3	21071412003	Punjab	Multan	Malik Muhammad Afzal:Malik Mehmood
20/07/2023	3	21071312003	Punjab	Multan	Muhammad Afzaal:Muhammad Iqbal
21/07/2023	3	21071312005	Punjab	Multan	Muhammad Irfan:Muhammad Ismail
04/08/2023	1	21013212001	Punjab	Nankana Sahib	Azra Bibi:W/O Anwar Sajid
05/08/2023	1	21013113001	Punjab	Nankana Sahib	Khalil-Ur-Rehman:Ali Ahmad
18/07/2023	1	21033112003	Punjab	Pakpattan	M. Tayyab:Muhammad Anwer
03/08/2023	2	21083412001	Punjab	Rahim Yar Khan	Abdul Ghaffar Khan Abbasi:Aziz-Ur-Rehman
04/08/2023	2	21083412002	Punjab	Rahim Yar Khan	Abuzar:Abdul Kareem
07/08/2023	1	21101412007	Punjab	Rawalpindi	Zameer Hussain:Abad Ali
07/08/2023	1	21101412004	Punjab	Rawalpindi	Raja Zulfiqar Ali:Raja G.Asghar
08/08/2023	1	21101612008	Punjab	Rawalpindi	Muhammad Shamroz:M. Ferooz
08/08/2023	1	21101614001	Punjab	Rawalpindi	Tariq Mehmood:Fazal Khan
23/06/2023	1	21031114002	Punjab	Sahiwal	Younis Gill:Khursheed Alam Gill
05/07/2023	1	21041814002	Punjab	Sargodha	Hassan Sultan:Irshad Ahmad

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
06/07/2023	2	21041814008	Punjab	Sargodha	Muneer Ahmed:Muhammad Deen
19/07/2023	1	21014112001	Punjab	Sheikhupura	Ehsan Elahi Virk:Arif Hussain
20/07/2023	2	21014112002	Punjab	Sheikhupura	Habib-Ur-Rehman Hashmi:Ali Hassan
04/07/2023	1	21024313002	Punjab	Toba Tek Singh	Ch.Muhammad Ali:Safdar Ali
05/07/2023	2	21024113001	Punjab	Toba Tek Singh	Farhan Akbar:Muhammad Akbar
12/06/2023	3	22031147001	KP	Abbottabad	Hanif Awan
26/06/2023	2	22011132001	KP	Bannu	Ihsanu Llah Khan
13/06/2023	3	22032147001	KP	Battagram	Shamalai
19/07/2023	1	22052232006	KP	Buner	Wst Mursaleen Shah
19/07/2023	1	22052232007	KP	Buner	Wst Rashid Ahmad
05/06/2023	2	22021432046	KP	Dera Ismail Khan	Abdul Majeed Tw Wst
09/06/2023	2	22021132001	KP	Dera Ismail Khan	Abdul Qayum
05/06/2023	2	22021432045	KP	Dera Ismail Khan	Ameer Asfand Yar
06/06/2023	2	22021432049	KP	Dera Ismail Khan	Fatima Begam
22/06/2023	2	22021132018	KP	Dera Ismail Khan	Ikram Ullah Tw Wst
09/06/2023	2	22021342001	KP	Dera Ismail Khan	Javed Anwar Khan
06/06/2023	2	22021432001	KP	Dera Ismail Khan	Mumtaz
07/06/2023	2	22021432044	KP	Dera Ismail Khan	Saif Ullah Tw Wst
07/06/2023	2	22021432047	KP	Dera Ismail Khan	Shafqat Ullah Tw Wst
09/06/2023	2	22021332004	KP	Dera Ismail Khan	Umar Ameen Tw Wst
05/07/2023	3	22033132010	KP	Haripur	Ahsan Raza
06/07/2023	3	22033132006	KP	Haripur	Khani Zaman
23/06/2023	3	22033132012	KP	Haripur	Muhammad Zaman Khan
04/07/2023	2	22043332007	KP	Karak	Adnan
04/07/2023	2	22043332001	KP	Karak	Mir Wali
25/07/2023	1	22101337001	KP	Khyber	Junaid
15/06/2023	1	22054132008	KP	Lower Dir	Sajjad Khan
07/06/2023	1	22051332003	KP	Malakand	Shakeel Ahmed

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
15/06/2023	3	22036235006	KP	Mansehra	Arshad Mehmood Wst
19/06/2023	3	22036234001	KP	Mansehra	Saqib Sherazi
20/06/2023	3	22036335002	KP	Mansehra	Kashtra Wst
22/06/2023	3	22036135009	KP	Mansehra	Saleem Khan Thakra Wst
14/07/2023	1	22061132005	KP	Mardan	Ahmad Ali
11/07/2023	1	22073132015	KP	Nowshera	Abdullah
06/07/2023	1	22073132002	KP	Nowshera	Iftikhar
11/07/2023	1	22073232017	KP	Nowshera	Irshad Ali
26/06/2023	1	22073332004	KP	Nowshera	Malook Khan
11/07/2023	1	22073232002	KP	Nowshera	Sawabuddin
10/07/2023	1	22073232003	KP	Nowshera	Wajahat Khan
06/07/2023	1	22073132028	KP	Nowshera	Zia Ullah Wst
23/06/2023	1	22071132041	KP	Peshawar	Afaq Ahmad
20/06/2023	1	22071132028	KP	Peshawar	Aqeel Afzal
22/06/2023	1	22071132005	KP	Peshawar	Aziz Khan
22/06/2023	1	22071132040	KP	Peshawar	Ibrahim Khan
22/06/2023	1	22071132009	KP	Peshawar	Muhammad Usman
22/06/2023	1	22071132006	KP	Peshawar	Muhammad Uzair
21/06/2023	1	22071132039	KP	Peshawar	Zahir Ul Amin
13/06/2023	1	22055134001	KP	Shangla	Fazal Khuda
13/06/2023	1	22055134004	KP	Shangla	Intikhab Alam Wst
18/07/2023	1	22062232001	KP	Swabi	Mazhar Ali
07/06/2023	1	22056234017	KP	Swat	Abdur Raziq
07/06/2023	1	22056244002	KP	Swat	Nasar
08/06/2023	1	22056234022	KP	Swat	Taj Mohammad
08/06/2023	1	22056234001	KP	Swat	Gul Roze
16/06/2023	1	22057144002	KP	Upper Dir	Tangai Bala
05/12/2022	1	972	Balochistan	Jhal Magsi	Syed Safdar Ali Shah

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
05/12/2022	2	951	Balochistan	Jhal Magsi	Ghulam Hussain
06/12/2022	1	953	Balochistan	Jhal Magsi	Haji Abdul Rasheed
06/12/2022	2	957	Balochistan	Jhal Magsi	Jhan Zaib
07/12/2022	2	1028	Balochistan	Kachi	Muhammad Mushtaq
07/12/2022	1	1003	Balochistan	Kachi	Kareem Baksh
08/12/2022	1	1007	Balochistan	Kachi	Khuda Baksh
08/12/2022	2	976	Balochistan	Kachi	Abdul Nabi
09/12/2022	1	1032	Balochistan	Kachi	Muneer Ahmed
09/12/2022	2	1015	Balochistan	Kachi	Mir Mohammad Baksh
12/12/2022	1	1031	Balochistan	Kachi	Mukthar Ahmeed
12/12/2022	2	1019	Balochistan	Kachi	Mohim Khan
13/12/2022	2	1039	Balochistan	Kachi	Rasheed Zaman
13/02/2023	1	1002	Balochistan	Kachi	Imran Khan
10/10/2022	1	176	Balochistan	Kalat	Muhammad Saleem
25/11/2022	1	215	Balochistan	Khuzdar	Abdul Haq
25/11/2022	3	226	Balochistan	Khuzdar	Abdul Razzaq
14/12/2022	3	231	Balochistan	Khuzdar	Ali Akber
14/12/2022	1	267	Balochistan	Khuzdar	Mujeeb Ur Rehman
15/12/2022	3	237	Balochistan	Khuzdar	Gul Mohammad
15/12/2022	1	238	Balochistan	Khuzdar	Habib Ur Rehman
15/12/2022	2	232	Balochistan	Khuzdar	Fareed Ahmed
22/08/2022	2	1075	Balochistan	Killa Abdullah	Abdul Khaliq
20/02/2023	3	1674	Balochistan	Killa Saifullah	Shamsu-Ur Rehman
20/02/2023	2	1577	Balochistan	Killa Saifullah	Abdul Wahab
20/02/2023	1	1661	Balochistan	Killa Saifullah	Muhammad Rahim
22/02/2023	2	660	Balochistan	Loralai	Abdul Jalil
22/02/2023	1	695	Balochistan	Loralai	Noorullah
22/02/2023	3	661	Balochistan	Loralai	Abdul Mateen

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
23/02/2023	3	3af352cd	Balochistan	Loralai	A Ghafar
23/02/2023	2	656	Balochistan	Loralai	Abdul Hadi
20/07/2022	3	526	Balochistan	Mastung	Rehmat Khan
15/02/2023	1	433	Balochistan	Mastung	Abdul Baqi
15/02/2023	2	524	Balochistan	Mastung	Qudrat Ullah
15/02/2023	3	527	Balochistan	Mastung	Shaib Khan
16/02/2023	2	445	Balochistan	Mastung	Abdul Samad
16/02/2023	1	500	Balochistan	Mastung	Mohammad Alim
20/12/2022	1	709	Balochistan	Musakhel	Dawod Khan
25/01/2023	1	1057	Balochistan	Nasirabad	Sanaullah
27/02/2023	1	1052	Balochistan	Nasirabad	Allah Dina
12/10/2022	3	238	Balochistan	Nushki	Habib Ur Rehman
02/01/2023	1	1193	Balochistan	Pishin	Malak Ahmed Khan
02/02/2023	3	1137	Balochistan	Pishin	Abdul Qadeer
03/02/2023	3	1160	Balochistan	Pishin	Ameenullah
06/02/2023	3	1137	Balochistan	Pishin	Malak Habib Ur Rehman
06/02/2023	2	1164	Balochistan	Pishin	Haji Alam Khan
06/06/2022	2	1259	Balochistan	Quetta	Ghulam Mustafa
06/06/2022	1	1276	Balochistan	Quetta	Saleh Muhammad
05/01/2023	3	abb0500f	Balochistan	Quetta	Abdul Hameed
05/01/2023	2	c2c86f30	Balochistan	Quetta	Haji Amanullah
05/01/2023	3	1269	Balochistan	Quetta	Muhammad Anwar
06/01/2023	1	1075	Balochistan	Quetta	Abdul Khaliq
09/01/2023	2	1275	Balochistan	Quetta	Saifullah
09/01/2023	1	2587131c	Balochistan	Quetta	Zafar ullah
27/04/2023	3	1270	Balochistan	Quetta	Muhammad Haroon
07/06/2023	1	1248	Balochistan	Quetta	Abdul Quddus
08/06/2023	1	1257	Balochistan	Quetta	Faqir Muhammad

Impact Survey Date	Team.#	WST ID	Zone	District	Farmer's Name
13/10/2022	2	1688	Balochistan	Sherani	Malak Mir Adam
13/10/2022	1	1695	Balochistan	Sherani	Rahmat Ullah
14/10/2022	3	1539	Balochistan	Sibi	Muhammad Saud Bughti
17/10/2022	3	1530	Balochistan	Sibi	Haroon Ur Rasheed Luni
18/10/2022	3	1536	Balochistan	Sibi	Mazar Khan
19/10/2022	3	1728	Balochistan	Zhob	Haji Akram
20/10/2022	3	1557	Balochistan	Ziarat	Malik Abdul Ghaffar
14/03/2023	2	1561	Balochistan	Ziarat	Naseebullah
15/03/2023	2	1549	Balochistan	Ziarat	Arifullah
15/03/2023	3	1562	Balochistan	Ziarat	Noor Muhammad
03/08/2023	1	25021227008	AJK	Bagh	Kernota
05/06/2023	1	25031127003	AJK	Bhimber	Machora
06/06/2023	1	25031127001	AJK	Bhimber	Pithorani-2
08/06/2023	1	25012116013	AJK	Jhelum	Doodhpura
08/06/2023	1	25012116009	AJK	Jhelum	Doodhpura Lower
09/06/2023	1	25012118002	AJK	Jhelum	Kakarwara
09/06/2023	1	25012126001	AJK	Jhelum	Lower Gujar Bandi
19/06/2023	1	25032416003	AJK	Kotli	Kugyali Khandar
19/06/2023	1	25032625002	AJK	Kotli	Tarala 2
03/07/2023	1	25033228001	AJK	Mirpur	Darari West
21/06/2023	1	25011124023	AJK	Muzaffarabad	Baglota Dana
21/06/2023	1	25011116046	AJK	Muzaffarabad	Pajgran
22/06/2023	1	25011124034	AJK	Muzaffarabad	Poothi Farooqabad
22/06/2023	1	25011116019	AJK	Muzaffarabad	Potha Kacheli
23/06/2023	1	25011116055	AJK	Muzaffarabad	Saibthaan
25/07/2023	1	25023216002	AJK	Poonch	Kanoli Chatra
26/07/2023	1	25023327004	AJK	Poonch	Lower Trasel
24/07/2023	1	25024316005	AJK	Sudhnoti	Jhanda Bagla

PLL FIELD SURVEY SCHEDULE - ZONE/UNIT WISE

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Bahawalnagar	04/06/2022	Abdul Ghafoor	Khan Muhammad	Crosfield Agro
Punjab	Bahawalnagar	31/05/2022	Ahsan Zahoor	Zahoor Ahmad	Al-Inyat & Sons
Punjab	Bahawalnagar	30/05/2022	Dildar Hussain	Shair Muhammad	Easy Farming
Punjab	Bahawalnagar	28/05/2022	Muhammad Aslam	Shah Ali	Easy Farming
Punjab	Bahawalnagar	02/06/2022	Muhammad Hussain	Abdul Rehman	Easy Farming
Punjab	Bahawalnagar	30/05/2022	Muhammad Sarwar	Bashir Ahmad	Al-Inyat & Sons
Punjab	Bahawalnagar	31/05/2022	Muhammad sharif	Muhammad Yaqoob	Easy Farming
Punjab	Bahawalnagar	02/06/2022	Muhammad Sohna	Ali Muhammad	Easy Farming
Punjab	Bahawalnagar	02/06/2022	Noor Ahmad	Jani	Easy Farming
Punjab	Bahawalnagar	02/06/2022	Saif Ur Rehman	Zahoor Ahmad	Easy Farming
Punjab	Bahawalnagar	04/06/2022	Sultan Mehmood	Ghulam Muhammad	Haji Sons International
Punjab	Bhakkar	16/06/2022	Ameer iqbal Asif	Naseer Ahmad	Ali Bhai Engineers
Punjab	Bhakkar	17/06/2022	Hassan Abbas	Akhtar Hussain	Modern Farming
Punjab	Bhakkar	18/06/2022	Muhammad Asad Khan	Muhammad Ismail	Modern Farming
Punjab	Bhakkar	01/05/2022	Muhammad Shahid	Mushtaq Ahmad Shaheen	Modern Farming
Punjab	Bhakkar	18/06/2022	Muhammad Younus	Muhammad Yousaf	Crosfield Agro
Punjab	Dera Ghazi Khan	24/05/2022	Abdul Majeed	Kareem Baksh	Crosfield Agro
Punjab	Dera Ghazi Khan	24/05/2022	Ghulam Hussain	Abdul Razaq	Hanzla Traders
Punjab	Dera Ghazi Khan	24/05/2022	Ghulam Hussain	Abdul Razzaq	Hanzla Traders
Punjab	Dera Ghazi Khan	25/05/2022	Lalan Mai	Raheem Buksh	Modern Farming
Punjab	Dera Ghazi Khan	24/05/2022	Muhammad Aslam	Ibrahim Baksh	Crosfield Agro
Punjab	Dera Ghazi Khan	24/05/2022	Muhammad idrees	Ghulam Muhi din	Falcon Traders
Punjab	Dera Ghazi Khan	23/05/2022	Muhammad Zahid	Abdul Sattar Hasrat	Hanzla Traders
Punjab	Dera Ghazi Khan	24/05/2022	Muzzaffar Qasim	Muhammad Qasim	Crosfield Agro
Punjab	Faisalabad	21/01/2023	Abdul Rauf	Fatah Muhammad	Falcon Traders
Punjab	Faisalabad	21/01/2023	Allah Ditta	Akbar Ali	Pioneer Agro Laser Land Level Services
Punjab	Faisalabad	21/01/2023	Arbab Saif Ullah	Saif Ullah	Ruba Digital Laser
Punjab	Faisalabad	20/01/2023	Arif Hussain Gill	Faqeer Hussain Gill	Easy Farming

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Faisalabad	21/01/2023	Bashir Ahmed	Sadar Din	Modern Farming
Punjab	Faisalabad	20/01/2023	Jamat Ali	Nawab Din	Ruba Digital Laser
Punjab	Faisalabad	20/01/2023	Mahe wal	Noor Muhammad	Falcon Traders
Punjab	Faisalabad	21/01/2023	Muhammad Anwar	Sardar Muhammad	Ruba Digital Laser
Punjab	Faisalabad	20/01/2023	Muhammad Khan	Muhammad Akram	Falcon Traders
Punjab	Faisalabad	21/01/2023	Muhammad Zubair	Muhammad Ali	Easy Farming
Punjab	Faisalabad	21/01/2023	Touqeer Abbas	Abbas Ali	Falcon Traders
Punjab	Gujranwala	21/01/2023	Akhtar Hussain	Fateh Muhammad	Bahawal Engineering
Punjab	Gujranwala	21/01/2023	Fayaz Ahmad	Muhammad Khan	Ruba Digital Laser
Punjab	Gujranwala	21/01/2023	Muhammad Asif	Muhammad Khan	Modern Farming
Punjab	Gujranwala	21/01/2023	Muhammad Farooq	Muhammad Hussain	Crosfield Agro
Punjab	Gujranwala	21/01/2023	Nadeem Raza	Muhammad Khan	Next Level
Punjab	Gujranwala	21/01/2023	Rafaqat Ali	Saif Ali	Crosfield Agro
Punjab	Gujranwala	21/01/2023	Tariq Hussain	Talib Hussain	Ruba Digital Laser
Punjab	Gujrat	22/01/2023	Aftab Ahmad	Muhammad Naeem Ullah	Maqbool Surviving Store
Punjab	Gujrat	22/01/2023	Faisal Nawaz	Muhammad Nawaz	Maqbool Surviving Store
Punjab	Gujrat	22/01/2023	Naeem Sohail	Nazeer Ahmad	Ruba Digital Laser
Punjab	Gujrat	22/01/2023	Nazar Hussain	Muhammad Din	Ruba Digital Laser
Punjab	Gujrat	22/01/2023	Orangzaib	Muhammad Razaq	Ruba Digital Laser
Punjab	Gujrat	22/01/2023	Qayyum Sarwar Qamar	Muhammad Sarwar	Ruba Digital Laser
Punjab	Hafizabad	23/01/2023	Allah Rakha	Muhammad Iqbal	Al-Inyat & Sons
Punjab	Hafizabad	23/01/2023	Mumtaz Ahmad	Abdullah	Falcon Traders
Punjab	Hafizabad	23/01/2023	Samia Baig	Iftikhar Ahmad (Husband)	Modern Farming
Punjab	Hafizabad	23/01/2023	Shahid Iqbal	Munir Ahmad	Easy Farming
Punjab	Hafizabad	23/01/2023	Usman Afzal Chatta	Muhammad Afzal Chatta	Ali Bhai Engineers
Punjab	Jhang	23/01/2023	Ajmal Nadeem	Shamir Khan	Next Level
Punjab	Jhang	23/01/2023	Bilal Hussain	Muhammad Ashraf	Next Level
Punjab	Jhang	23/01/2023	Hanif Tahir	Muhammad Ramzan	Easy Farming
Punjab	Jhang	23/01/2023	Shamir Khan	Muhabat Ali	Next Level

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Jhang	23/01/2023	Umar Hayat	YASEEN	Crosfield Agro
Punjab	Kasur	21/01/2023	Abid Hussain	Fareed Din	Rehman Agro Engineers
Punjab	Kasur	21/01/2023	Ali Asgar	Muhammad Din	Modern Farming
Punjab	Kasur	21/01/2023	Bashir Ahmad	M.Shafi	Farm Power International
Punjab	Kasur	21/01/2023	Ch.Muhabbat Ali	Rehmat Ali	Crosfield Agro
Punjab	Khanewal	23/01/2023	Amjad Hussain	Muhammad waryar	Hanzla Traders
Punjab	Khanewal	23/01/2023	Asghar Ali	Muhammad Anwar	Green Land Laser
Punjab	Khanewal	23/01/2023	M.Abid khan	Khalil Ahmad	Waseer Agrics
Punjab	Khanewal	23/01/2023	M.Ibrahim	M.Ismail	Green Land Laser
Punjab	Khanewal	23/01/2023	Muhammad Sharif	Muhammad Iqbal	Easy Farming
Punjab	Khanewal	23/01/2023	Syed Asad Ali	Syed Shaheen Haider	Rehman Agro Engineers
Punjab	Khanewal	23/01/2023	Zia Ullah khan	Haq nawaz khan	Waseer Agrics
Punjab	Khushab	25/01/2023	Ghulam Akbar	Atta Muhammad	Pioneer Agro Laser Land Level Services
Punjab	Khushab	25/01/2023	Khushi Muhammad	Atta Muhammad	Ruba Digital Laser
Punjab	Khushab	25/01/2023	Mansab Dar	Ahmad Khan	Crosfield Agro
Punjab	Khushab	25/01/2023	Muhammad Ramzan	Muhammad Khan	Ruba Digital Laser
Punjab	Khushab	25/01/2023	Muhammad Safdar	Shah Muhammad	Ruba Digital Laser
Punjab	Khushab	01/01/2021	Muhammad Shameer	Muhammad Ameer	Crosfield Agro
Punjab	Khushab	25/01/2023	Sher Khan	Ahmad Khan	Ruba Digital Laser
Punjab	Khushab	25/01/2023	Umer Daraz	Muhammad Raza	Pioneer Agro Laser Land Level Services
Punjab	Lodhran	25/01/2023	Abdul Malik	Azam Ali	Ruba Digital Laser
Punjab	Lodhran	25/01/2023	Haq Nawaz	Peera datta	Modern Farming
Punjab	Lodhran	25/01/2023	Haq Nawaz	Peera datta	Modern Farming
Punjab	Lodhran	25/01/2023	Hazoor Ahmad	Pearinditta	Modern Farming
Punjab	Lodhran	25/01/2023	Javeed Iqbal	M Sharif	Next Level
Punjab	Lodhran	25/01/2023	Mushtaq Hussain	Kamal pur jatyal	Ali Bhai Engineers
Punjab	Lodhran	25/01/2023	Talha Naeem	M.Afzal	Hanzla Traders
Punjab	Lodhran	25/01/2023	Umar Farooq Khan	Shaib yar	Hanzla Traders
Punjab	Multan	24/01/2023	Ali Ahmad	Bashir Ahmad	Crosfield Agro

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Multan	24/01/2023	Ghulam Rasool	Nawab Din	Pioneer Agro Laser Land Level Services
Punjab	Multan	24/01/2023	Khuda Bukhsh	Muhammad Bukhsh	Crosfield Agro
Punjab	Multan	24/01/2023	M.Arif	M.Suleman	Farm Power International
Punjab	Multan	24/01/2023	Muhammad Aslam	Allah Dad	Farm Power International
Punjab	Multan	24/01/2023	Muhammad Iqbal	Bashir Ahmad	Pioneer Agro Laser Land Level Services
Punjab	Multan	24/01/2023	RIAZ HUSSAIN	M.Sharif Bajwa	Al-Inyat & Sons
Punjab	Multan	24/01/2023	Shoukat Hussain	Ameer Bukhsh	Crosfield Agro
Punjab	Nankana Sahib	19/01/2023	Abdul Sattar	Sardar Muhammad	Easy Farming
Punjab	Nankana Sahib	19/01/2023	Aitazaz Hussain Bhatti	Nazir Ahmad	Crosfield Agro
Punjab	Nankana Sahib	19/01/2023	M.imran	M.Sharif	Crosfield Agro
Punjab	Nankana Sahib	19/01/2023	Muhammad Asim	Muhammad Saleem	Rehman Agro Engineers
Punjab	Nankana Sahib	19/01/2023	Zafar Iqbal	Nazeer Ahmad	Easy Farming
Punjab	Okara	27/01/2023	Haji Muhammad Ashraf	Fazal Karim	Easy Farming
Punjab	Okara	27/01/2023	Khan Muhammad	Wali Muhammad	Crosfield Agro
Punjab	Okara	27/01/2023	Maqbool Ahmed	Sardar Muhammad Zafar	Easy Farming
Punjab	Okara	27/01/2023	Muhammad Akram	Muhammad Ali	Ruba Digital Laser
Punjab	Okara	27/01/2023	Muhammad Ramzan	Taj ud Din	Easy Farming
Punjab	Okara	27/01/2023	Muhammad Younas Bhatti	Salamat Ali Bhatti	Ruba Digital Laser
Punjab	Okara	27/01/2023	Sabir	Abdul Ghani	Easy Farming
Punjab	Rahim Yar Khan	04/07/2022	Muhammad Aslam Sohail	Ghulam Mustafa Sohail	Hanzla Traders
Punjab	Sahiwal	26/01/2023	Abdul Farooq	Peer Muhammad	Easy Farming
Punjab	Sahiwal	26/01/2023	Ali Rizwan Khan	Zahoor Khan	Waseer Agrics
Punjab	Sahiwal	26/01/2023	Muhammad Ibrar	M.Adrees	Easy Farming
Punjab	Sahiwal	26/01/2023	Muhammad Nawaz	Noor Muhammd	Waseer Agrics
Punjab	Sahiwal	26/01/2023	Muhammad Ramzan	Karam Ali	Easy Farming
Punjab	Sahiwal	26/01/2023	Nazar Muhammad	Muhammad Nawaz Khan	Waseer Agrics
Punjab	Sahiwal	26/01/2023	Noor Muhammad	Muhammad Ameer	Waseer Agrics
Punjab	Sahiwal	26/01/2023	Usman ali	Arshad Akhter	Pioneer Agro Laser Land Level Services
Punjab	Sargodha	24/01/2023	Ahmad Hussain	Noor Hussain	Maqbool Surviving Store

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Sargodha	24/01/2023	Allah Dad	Muhammad Khan	Modern Farming
Punjab	Sargodha	24/01/2023	Muhammad Safdar	Shah Muhammad	Farm Power International
Punjab	Sargodha	24/01/2023	Muhammad Sher	Ahmad Khan	Maqbool Surving Store
Punjab	Sargodha	24/01/2023	Nouman Mumtaz	Muhammad Mumtaz	Next Level
Punjab	Sargodha	24/01/2023	Saleh Muhammad	Allah Yar	Maqbool Surving Store
Punjab	Sheikhupura	20/01/2023	Asad ullah	Denar Ahmad	Crosfield Agro
Punjab	Sheikhupura	20/01/2023	Ghulam Muhi-ud-DIN	Hassan Din	Modern Farming
Punjab	Sheikhupura	20/01/2023	M.Akhtar	Niyamat Ali	Al-Inyat & Sons
Punjab	Sheikhupura	20/01/2023	Mubarak Ali	Ghulam nabi	Bahawal Engineering
Punjab	Sheikhupura	20/01/2023	Muhammad Akram	Khushi Muhammad	Crosfield Agro
Punjab	Sheikhupura	20/01/2023	Sajjad Ahmad	Nazir Ahmad	Al-Inyat & Sons
Punjab	Sheikhupura	20/01/2023	Shafqat Ali	M Shafee	Bahawal Engineering
Punjab	Sialkot	20/01/2023	Amjid Mehmood	Muhammad Sharif	Bahawal Engineering
Punjab	Sialkot	20/01/2023	Muhammad Naveed	Muhammad Mushtaq	Bahawal Engineering
Punjab	Sialkot	20/01/2023	Muhammad Zakaullah	Sana Ullah	Bahawal Engineering
Punjab	Sialkot	20/01/2023	Munir Ahmad	Barkat Ali	Bahawal Engineering
Punjab	Sialkot	20/01/2023	Wahid Ali	Muhammad Ismail	Crosfield Agro
Punjab	Toba Tek Singh	24/01/2023	Akram ul Haq	Muhammad Boota	Ruba Digital Laser
Punjab	Toba Tek Singh	24/01/2023	Chawa	Ghulam Muhammad	Next Level
Punjab	Toba Tek Singh	24/01/2023	Ghulam Murtaza	Akbar Ali	Easy Farming
Punjab	Toba Tek Singh	24/01/2023	Ijaz Ahmed	Muhammad Sharif	Modern Farming
Punjab	Toba Tek Singh	24/01/2023	Muhammad Ali	Abdul Hayee khan	Ruba Digital Laser
Punjab	Toba Tek Singh	24/01/2023	Muhammad Jameel	Rukan Din	Al-Inyat & Sons
Punjab	Toba Tek Singh	24/01/2023	Umar Hayat	Noor Muhammad	Ruba Digital Laser
Punjab	Toba Tek Singh	24/01/2023	Zafar Iqbal	Muhammad Aslam	Ruba Digital Laser
Punjab	Vehari	25/01/2023	Ashraf Ali	Ali Muhammad	Rehman Agro Engineers
Punjab	Vehari	25/01/2023	Karam Elahi	Haji Allah Baksh	Crosfield Agro
Punjab	Vehari	25/01/2023	Master Basir Ahmed	Atta Muhammad	Hanzla Traders
Punjab	Vehari	25/01/2023	Muhammad Banyameen	Muhammad Sarwar	Easy Farming

Zone/Unit	District	Date of Survey	Name of Service Provider	Father Name	Company name
Punjab	Vehari	25/01/2023	Muhammad Nasrullah	Ghulam Nabi	Ali Bhai Engineers
Punjab	Vehari	25/01/2023	Muhammad Saleem	Rehmat Ullah	Amjad Brothers Zarai Industries
Punjab	Vehari	25/01/2023	Muhammad Yaqoob	Sajwara	Easy Farming
Punjab	Vehari	25/01/2023	Sajjad Mehmood	Bashir Ahmed	Hanzla Traders
KP	Dera Ismail Khan	20/01/2023	Junaid Ahmad Khan	Jamshaid Ahmad khan	Cross Field Agro
KP	Dera Ismail Khan	20/01/2023	Malik Muhammad Bhawal	Muhammad Afzal	Cross Field Agro
KP	Dera Ismail Khan	20/01/2023	Muhammad Arif	Malik khuda Baksh	Ruba Digital Laser
KP	Dera Ismail Khan	20/01/2023	Muhammad Arshad	Muhammad Yaqoob	Cross Field Agro
KP	Dera Ismail Khan	21/01/2023	Muhammad Ramzan	Muhammad Hashim	Modern Farming PLL Services
Balochistan	Jafarabad	23/01/2023	Ejaz Ali	Mohammed Azeem	Amjad Brothers Zarai Industries
Balochistan	Jafarabad	23/01/2023	Javeed Ali	Mohabbat Khan	Amjad Brothers Zarai Industries
Balochistan	Jafarabad	23/01/2023	Mohammed Kaleem	Haji Ameer Bux	Amjad Brothers Zarai Industries
Balochistan	Jafarabad	23/01/2023	Sher Khan	Ghulam Haider	Amjad Brothers Zarai Industries
Balochistan	Sohbatpur	24/01/2023	Ghulam Sabir	Abdul Rehman	Amjad Brothers Zarai Industries
Balochistan	Sohbatpur	24/01/2023	Mohammed Hassan	Noor Mohammed	Amjad Brothers Zarai Industries
Balochistan	Sohbatpur	24/01/2023	Mohiudin	Sabir	Amjad Brothers Zarai Industries

**ANNEXURE C: ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP AREA AND
CROPPING PATTERN**

Table: Impact of Watercourse Improvement on Crop Area and Cropping Pattern in Punjab

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	7923	47.4%	8036	46.0%	113	1.4%
Rice	3967	23.7%	4011	23.0%	44	1.1%
Cotton	2645	15.8%	2751	15.8%	106	4.0%
Maize	519	3.1%	542	3.1%	22	4.3%
Sugarcane	575	3.4%	743	4.3%	168	29.3%
Oil Seeds	9	0.1%	10	0.1%	1	12.7%
Pulses	0	0.0%	0	0.0%	0	0.0%
Tobacco	92	0.5%	105	0.6%	13	14.3%
Okra	2	0.0%	2	0.0%	1	30.9%
Onions	0	0.0%	0	0.0%	0	0.0%
Potato	325	1.9%	374	2.1%	49	15.1%
Tomato	0	0.0%	0	0.0%	0	0.0%
Other Vegetables	40	0.2%	59	0.3%	19	47.2%
Apple	0	0.0%	0	0.0%	0	0.0%
Peach	0	0.0%	0	0.0%	0	0.0%
Other Fruits	18	0.1%	23	0.1%	5	24.6%
Rabi Fodder	322	1.9%	406	2.3%	84	26.0%
Kharif Fodder	294	1.8%	397	2.3%	102	34.8%
Overall	16732	100.0%	17458	100.0%	726	4.3%

Table: Impact of Watercourse Improvement on Crop Area and Cropping Pattern in KP

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	2087	55.4%	2166	46.9%	79	3.8%
Rice	16	0.4%	16	0.4%	0	2.3%
Cotton	15	0.4%	17	0.4%	1	7.7%
Maize	470	12.5%	506	11.0%	36	7.6%
Sugarcane	122	3.2%	184	4.0%	62	50.7%
Oil Seeds	2	0.1%	2	0.0%	0	21.3%
Pulses	341	9.1%	796	17.2%	455	133.2%
Tobacco	29	0.8%	36	0.8%	7	24.1%
Okra	1	0.0%	1	0.0%	0	51.5%
Onions	28	0.7%	43	0.9%	15	52.5%
Potato	135	3.6%	170	3.7%	35	25.8%
Tomato	93	2.5%	120	2.6%	27	29.4%
Other Vegetables	29	0.8%	52	1.1%	23	79.1%
Apple	0	0.0%	0	0.0%	0	0.0%
Peach	150	4.0%	153	3.3%	2	1.6%
Other Fruits	101	2.7%	143	3.1%	42	41.2%
Rabi Fodder	125	3.3%	180	3.9%	56	44.5%
Kharif Fodder	22	0.6%	34	0.7%	13	58.9%
Overall	3766	100.0%	4619	100.0%	853	22.7%

Table: Impact of Watercourse Improvement on Crop Area and Cropping Pattern in Balochistan

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	493	27.0%	754	26.1%	261	52.9%
Rice	735	40.3%	909	31.5%	174	23.6%
Cotton	132	7.2%	218	7.5%	86	64.8%
Maize	0	0.0%	0	0.0%	0	0.0%
Sugarcane	11	0.6%	46	1.6%	35	309.7%
Oil Seeds	91	5.0%	195	6.7%	103	113.3%
Pulses	2	0.1%	19	0.7%	17	752.4%
Tobacco	30	1.6%	69	2.4%	39	129.8%
Okra	0	0.0%	0	0.0%	0	0.0%
Onions	0	0.0%	0	0.0%	0	0.0%
Potato	0	0.0%	0	0.0%	0	0.0%
Tomato	59	3.3%	154	5.3%	94	158.5%
Other Vegetables	30	1.6%	155	5.4%	126	421.1%
Apple	197	10.8%	212	7.3%	15	7.6%
Peach	0	0.0%	0	0.0%	0	0.0%
Other Fruits	0	0.0%	0	0.0%	0	0.0%
Rabi Fodder	44	2.4%	158	5.5%	114	259.9%
Kharif Fodder	0	0.0%	0	0.0%	0	0.0%
Overall	1825	100.0%	2887	100.0%	1062	58.2%

Table: Impact of Watercourse Improvement on Crop Area and Cropping Pattern in AJK

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	168	42.2%	177	41.6%	9	5.4%
Rice	6	1.5%	6	1.5%	0	2.7%
Cotton	0	0.0%	0	0.0%	0	0.0%
Maize	216	54.4%	231	54.4%	15	7.0%
Sugarcane	0	0.0%	0	0.0%	0	0.0%
Oil Seeds	0	0.0%	0	0.0%	0	0.0%
Pulses	0	0.0%	0	0.0%	0	0.0%
Tobacco	0	0.0%	0	0.0%	0	0.0%
Okra	0	0.0%	0	0.0%	0	0.0%
Onions	0	0.0%	0	0.0%	0	0.0%
Potato	0	0.0%	0	0.0%	0	0.0%
Tomato	0	0.0%	0	0.0%	0	0.0%
Other Vegetables	0	0.0%	0	0.0%	0	0.0%
Apple	0	0.0%	0	0.0%	0	0.0%
Peach	0	0.0%	0	0.0%	0	0.0%
Other Fruits	0	0.0%	0	0.0%	0	0.0%
Rabi Fodder	3	0.8%	5	1.1%	1	38.2%
Kharif Fodder	4	1.1%	6	1.5%	2	49.7%
Overall	397	100.0%	425	100.0%	28	7.0%

Table: Impact of Watercourse Improvement on Crop Area and Cropping Pattern in ICT

Crop	Before WC Improvement		After WC Improvement		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	8	31.5%	12	36.7%	4	44.4%
Rice	0	0.0%	0	0.0%	0	0.0%
Cotton	0	0.0%	0	0.0%	0	0.0%
Maize	8	30.3%	9	28.5%	1	16.8%
Sugarcane	0	0.0%	0	0.0%	0	0.0%
Oil Seeds	0	0.0%	0	0.0%	0	0.0%
Pulses	0	0.0%	0	0.0%	0	0.0%
Tobacco	0	0.0%	0	0.0%	0	0.0%
Okra	9	32.7%	10	29.4%	1	11.3%
Onions	0	0.0%	0	0.0%	0	0.0%
Potato	0	0.0%	0	0.0%	0	0.0%
Tomato	1	2.9%	1	2.7%	0	13.7%
Other Vegetables	1	2.6%	1	2.7%	0	29.6%
Apple	0	0.0%	0	0.0%	0	0.0%
Peach	0	0.0%	0	0.0%	0	0.0%
Other Fruits	0	0.0%	0	0.0%	0	0.0%
Rabi Fodder	0	0.0%	0	0.0%	0	0.0%
Kharif Fodder	0	0.0%	0	0.0%	0	0.0%
Overall	27	100.0%	33	100.0%	6	23.9%

.

ANNEXURE D: ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP YIELD ON SAMPLE FARMS

Table: Impact of Watercourse Improvement on Crop Yield on Sample Farms in Punjab

Crops	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	32	34	1.60	5%
Rice	27	30	2.55	9%
Cotton	27	29	2.50	9%
Maize	81	85	4.50	6%
Sugarcane	741	801	60.43	8%
Oil Seeds	24	26	2.00	8%
Pulses	0	0	0.00	0%
Tobacco	70	75	5.00	7%
Okra	90	105	15.00	17%
Onions	0	0	0.00	0%
Potato	250	275	25.30	10%
Tomato	0	0	0.00	0%
Other Vegetables	64	70	6.03	9%
Apple	0	0	0.00	0%
Peach	0	0	0.00	0%
Other Fruits	117	130	12.55	11%
Rabi Fodder	414	455	41.00	10%
Kharif Fodder	338	351	12.77	4%

Table: Impact of Watercourse Improvement on Crop Yield on Sample Farms in KP

Crops	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre		Percent	
Wheat	24	29	5.00	21%
Rice	25	27	2.50	10%
Cotton	28	31	2.50	9%
Maize	20	27	6.90	34%
Sugarcane	610	653	43.00	7%
Oil Seeds	16	17	1.00	6%
Pulses	6	6	0.20	3%
Tobacco	26	30	4.13	16%
Okra	85	94	9.00	11%
Onions	167	190	23.00	14%
Potato	141	165	24.00	17%
Tomato	73	80	6.67	9%
Other Vegetables	44	50	6.50	15%
Apple	0	0	0.00	0%
Peach	82	90	8.00	10%
Other Fruits	58	65	7.50	13%
Rabi Fodder	377	400	22.78	6%
Kharif Fodder	328	355	27.50	8%

Table: Impact of Watercourse Improvement on Crop Yield on Sample Farms in Balochistan

Crops	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre		Percent	
Wheat	27	28	1.00	4%
Rice	32	35	3.50	11%
Cotton	25	28	3.00	12%
Maize	0	0	0.00	0%
Sugarcane	627	645	18.00	3%
Oil Seeds	10	12	2.05	21%
Pulses	8	9	0.60	8%
Tobacco	65	66	1.00	2%
Okra	0	0	0.00	0%
Onions	0	0	0.00	0%
Potato	0	0	0.00	0%
Tomato	124	136	12.00	10%
Other Vegetables	193	195	2.50	1%
Apple	77	86	9.43	12%
Peach	0	0	0.00	0%
Other Fruits	0	0	0.00	0%
Rabi Fodder	360	380	20.00	6%
Kharif Fodder	0	0	0.00	0%

Table: Impact of Watercourse Improvement on Crop Yield on Sample Farms in AJK

Crops	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre		Percent	
Wheat	28	31	3.50	13%
Rice	27	28	1.00	4%
Cotton	0	0	0.00	0%
Maize	31	35	4.00	13%
Sugarcane	0	0	0.00	0%
Oil Seeds	0	0	0.00	0%
Pulses	0	0	0.00	0%
Tobacco	0	0	0.00	0%
Okra	0	0	0.00	0%
Onions	0	0	0.00	0%
Potato	210	215	5.00	2%
Tomato	0	0	0.00	0%
Other Vegetables	0	0	0.00	0%
Apple	0	0	0.00	0%
Peach	0	0	0.00	0%
Other Fruits	0	0	0.00	0%
Rabi Fodder	390	425	35.00	9%
Kharif Fodder	475	480	5.00	1%

Table: Impact of Watercourse Improvement on Crop Yield on Sample Farms in ICT

Crops	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre		Percent	
Wheat	29	30	1.50	5%
Rice	0	0	0.00	0%
Cotton	0	0	0.00	0%
Maize	33	36	3.13	10%
Sugarcane	0	0	0.00	0%
Oil Seeds	0	0	0.00	0%
Pulses	0	0	0.00	0%
Tobacco	0	0	0.00	0%
Okra	120	130	10.00	8%
Onions	0	0	0.00	0%
Potato	0	0	0.00	0%
Tomato	101	115	14.00	14%
Other Vegetables	54	58	4.03	7%
Apple	0	0	0.00	0%
Peach	0	0	0.00	0%
Other Fruits	0	0	0.00	0%
Rabi Fodder	0	0	0.00	0%
Kharif Fodder	0	0	0.00	0%

ANNEXURE E: ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON CROP PRODUCTION

Table: Impact of Watercourse Improvement on Crop Production in Punjab

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	257147.91	270005.30	12857.40	5%
Rice	110097.81	120325.48	10227.67	9%
Cotton	72899.06	79776.33	6877.27	9%
Maize	43601.89	46039.27	2437.37	6%
Sugarcane	550495.75	595412.03	44916.28	8%
Oil Seeds	236.79	256.52	19.73	8%
Pulses	0.00	0.00	0.00	0%
Tobacco	7354.79	7880.13	525.34	7%
Okra	216.59	252.69	36.10	17%
Onions	0.00	0.00	0.00	0%
Potato	93276.19	102727.08	9450.89	10%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	3770.44	4125.85	355.41	9%
Apple	0.00	0.00	0.00	0%
Peach	0.00	0.00	0.00	0%
Other Fruits	2692.60	2980.32	287.72	11%
Rabi Fodder	168078.00	184723.41	16645.41	10%
Kharif Fodder	134151.13	139216.49	5065.37	4%

Table: Impact of Watercourse Improvement on Crop Production in KP

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	51987.25	62817.92	10830.68	21%
Rice	401.80	442.80	41.00	10%
Cotton	466.84	508.53	41.68	9%
Maize	10172.34	13664.33	3492.00	34%
Sugarcane	112206.09	120115.70	7909.61	7%
Oil Seeds	36.77	39.07	2.30	6%
Pulses	4778.19	4937.46	159.27	3%
Tobacco	937.01	1086.59	149.59	16%
Okra	68.38	75.62	7.24	11%
Onions	7168.39	8155.65	987.26	14%
Potato	23905.39	27974.39	4069.00	17%
Tomato	8827.19	9629.66	802.47	9%
Other Vegetables	2241.40	2576.32	334.92	15%
Apple	0.00	0.00	0.00	0%
Peach	12507.95	13728.24	1220.29	10%
Other Fruits	8195.98	9265.02	1069.04	13%
Rabi Fodder	68079.17	72189.99	4110.82	6%
Kharif Fodder	11288.37	12236.25	947.88	8%

Table: Impact of Watercourse Improvement on Crop Production in Balochistan

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	20354.01	21107.86	753.85	4%
Rice	28620.56	31800.62	3180.06	11%
Cotton	5442.07	6095.12	653.05	12%
Maize	0.00	0.00	0.00	0%
Sugarcane	28967.09	29798.68	831.59	3%
Oil Seeds	1936.47	2335.44	398.97	21%
Pulses	151.51	162.87	11.36	7%
Tobacco	4476.88	4545.76	68.88	2%
Okra	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Potato	0.00	0.00	0.00	0%
Tomato	19036.27	20878.49	1842.22	10%
Other Vegetables	29905.39	30293.77	388.38	1%
Apple	16200.03	18194.81	1994.78	12%
Peach	0.00	0.00	0.00	0%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	56764.54	59918.13	3153.59	6%
Kharif Fodder	0.00	0.00	0.00	0%

Table: Impact of Watercourse Improvement on Crop Production in AJK

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	4856.26	5474.33	618.07	13%
Rice	169.22	175.49	6.27	4%
Cotton	0.00	0.00	0.00	0%
Maize	7169.13	8094.18	925.05	13%
Sugarcane	0.00	0.00	0.00	0%
Oil Seeds	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Tobacco	0.00	0.00	0.00	0%
Okra	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Potato	0.00	0.00	0.00	0%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	0.00	0.00	0.00	0%
Apple	0.00	0.00	0.00	0%
Peach	0.00	0.00	0.00	0%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	1760.54	1918.54	158.00	9%
Kharif Fodder	2999.35	3030.92	31.57	1%

Table: Impact of Watercourse Improvement on Crop Production in ICT

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)			Percent
Wheat	347.39	365.67	18.28	5%
Rice	0.00	0.00	0.00	0%
Cotton	0.00	0.00	0.00	0%
Maize	311.53	341.14	29.61	10%
Sugarcane	0.00	0.00	0.00	0%
Oil Seeds	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Tobacco	0.00	0.00	0.00	0%
Okra	1171.37	1268.98	97.61	8%
Onions	0.00	0.00	0.00	0%
Potato	0.00	0.00	0.00	0%
Tomato	88.97	101.31	12.33	14%
Other Vegetables	49.01	52.67	3.66	7%
Apple	0.00	0.00	0.00	0%
Peach	0.00	0.00	0.00	0%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	0.00	0.00	0.00	0%
Kharif Fodder	0.00	0.00	0.00	0%

**ANNEXURE F: ZONE-WISE IMPACT OF WATERCOURSE IMPROVEMENT ON AGRICULTURE
EMPLOYMENT**

Table: Impact of Watercourse Improvement on Agriculture Employment in Punjab

Crops	Agricultural Employment		Change	
	Before WC Improvement	After WC Improvement		
	Labor Man Days			Percent
Wheat	205044	207968	2925	1%
Rice	125362	126743	1381	1%
Cotton	156155	162386	6231	4%
Maize	23535	24544	1009	4%
Sugarcane	32974	42623	9649	29%
Oil Seeds	421	619	199	47%
Pulses	0	0	0	0%
Tobacco	0	0	0	0%
Okra	100	131	31	31%
Onions	0	0	0	0%
Potato	21210	24408	3198	15%
Tomato	4150	4745	595	14%
Other Vegetables	13099	16503	3405	26%
Apple	571	644	72	13%
Peach	0	0	0	0%
Other Fruits	17660	23798	6137	35%
Rabi Fodder	0	0	0	0%
Kharif Fodder	362	450	89	25%
Total	600643	635563	34921	6%

Table: Impact of Watercourse Improvement on Agriculture Employment in KP

Crops	Agricultural Employment		Change	
	Before WC Improvement	After WC Improvement		
	Labor Man Days			Percent
Wheat	54010	56060	2050	4%
Rice	506	518	12	2%
Cotton	914	984	70	8%
Maize	21306	22933	1627	8%
Sugarcane	6999	10547	3549	51%
Oil Seeds	302	542	239	79%
Pulses	0	0	0	0%
Tobacco	4248	5495	1247	29%
Okra	29	44	15	51%
Onions	1822	2779	957	53%
Potato	8808	11078	2270	26%
Tomato	1318	1636	317	24%
Other Vegetables	5077	7336	2260	45%
Apple	124	150	26	21%
Peach	24104	56223	32119	133%
Other Fruits	1301	2068	767	59%
Rabi Fodder	4442	4515	73	2%
Kharif Fodder	1984	2801	817	41%
Total	137294	185709	48415	35%

Table: Impact of Watercourse Improvement on Agriculture Employment in Balochistan

Crops	Agricultural Employment		Change	
	Before WC Improvement	After WC Improvement		
	Labor Man Days		Percent	
Wheat	12759	19510	6751	53%
Rice	23229	28711	5483	24%
Cotton	7797	12850	5053	65%
Maize	0	0	0	0%
Sugarcane	647	2649	2003	310%
Oil Seeds	313	1633	1319	421%
Pulses	1691	1819	129	8%
Tobacco	2711	7008	4297	159%
Okra	0	0	0	0%
Onions	0	0	0	0%
Potato	0	0	0	0%
Tomato	1353	3110	1757	130%
Other Vegetables	1781	6410	4629	260%
Apple	5951	12695	6744	113%
Peach	157	1337	1180	752%
Other Fruits	0	0	0	0%
Rabi Fodder	0	0	0	0%
Kharif Fodder	0	0	0	0%
Total	58389	97733	39344	67%

Table: Impact of Watercourse Improvement on Agriculture Employment in AJK

Crops	Agricultural Employment		Change	
	Before WC Improvement	After WC Improvement		
	Labor Man Days		Percent	
Wheat	4336	4570	235	5%
Rice	193	198	5	3%
Cotton	0	0	0	0%
Maize	9792	10480	688	7%
Sugarcane	0	0	0	0%
Oil Seeds	0	0	0	0%
Pulses	0	0	0	0%
Tobacco	0	0	0	0%
Okra	0	0	0	0%
Onions	0	0	0	0%
Potato	0	0	0	0%
Tomato	0	0	0	0%
Other Vegetables	133	184	51	38%
Apple	0	0	0	0%
Peach	0	0	0	0%
Other Fruits	253	379	126	50%
Rabi Fodder	0	0	0	0%
Kharif Fodder	0	0	0	0%
Total	14706	15810	1104	8%

Table: Impact of Watercourse Improvement on Agriculture Employment in ICT

Crops	Agricultural Employment		Change	
	Before WC Improvement	After WC Improvement		
	Labor Man Days			Percent
Wheat	218	315	97	44%
Rice	0	0	0	0%
Cotton	0	0	0	0%
Maize	368	429	62	17%
Sugarcane	0	0	0	0%
Oil Seeds	7	10	2	29%
Pulses	0	0	0	0%
Tobacco	35	40	5	14%
Okra	479	533	54	11%
Onions	0	0	0	0%
Potato	0	0	0	0%
Tomato	0	0	0	0%
Other Vegetables	0	0	0	0%
Apple	0	0	0	0%
Peach	0	0	0	0%
Other Fruits	0	0	0	0%
Rabi Fodder	0	0	0	0%
Kharif Fodder	0	0	0	0%
Total	1108	1328	220	20%

ANNEXURE G: ZONE-WISE IMPACT OF WATER TANKS ON CROP AREA AND CROPPING PATTERN

Table: Impact of Water Tanks on Crop Area and Cropping Pattern in Punjab

Crop	Before		After		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	487	51.6%	548	50.0%	60	12.4%
Rice	262	27.8%	299	27.3%	37	14.0%
Cotton	39	4.1%	43	3.9%	4	10.3%
Maize	94	9.9%	104	9.5%	11	11.4%
Sugarcane	22	2.4%	38	3.5%	15	68.7%
Pulses	0	0.0%	0	0.0%	0	0.0%
Onions	0	0.0%	0	0.0%	0	0.0%
Tomato	0	0.0%	0	0.0%	0	0.0%
Other Vegetables	0	0.0%	0	0.0%	0	0.0%
Apple	0	0.0%	0	0.0%	0	0.0%
Other Fruits	0	0.0%	0	0.0%	0	0.0%
Rabi Fodder	0	0.0%	0	0.0%	0	0.0%
Kharif Fodder	39	4.2%	63	5.7%	23	58.9%
Overall	944	100.0%	1094	100.0%	150	15.9%

Table: Impact of Water Tanks on Crop Area and Cropping Pattern in KP

Crop	Before		After		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	122	21.2%	131	18.3%	9	7.4%
Rice	2	0.3%	2	0.3%	0	7.6%
Cotton	0	0.0%	0	0.0%	0	0.0%
Maize	40	6.9%	42	5.9%	2	6.0%
Sugarcane	0	0.0%	0	0.0%	0	0.0%
Pulses	49	8.6%	74	10.3%	24	49.1%
Onions	120	20.9%	153	21.4%	32	27.0%
Tomato	30	5.3%	37	5.1%	6	20.7%
Other Vegetables	42	7.2%	54	7.6%	12	30.0%
Apple	0	0.0%	0	0.0%	0	0.0%
Other Fruits	149	26.0%	196	27.4%	47	31.2%
Rabi Fodder	11	2.0%	14	2.0%	3	25.1%
Kharif Fodder	9	1.6%	12	1.7%	3	30.4%
Overall	575	100.0%	714	100.0%	139	24.2%

Table: Impact of Water Tanks on Crop Area and Cropping Pattern in Balochistan

Crop	Before		After		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	36	7.0%	41	6.2%	4	11.8%
Rice	44	8.5%	49	7.5%	5	12.0%
Cotton	0	0.0%	0	0.0%	0	0.0%
Maize	0	0.0%	0	0.0%	0	0.0%
Sugarcane	0	0.0%	0	0.0%	0	0.0%
Pulses	0	0.0%	0	0.0%	0	0.0%
Onions	0	0.0%	0	0.0%	0	0.0%
Tomato	26	5.0%	34	5.3%	8	31.8%
Other Vegetables	193	37.3%	283	43.3%	90	46.7%
Apple	207	39.9%	230	35.2%	23	11.3%
Other Fruits	0	0.0%	0	0.0%	0	0.0%
Rabi Fodder	12	2.3%	16	2.5%	5	38.4%
Kharif Fodder	0	0.0%	0	0.0%	0	0.0%
Overall	518	100.0%	654	100.0%	136	26.3%

Table: Impact of Water Tanks on Crop Area and Cropping Pattern in AJK

Crop	Before		After		Impact	
	Crop Acres	Percent	Crop Acres	Percent	Crop Acres	Percent Point
Wheat	99	49.6%	124	47.1%	25	24.8%
Rice	17	8.6%	21	7.9%	4	20.7%
Cotton	0	0.0%	0	0.0%	0	0.0%
Maize	45	22.6%	52	19.7%	7	14.7%
Sugarcane	0	0.0%	0	0.0%	0	0.0%
Pulses	0	0.0%	0	0.0%	0	0.0%
Onions	0	0.0%	0	0.0%	0	0.0%
Tomato	0	0.0%	0	0.0%	0	0.0%
Other Vegetables	0	0.0%	0	0.0%	0	0.0%
Apple	0	0.0%	0	0.0%	0	0.0%
Other Fruits	31	15.6%	55	20.9%	24	75.9%
Rabi Fodder	3	1.7%	5	2.0%	2	52.6%
Kharif Fodder	4	1.8%	6	2.3%	2	65.6%
Overall	199	100.0%	262	100.0%	63	31.4%

ANNEXURE H: ZONE-WISE IMPACT OF WATER TANKS ON CROP YIELDS

Table: Impact of Water Tanks on Crop Yields in Punjab

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	32.00	36.00	4.00	13%
Rice	27.45	30.00	2.55	9%
Cotton	26.50	28.30	1.80	7%
Maize	80.50	88.00	7.50	9%
Sugarcane	740.57	815.00	74.43	10%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	0.00	0.00	0.00	0%
Apple	0.00	0.00	0.00	0%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	0.00	0.00	0.00	0%
Kharif Fodder	338.23	360.00	21.77	6%

Table: Impact of Water Tanks on Crop Yields in KP

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	24.00	30.00	6.00	25%
Rice	24.50	26.00	1.50	6%
Cotton	0.00	0.00	0.00	0%
Maize	20.10	70.00	49.90	248%
Sugarcane	0.00	0.00	0.00	0%
Pulses	6.00	7.00	1.00	17%
Onions	167.00	185.00	18.00	11%
Tomato	73.33	83.00	9.67	13%
Other Vegetables	43.50	56.00	12.50	29%
Apple	0.00	0.00	0.00	0%
Other Fruits	57.50	65.00	7.50	13%
Rabi Fodder	373.33	410.00	36.67	10%
Kharif Fodder	327.50	345.00	17.50	5%

Table: Impact of Water Tanks on Crop Yields in Balochistan

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	25.50	29.00	3.50	14%
Rice	27.00	29.50	2.50	9%
Cotton	0.00	0.00	0.00	0%
Maize	0.00	0.00	0.00	0%
Sugarcane	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	109.00	120.00	11.00	10%
Other Vegetables	192.50	204.00	11.50	6%
Apple	76.57	85.00	8.43	11%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	360.00	375.00	15.00	4%
Kharif Fodder	0.00	0.00	0.00	0%

Table: Impact of Water Tanks on Crop Yields in AJK

Crops	Crop Yields			
	Before WC Improvement	After WC Improvement	Impacts of WC Improvement	
	Maunds (40 Kgs) per Acre			Percent
Wheat	27.00	29.00	2.00	7%
Rice	27.00	29.30	2.30	9%
Cotton	0.00	0.00	0.00	0%
Maize	31.00	35.00	4.00	13%
Sugarcane	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	0.00	0.00	0.00	0%
Apple	0.00	0.00	0.00	0%
Other Fruits	80.00	88.00	8.00	10%
Rabi Fodder	390.00	405.00	15.00	4%
Kharif Fodder	475.00	500.00	25.00	5%

ANNEXURE I: ZONE-WISE IMPACT OF WATER TANKS ON CROP PRODUCTION

Table: Impact of Water Tanks on Crop Production in Punjab

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)		Percent	
Wheat	15586.00	19711.79	4125.79	26%
Rice	7203.34	8971.10	1767.76	25%
Cotton	1024.06	1206.71	182.65	18%
Maize	7546.96	9188.20	1641.24	22%
Sugarcane	16582.76	30784.61	14201.85	86%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	0.00	0.00	0.00	0%
Apple	0.00	0.00	0.00	0%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	0.00	0.00	0.00	0%
Kharif Fodder	13324.26	22541.03	9216.76	69%

Table: Impact of Water Tanks on Crop Production in KP

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)		Percent	
Wheat	2921.23	3920.56	999.33	34%
Rice	48.50	55.40	6.90	14%
Cotton	0.00	0.00	0.00	0%
Maize	797.20	2943.84	2146.64	269%
Sugarcane	0.00	0.00	0.00	0%
Pulses	296.69	516.25	219.56	74%
Onions	20071.52	28238.98	8167.46	41%
Tomato	2223.58	3037.48	813.91	37%
Other Vegetables	1805.29	3020.86	1215.56	67%
Apple	0.00	0.00	0.00	0%
Other Fruits	8582.47	12728.90	4146.43	48%
Rabi Fodder	4278.17	5875.91	1597.74	37%
Kharif Fodder	3088.97	4241.90	1152.93	37%

Table: Impact of Water Tanks on Crop Production in Balochistan

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)		Percent	
Wheat	926.22	1177.91	251.69	27%
Rice	1184.48	1449.36	264.88	22%
Cotton	0.00	0.00	0.00	0%
Maize	0.00	0.00	0.00	0%
Sugarcane	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	2849.92	4135.99	1286.07	45%
Other Vegetables	37170.89	57799.92	20629.03	55%
Apple	15822.59	19554.54	3731.95	24%
Other Fruits	0.00	0.00	0.00	0%
Rabi Fodder	4218.57	6083.86	1865.29	44%
Kharif Fodder	0.00	0.00	0.00	0%

Table: Impact of Water Tanks on Crop Production in AJK

Crops	Crop Production		Impacts of WC Improvement	
	Before WC Improvement	After WC Improvement		
	Maunds (40 Kgs)		Percent	
Wheat	2672.62	3583.13	910.51	34%
Rice	465.35	609.68	144.33	31%
Cotton	0.00	0.00	0.00	0%
Maize	1394.71	1805.40	410.69	29%
Sugarcane	0.00	0.00	0.00	0%
Pulses	0.00	0.00	0.00	0%
Onions	0.00	0.00	0.00	0%
Tomato	0.00	0.00	0.00	0%
Other Vegetables	0.00	0.00	0.00	0%
Apple	0.00	0.00	0.00	0%
Other Fruits	2496.25	4829.94	2333.69	93%
Rabi Fodder	1341.53	2126.59	785.05	59%
Kharif Fodder	1712.52	2984.31	1271.79	74%

ANNEXURE J: ZONE-WISE IMPACT OF WATER TANK ON AGRICULTURE EMPLOYMENT

Table: Impact of Water Tank on Agriculture Employment in Punjab

Crops	Agricultural Employment		Change	
	Before	After		
	Labor Man Days			Percent
Wheat	12605	14171	1565	12%
Rice	8292	9450	1157	14%
Cotton	2281	2517	236	10%
Maize	4248	4731	483	11%
Sugarcane	1284	2166	882	69%
Pulses	0	0	0	0%
Onions	0	0	0	0%
Tomato	0	0	0	0%
Other Vegetables	0	0	0	0%
Apple	0	0	0	0%
Other Fruits	0	0	0	0%
Rabi Fodder	0	0	0	0%
Kharif Fodder	774	1230	456	59%
Total	29485	34265	4780	16%

Table: Impact of Water Tank on Agriculture Employment in KP

Crops	Agricultural Employment		Change	
	Before	After		
	Labor Man Days		Percent	
Wheat	3150	3382	232	7%
Rice	63	67	5	8%
Cotton	0	0	0	0%
Maize	1797	1906	108	6%
Sugarcane	0	0	0	0%
Pulses	425	634	209	49%
Onions	7781	9882	2101	27%
Tomato	1369	1653	283	21%
Other Vegetables	1687	2193	506	30%
Apple	0	0	0	0%
Other Fruits	8956	11750	2794	31%
Rabi Fodder	339	424	85	25%
Kharif Fodder	185	242	56	30%
Total	25753	32133	6380	25%

Table: Impact of Water Tank on Agriculture Employment in Balochistan

Crops	Agricultural Employment		Change	
	Before	After		
	Labor Man Days		Percent	
Wheat	940	1051	111	12%
Rice	1386	1553	166	12%
Cotton	0	0	0	0%
Maize	0	0	0	0%
Sugarcane	0	0	0	0%
Pulses	0	0	0	0%
Onions	0	0	0	0%
Tomato	1181	1557	376	32%
Other Vegetables	7849	11517	3668	47%
Apple	13479	15006	1527	11%
Other Fruits	0	0	0	0%
Rabi Fodder	347	480	133	38%
Kharif Fodder	0	0	0	0%
Total	25182	31164	5982	24%

Table: Impact of Water Tank on Agriculture Employment in AJK

Crops	Agricultural Employment		Change	
	Before	After		
	Labor Man Days		Percent	
Wheat	2562	3198	636	25%
Rice	545	658	113	21%
Cotton	0	0	0	0%
Maize	2039	2337	299	15%
Sugarcane	0	0	0	0%
Pulses	0	0	0	0%
Onions	0	0	0	0%
Tomato	0	0	0	0%
Other Vegetables	0	0	0	0%
Apple	0	0	0	0%
Other Fruits	1872	3293	1421	76%
Rabi Fodder	102	155	54	53%
Kharif Fodder	71	117	46	66%
Total	7190	9758	2569	36%

ANNEXURE K: WUA MONITORING AND WATERCOURSE IMPACT SURVEY TOOL

MT-01: BRIEF PROFILE – WC

DB Code	Q. #	Field Name
IDENTIFICATION		
BP.1.0	1.0	Select Zone/ Unit
BP.1.1	1.1	Select Division
BP.1.2	1.2	Select District
BP.1.3	1.3	Select Tehsil
BP.1.4	1.4	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
BP.1.5	1.5	Union council?
BP.1.6	1.6	Village?
BP.1.7	1.7	Name of WUA Chairman?
BP.1.8	1.8	Contact no. of the WUA Chairman?
BP.1.9	1.9	National Assembly Constituency?
BP.1.10	1.10	Provincial Assembly Constituency?
BP.2.0	2.0	Select date of survey
BP.2.1	2.1	Watercourse name/number?
BP.2.2	2.2	Select improvement status of watercourse
	1	Technical sanction (TS) issued
	2	Intermediate Completion Report-1 (ICR-I) issued
	3	Intermediate Completion Report-2 (ICR-II) issued
	4	Final completion report (FCR) issued
Fill Date as per the selection of status of watercourse improvement		
BP.2.2.1	2.2.1	Issuance date of TS
BP.2.2.2	2.2.2	Issuance date of first Intermediate Completion Report (ICR-I)
BP.2.2.3	2.2.3	Issuance date of second Intermediate Completion Report (ICR-I)
BP.2.2.4	2.2.4	Issuance date of Final Completion Report (FCR)
BP.2.2.5	2.2.5	Completion date of Watercourse
BP.3.0	3.0	Select improvement type of Watercourse
	1	Regular (New)
	2	20 years old (Rehabilitation)
	3	Additional lining
BP.3.1	3.1	Select type of lining
	1	Rectangular/Bricks
	2	Pre Cast Parabolic Segment (PCPS)
	3	PVC pipe
	4	RCC pipe
	5	PCC
	6	HDPE
	7	Stone masonry
	8	Mix types
If selected "Mix types" in Q.# 3.1 then continue with Q.# 3.1.1		Otherwise go to Q.# 3.2
BP.3.1.1	3.1.1	Select the multiple options to define the mix types
If selected "PVC pipe" in Q.# 3.1 or Q.# 3.1.1 then continue with Q.# 3.1.2		Otherwise go to Q.# 3.2
BP.3.1.2	3.1.2	PVC pipe dia?
BP.3.2	3.2	Total length of watercourse? (Meters)

If selected "20 years old or Additional lining" in Q.# 3.0 then continue with Q.# 3.2.0.1		Otherwise go to Q.# 3.2.1
BP.3.2.0.1	3.2.0.1	Name of previous improvement scheme?
BP.3.2.0.2	3.2.0.2	Name of another previous improvement scheme? (If Improved in more than one scheme)
BP.3.2.0.3	3.2.0.3	Total lined length improved previously?
BP.3.2.1	3.2.1	Sanctioned lining length? (Meters)
BP.3.2.2	3.2.2	Executed/Improved lining length? (Meters) (In case of FCR issued)
BP.4.0	4.0	Irrigation source type?
	1	Canal area
	2	Non-canal area
If selected 'Canal area' in Q.# 4.0 then continue with Q.# 4.0.1		Otherwise go to Q# 4.0.7
BP.4.0.1	4.0.1	Canal?
BP.4.0.2	4.0.2	Branch?
BP.4.0.3	4.0.3	Distributary?
BP.4.0.4	4.0.4	Minor?
BP.4.0.5	4.0.5	Select type of canal
	1	Perennial canal
	2	Non-perennial canal
BP.4.0.6	4.0.6	Select location of watercourse on the minor/canal
	1	Head
	2	Middle
	3	Tail
If selected 'Non-canal area' in Q.# 4.0 then continue with Q.# 4.0.7		Otherwise go to Q# 4.1
BP.4.0.7	4.0.7	Select non-canal source?
	1	Tube well
	2	Nallah
	3	Stream
	4	Spring
	5	River
	6	Lift pump
	7	WST
	8	Mini dam
	9	Other source?
BP.4.0.7	4.0.7Y	Other non-canal source name?
BP.4.1	4.1	Designed discharge? (LPS)
BP.4.1.1	4.1.1	Additional discharge?
	1	Yes
	0	No
If selected "Yes" in Q# 4.1.1 then continue with Q.# 4.1.2		Otherwise go to Q.# 4.2
BP.4.1.2	4.1.2	Select source of additional discharge
	1	Tube well
	2	WST
	3	Lift pump
	4	Other source of additional discharge?
BP.4.1.2Y	4.1.2Y	Other source name of additional discharge?
BP.4.2	4.2	Select quality of ground water
	1	Sweet
	2	Brackish
BP.4.3	4.3	Total gross command area (GCA)? (Acres)
BP.4.3.1	4.3.1	Total culturable command area (CCA)? (Acres)

BP.4.4	4.4	Total water user's? (No) (Total no. of farmers (owners/tenants))
BP.5.0	5.0	Authentication by supervisor
BP.5.1	5.1	Financial year?
BP.5.2	5.2	Select form submission status
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
BP.5.3	5.3	Comments of enumerator (if any) (optional)

MT-02: Owners / Tenants List – WC

DB Code	Q. #	Field Name
IDENTIFICATION		
ID.1.0	1.0	Select Zone/Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select date of survey
ID.1.4	1.4	Select Watercourse ID
OWNERS LIST		
SH.2.0	2.0	Name of owner?
SH.2.0.1	2.1	Gender?
	1	Male
	2	Female
SH.2.0.2	2.0.2	Father's name?
SH.2.1	2.1	Area owned? (Acres)
SH.2.1.1	2.1.1	Area rented in? (Acres)
SH.2.1.2	2.1.2	Area rented out? (Acres)
SH.2.2C	2.2C	Total area operated? (Acres)
SH.2.3	2.3	Select position in Water User Association
	1	Chairman
	2	Vice Chairman
	3	Treasurer
	4	Secretary
	5	Member
	6	Not Member
SH.2.4	2.4	Select location at watercourse
	1	Head
	2	Middle
	3	Tail
TENANTS LIST		
BL.3.0	3.0	Name of share-croppers / harries / tenant / etc.?
BL.3.0.1	3.0.1	Gender?
	1	Male
	2	Female
BL.3.0.2	3.0.2	Father's name?
BL.3.1	3.1	Total area operated? (Acres)
BL.3.2	3.2	Select location at watercourse
	1	Head
	2	Middle
	3	Tail
BL.4.0	4.0	Authentication by supervisor
BL.4.1	4.1	Select form submission status
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
BL.4.2	4.2	Comments of enumerator (if any) (optional)

MT-03: BENEFICIARIES FEEDBACK - WC

DB Code	Q. #	Field Name
IDENTIFICATION		
ID.1.0	1.0	Select Zone/ Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select survey date
ID.1.4	1.4	Select Watercourse ID
ID.1.5	1.5	Select improvement status of watercourse
	1	Technical sanction (TS) issued
	2	Intermediate Completion Report-1 (ICR-I) issued
	3	Intermediate Completion Report-2 (ICR-II) issued
	4	Final completion report (FCR) issued
If Selected "Technical Sanction Issued" in Q.# 1.5 then continue with Q.# 1.6 & Covered till Q.# 5.6		
Coordinates & Picture		
ID.1.6	1.6	Collect the coordinates at the Mogha point? (Turn off wireless or mobile data for precise coordinates)
ID.1.6.1	1.6.1	Take picture at start of Mogha point? (Facing toward watercourse)
ID.1.6.2	1.6.2	Take picture of Signboard? (In case of FCR Issued)
FARMER'S FEEDBACK		
BF.2.0	2.0	Number of Beneficiaries to be interviewed?
BF.3.0	3.0	Name of farmer?
BF.3.0.1	3.0.1	Select location at watercourse
	1	Head
	2	Middle
	3	Tail
BF.3.0.2	3.0.2	Select tenurial status
	1	Owner
	2	Owner cum tenant
	3	Tenant
WATER USER'S ASSOCIATION		
WUA.3.1	3.1	Do you know about the Water Users Association?
	1	Yes
	0	No
	2	No Response
If Selected "Yes" in Q.# 3.1 then continue with Q.# 3.2		otherwise go to Q.# 3.17
WUA.3.2	3.2	Did OFWM staff organize awareness meetings before formation of Water User's Association?
	1	Yes
	0	No
WUA.3.3	3.3	Did all the water users participate in these meetings?
	1	Yes
	0	No
WUA.3.4	3.4	Did the formation of the Water Users Association formed democratically?
	1	Yes
	0	No
If Selected "No" in Q.# 3.4 then continue with Q.# 3.4.1		otherwise go to Q.# 3.5

WUA.3.4.1	3.4.1	Select reasons of non-democratic formation of Water Users Association?
	1	Political influence
	2	Big landlord
	3	Favoritism
WUA.3.4.1Y	3.4.1Y	Define other reason of non-democratic formation of Water Users Association?
	3.5	Did OFWM provide any literature/awareness/capacity building method for the Water Users Association functions/ Role?
	1	Yes
	0	No
WUA.3.6	3.6	Are you a member of the Water Users Association?
	1	Yes
	0	No
	3.6.1	Is Water Users Association functional/operational?
WUA.3.6.1	1	Yes
	0	No
	If Selected "No" in Q.# 3.6.1 then continue with Q.# 3.6.2	
	otherwise go to Q.# 3.7	
WUA.3.6.2	3.6.2	Non-functional reason?
	1	Farm lands are located much apart
	2	Farmers Internal/social conflicts makes it difficult
	3	Any other? Please specify
WUA.3.6.2Y	3.6.2Y	Define other non-functional reason?
WUA.3.7	3.7	Who motivated you to be a member?
	1	Fellow farmers
	2	Big landlord
	3	OFWM field team
WUA.3.7Y	3.7Y	Define other who motivated you to become a member of WUA?
	3.8	Did you pay any membership fee to become a member of the Water Users Association?
	1	Yes
	0	No
WUA.3.8	2	No response
	3.9	Do all the Water Users Association members are water user?
	1	Yes
	0	No
WUA.3.9	3.10	Do Water Users Association hold regular meetings of the association?
	1	Yes
	0	No
	2	To some extent
WUA.3.10	3.11	Do you participate in the Water Users Association meetings?
	1	Always
	2	Occasionally
	3	Never
WUA.3.11	3.12	What is the frequency of Water Users Association meetings?
	1	Every Month
	2	Quarterly
	3	Once a Year
WUA.3.12	4	As per Need Arises
	3.13	Do the majority of the members participate in the meetings?
	1	Yes
	WUA.3.13	

	0	No
	2	To Some Extent
WUA.3.14	3.14	Do decisions make democratically?
	1	Yes
	0	No
	2	To Some Extent
WUA.3.15	3.15	Are you aware of the functions and responsibilities of the Water Users Association?
	1	Provide right of way for construction of WC (Land Acquisition)
	2	Distribution of Naccas
	3	Resolve disputes
	4	Funding for accounts
	5	Alternate arrangement for conveyance of water during execution
	6	Procure construction material
	7	Organized skilled & Un-skilled labor
	8	Participate in Allocation & Distribution (Warabandi)
	9	Develop drainage facilities
WUA.3.16	3.16	Do you think the Water Users Association helps in solving your farming problems?
	1	Always
	2	To some extent
	3	Never
WUA.3.17	3.17	Did you face any disputes during Watercourse construction?
	1	Yes
	0	No
If Selected "Yes" selected in Q.# 3.17 then continue with Q.# 3.17.1		otherwise go to Q.# 3.17.2
WUA.3.17.1	3.17.1	Select Reason for disputes?
	1	Provide right of way for construction of WC (Land Acquisition)
	2	Distribution of naccas
	3	Funding for accounts
	4	Water theft
	5	Any other? Please specify
WUA.3.17.1 Y	3.17.1Y	Define other reason of disputes?
If Selected "Yes" selected in Q.# 3.6 then continue with Q.# 3.17.2		otherwise go to Q.# 3.17.3
WUA.3.17.2	3.17.2	How many disputes were resolved by the Water Users Association till to date?
WUA.3.17.3	3.17.3	Select How your disputes were resolved?
	1	WUA
	2	OFWM
	3	Irrigation department
	4	Revenue department
	5	Any other? Please specify
WUA.3.17.3 Y	3.17.3Y	Dispute resolved by other?
WUA.3.18	3.18	Enumerator's observations about WUA (if any)
WATER LOGGING & SALINITY		
WLS.4.0	4.0	How much land is affected by waterlogging & salinity?
If Entered "Greater than Zero" in Q.# 4.0 then continue with Q.# 4.0.1		Otherwise go to Q.# 5.0

WLS.4.0.1	4.0.1	Reason for Waterlogging?
	1	Seepage of water
	2	Excessive irrigation
	3	Poor surface runoff and slow drainage
	4	Rainfall
	5	Floods
WLS.4.0.1Y	Q.4.0.1Y	Define other reason of waterlogging?
WLS.4.1	4.1	What is the depth of water table in your area? (Feet)
WLS.4.2	4.2	Do you have an appropriate drainage facility to remove excessive water from your land?
	1	Yes
	0	No
WLS.4.3	4.3	Did you carry out any efforts to reduce/overcome this waterlogging?
	1	Yes
	0	No
If Selected "Yes" in Q.# 3.3 then continue with Q.# 3.3.1		Otherwise go to Q.# 3.4.1
WLS.4.3.1	4.3.1	Which method have you used to overcome waterlogging?
	1	Surface drains
	2	Pumping of ground water via tube well
	3	Any other? Please specify
WLS.4.3.1Y	4.3.1Y	Define other method you have used to overcome waterlogging?
WLS.4.4.1	4.4.1	Which method have you used to overcome salinity?
	1	Leaching
	2	Growing suitable crops
	3	Use of chemicals/gypsum
	3	Any other? Please specify
WLS.4.4.1Y	4.4.1Y	Define other method you have used to overcome salinity?
If Selected "Technical Sanction Issued" selected in Q.# 1.5 then continue with Q.# 5.0		Otherwise go to Q.# 5.1
BF.5.0	5.0	Do you Know that your watercourse is going to be newly lined/ additionally lined/reconstructed?
	1	Yes
	0	No
	2	Don't know
If Selected "Yes" in Q.# 5.0 then continue with Q.# 5.0.1		Otherwise go to Q.# 5.1
BF.5.0.1	5.0.1	What benefits can you expect from this lining?
	1	Increase water
	2	Increase cultivated area
	3	Reduce water losses
	4	Increase crop yield
	5	Any other? Please specify
BF.5.0.1Y	5.0.1Y	Define other benefits you can expect from this lining?
BF.5.0.2	5.0.2	Will there be land required for the improvement / alignment of the watercourse?
	1	Yes
	0	No
BF.5.0.3	5.0.3	Will the local labor be hired for works on this watercourse?
	1	Yes
	0	No
PART A: BEFORE CONSTRUCTION		

PART-A: ENVIRONMENT		
EBF.5.1	5.1	Are the clothes washed on this watercourse?
	1	Yes
	0	No
If Selected "Yes" in Q.# 5.1 then continue with Q.# 5.1.1		Otherwise go to Q.# 5.2
EBF.5.1.1	5.1.1	How many places for washing clothes? (user at head, middle, tail)
EBF.5.2	5.2	Are washing bays required on this watercourse?
	1	Yes
	0	No
EBF.5.3	5.3	Will any trees be cut down on this watercourse?
	1	Yes
	0	No
If Selected "Yes" in Q.# 5.3 then continue with Q.# 5.3.1		Otherwise go to Q.# 5.4
EBF.5.3.1	5.3.1	Number of trees to be cut down?
EBF.5.4	5.4	Will temporary diversion channel(s) be needed?
	1	Yes
	0	No
EBF.5.5	5.5	How the solid waste material will be disposed of?
	1	Used in filling small depressions
	2	Used for dressing inspection path / non inspection path
	3	Left unattended
	4	Any other? Please specify
EBF.5.5Y	5.5Y	Define other solid waste material disposed of method?
EBF.5.6	5.6	Will there be disruption to local routes?
	1	Yes
	0	No
If Selected "ICR-1 or ICR-2 Issued" in Q.# 1.5 then Skip "Part-A" and continue with Q.# 6 .0		
PART-B: DURING CONSTRUCTION		
BF.6.0	6.0	Was local labor hired for improvement works of the watercourse?
	1	Yes
	0	No
PART-B: ENVIRONMENT		
EBF.6.1	6.1	Are washing bays under construction?
	1	Farmer/ community expense
	2	Govt. expense
	0	No
EBF.6.2	6.2	Were any trees cut down during watercourse improvement work?
	1	Yes
	0	No
If Selected "Yes" in Q.# 6.2 then continue with Q.# 6.2.1		Otherwise go to Q.# 6.3
EBF.6.2.1	6.2.1	Number of trees cut down?
If Entered "Greater than Zero" in Q.# 6.2.1 then continue with Q.# 6.2.2		Otherwise go to Q.# 6.3
EBF.6.2.2	6.2.2	How many saplings have been planned to be planted against each tree cut down?
If Entered "Greater than Zero" in Q.# 6.2.2 then continue with Q.# 6.2.3		Otherwise go to Q.# 6.3
EBF.6.2.3	6.2.3	Are the arrangements made for the protection of newly planted saplings?
	1	Yes
	0	No
EBF.6.3	6.3	Were temporary diversion channel(s), if any, made?
	1	Yes

	0	No
EBF.6.4	6.4	How the solid waste material was disposed of?
	1	Used in filling small depressions
	2	Used for dressing inspection path / non inspection path
	3	Left unattended
	4	Any other? Please specify
EBF.6.4Y	6.4Y	Define other solid waste material disposed of method?
EBF.6.5	6.5	Was the disruption of local routes occurring?
	1	Yes
	0	No
If Selected "Yes" in Q.# 6.5 then continue with Q.# 6.5.1		Otherwise go to Q.# 7.0
EBF.6.5.1	6.5.1	Were measures taken to restore the local routes properly?
	1	Yes
	0	No
If Selected "FCR Issued" in Q.# 1.5 then Skip "Part-A & Part-B" and continue with Q.# 7.0		
PART-C: AFTER CONSTRUCTION		
BF.7.0	7.0	Do you know that your watercourse is newly lined/ additionally lined/reconstructed?
	1	Yes
	0	No
	2	No response
BF.7.0.1	7.0.1	What benefits have you observed from this lining?
	1	Increased water
	2	Increased income
	3	Reduced water losses
	4	Increased crop yield
	5	Any other? Please specify
BF.7.0.1Y	7.0.1Y	Define other benefits you have observed from this lining?
BF.7.0.2	7.0.2	Do you know that before the lining work was started, the watercourse was earthen, improved/renovated?
	1	Yes
	0	No
	2	Don't know
If Selected "Yes" in Q.# 7.0.2 then continue with Q.# 7.0.3		Otherwise go to Q.# 7.1
BF.7.0.3	7.0.3	How much in your view watercourse length was earthen improved / renovated?
	1	Entire length
	2	Only lining part
	3	Do not know
BF.7.1	7.1	Did you ever visit watercourse site as it was being improved?
	1	Yes
	0	No
	2	No response
If Selected "No" in Q.# 7.1 then continue with Q.# 7.1.1		Otherwise go to Q.# 7.1.2
BF.7.1.1	7.1.1	Have you heard about the quality of work?
	1	Yes
	0	No
	2	Do not know
BF.7.1.2	7.1.2	Do you think work quality was?
	1	Good
	2	Average
	3	Not good

	4	Don't know
If Selected "Not good" in Q.# 7.1.2 then continue with Q.# 7.1.3		Otherwise Go to Q.# 7.2
BF.7.1.3	7.1.3	If work quality is not good, then of which?
	1	Bricks
	2	RCC/PVC pipe
	3	Cement
	4	Slab
	5	Control structure/nacca
	6	Workmanship
	7	Any other? Please specify
BF.7.1.3Y	7.1.3Y	Define other reason for bad work quality?
BF.7.2	7.2	Do you think that irrigation water availability has increased after the watercourse improvement at your farm?
	1	Yes
	0	No
	2	Don't know
If Selected "Yes" in Q.# 7.2 then continue with Q.# 7.2.1		Otherwise go to Q.# 7.3
BF.7.2.1	7.2.1	How much? (Please guess keeping in view difference in acreage irrigated before and after WC improvement)
	1	Less than 5%
	2	5%
	3	10%
	4	20%
	5	Define other %
BF.7.2.1Y	7.2.1Y	If irrigation water increased more than 20% then specify? (Percentage)
PART C: ENVIRONMENT		
EBF.7.3	7.3	Were the washing bays constructed/completed?
	1	Yes
	0	No
If Selected "Yes" in Q.# 7.3 then continue with Q.# 7.3.1		Otherwise go to Q.# 7.4
EBF.7.3.1	7.3.1	How many washing bays constructed/completed? (user at head, middle, tail)
EBF.7.4	7.4	How many trees were cut down?
If Entered "Greater than Zero" in Q.# 7.4 then continue with Q.# 7.4.1		Otherwise go to Q.# 7.5
EBF.7.4.1	7.4.1	How many saplings were planted against each tree cut down?
If Entered "Greater than Zero" in Q.# 7.4.1 then continue with Q.# 7.4.2		Otherwise go to Q.# 7.5
EBF.7.4.2	7.4.2	Number of survived trees?
EBF.7.4.3	7.4.3	Were the arrangements made for the protection of newly planted saplings?
EBF.7.5	7.5	Were temporary diversion channel(s), if any, restored?
	1	Yes
	0	No
EBF.7.6	7.6	How was the solid waste material disposed of?
	1	Used in filling small depressions
	2	Used for dressing inspection path / non inspection path
	3	Left unattended
	4	Any other? Please specify
EBF.7.6.1Y	7.6.1Y	Define other solid waste material disposed of method?
EBF.7.7	7.7	Was the disruption of local routes occurring?
	1	Yes
	0	No
If "Yes" in Q.# 7.7 then continue with Q.# 7.7.1		Otherwise go to Q.# 8.0

EBF.7.7.1	7.7.1	Were measures taken to restore the local routes properly?
	1	Yes
	0	No
BF.8.0	8.0	Authentication by supervisor
BF.8.1	8.1	Select form submission status
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
BF.8.2	8.2	Comments of enumerator (if any) (optional)

MT-04: FARMING HOUSEHOLD – WC

DB Code	Q. #	Field Name
IDENTIFICATION		
ID.1.0	1.0	Select Zone/ Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select survey date
ID.1.4	1.4	Select Watercourse ID
BENEFICIARY PROFILE		
FH.2.0	2.0	Name of Farmer?
FH.2.0.1	2.0.1	Select gender?
	1	Male
FH.2.0.2	2.0.2	Father's name?
	2	Female
FH.2.0.3	2.0.3	Select location of farm on watercourse?
	1	Head
	2	Middle
FH.2.0.3	3	Tail
FARM SIZE AND TEANURIAL STATUS		
FA.3.0	3.0	Area owned? (Acres)
FA.3.0.1	3.0.1	Area rented in? (Acres)
FA.3.0.2	3.0.2	Area rented out? (Acres)
FA.3.0.3	3.0.3	Fallow land? (Acres)
FA.3.1C	3.1C	Total land holding? (Acres)
FA.3.2	3.2	Area not cultivatable? (Acres)
FA.3.3C	3.3C	Total farm area? (Acres)
FH.4.0	4.0	Select tenurial status?
	1	Owner
	2	Owner cum tenant
FH.4.0	3	Tenant
SOURCE OF IRRIGATION WATER		
IS.4.1	4.1	Select main source? (Multiple Choice)
	1	Canal
	2	Tube Well
IS.4.1Y	4.1Y	Any other? Please specify
	4.1Y	Define other source of irrigation?
	4.1Y	
If Selected "Tube well" in Q.# 4.1 then continue with Q.# 4.1.1		
IS.4.1.1	4.1.1	Select status of tube well water used?
	1	Owned
	2	Purchased
If Selected "Purchased" in Q.# 4.1.1 then continue with Q.#.4.1.2		
IS.4.1.2	4.1.2	Share of tube well water in irrigation? (%)
	4.1.2	
	4.1.2	
LIVESTOCK		
LS.5.0	5.0	Do you own live stock?
	1	Yes
	0	No
If Selected "Yes" in Q.# 5.0 then continue with Q.# 5.1		
Otherwise go to Q.# 6.0		

146

LS.5.1	5.1	Select type of live stock you owned?
	1	Buffalo
	2	Cow/Bull
	3	Camel
	4	Goats
	5	Sheep
	6	Poultry
	7	Ducks
Herd Size		
LS.5.1.1	5.1.1	No. of buffalo
LS.5.1.2	5.1.2	No. of cow/bull
LS.5.1.3	5.1.3	No. of camel
LS.5.1.4	5.1.4	No. of goats
LS.5.1.5	5.1.5	No. of sheep
LS.5.1.6	5.1.6	No. of poultry
LS.5.1.7	5.1.7	No. of ducks
FAMILY AND PERMANENT HIRED LABOR		
FM.6.0	6.0	How many members are living in the household?
FM.6.1	6.1	No. of adult? (Male)
FM.6.2	6.2	No. of adult? (Female)
FM.6.3	6.3	No. of children? (Boys)
FM.6.4	6.4	No. of children? (Girls)
Food Consumption Pattern		
FH.7.0	7.0	Select food cooking/consumption patterns
	1	Wheat/Wheat flour
	2	Rice
	3	Maize/Maize flour
	4	Sorghum/Millet flour
	5	Pulses
	6	Vegetables
	7	Chicken
	8	Beef
	9	Mutton
	10	Fish
	11	Egg
	12	Milk
	13	Fruit
	14	Sugar
15	Oil	

MT-04: FARMING HOUSEHOLD (Crops) - WC

DB Code	Q. #	Field Name
FH.8.0	8.0	Select all Grown Crops
	1	Wheat
	2	Rice
	3	Cotton
	4	Barley
	5	Berseem/Lucern
	6	Sugarcane (Ratoon)
	7	Sugarcane (New)
	8	Sunflower
	9	Sorghum
	10	Rapeseed, Mustard, Canola
	11	Maize
	12	Mango orchard (old)
	13	Mango orchard (new)
	14	Oats or Javi or Jontari
	15	Pulses (gram)
	16	Pulses (lentil)
	17	Dates orchard (old)
	18	Dates orchard (new)
	19	Banana orchard (old)
	20	Banana orchard (new)
	21	Lemon orchard (old)
	22	Lemon orchard (new)
	23	Apple orchard (old)
	24	Apple orchard (new)
	25	Tomato
	26	Chilli
	27	Okra
	28	Onion
	29	Tobacco
	30	Rabi fodder
	31	Kharif fodder
FH.8.0.1	8.0.1	Other kharif crop name?
FH.8.0.2	8.0.2	Other Rabi crops name?
FH.8.0.3	8.0.3	Other Orchard name?
FH.8.0.4	8.0.4	Other Vegetable name?
FH.8.1	8.1	Crop Acreage? (Acre)
Land Preparation		
LP.9.0	9.0	Land preparation area? (Acre)
Ploughing		
LP.9.1	9.1	Ploughing - Avg. No. of operation/Acre
LP.9.2	9.2	Ploughing - Avg. cost per operation/Acre? (Rs./Acre)
LP.9.3	9.3	Ploughing - Avg. Labor per Acre? (Man Days)
Planking		
LP.10.0	10.0	Planking - Avg. No. of operation/Acre
LP.10.1	10.1	Planking - Avg. cost per operation/Acre? (Rs./Acre)
LP.10.2	10.2	Planking - Avg. Labor per Acre? (Man Days)
Seed		
LP.11.0	11.0	Seed Used? (Kg/Acre)
LP.11.1	11.1	Seed Rate? (Rs./Kg)

LP.11.2	11.2	Seed - Avg. Labor per Acre? (Man Days)
Seedling		
LP.12.0	12.0	Nursery/Seedling Used - Avg. cost per operation/Acre? (Rs./Acre)
LP.12.1	12.1	Nursery/Seedling Used - Avg. Labor per Acre? (Man Days)
Uprooting & Transplanting		
LP.13.0	13.0	Uprooting, Transporting & Transplanting - Avg. cost per operation/Acre? (Rs./Acre)
LP.13.1	13.1	Uprooting, Transporting & Transplanting - Avg. Labor per Acre? (Man Days)
Manual Weeding		
WS.14.0	14.0	Manual Weeding - Avg. No. of operation/Acre
WS.14.1	14.1	Manual Weeding - Avg. cost per operation/Acre? (Rs./Acre)
WS.14.2	14.2	Manual Weeding - Avg. Labor per Acre? (Man Days)
Weedicides/Pesticides		
WS.15.0	15.0	Weedicides/Pesticides - Avg. No. of operation/Acre
WS.15.1	15.1	Weedicides/Pesticides - Avg. cost per operation/Acre? (Rs./Acre)
WS.15.2	15.2	Weedicides/Pesticides - Avg. Labor per Acre? (Man Days)
Farm Yard Manure (FYM)		
FY.16.0	16.0	Farm yard manure (FYM) - Avg. No. of Tractor-Trollies/Acre
FY.16.1	16.1	Farm yard manure (FYM) including transport & Application - Avg. cost per Tractor-Trollies/Acre? (Rs./Acre)
FY.16.2	16.2	Farm yard manure (FYM) including transport & Application - Avg. Labor per Acre? (Man Days)
Fertilizer		
FI.17.0	17.0	Urea (Bag)
		Urea Rate? (Rs./Bag)
FI.17.0.1	17.0.1	Urea - Avg. Labor per acre? (Man Days)
FI.17.1	17.1	DAP (Bag)
		DAP Rate? (Rs./Bag)
FI.17.1.1	17.1.1	DAP - Avg. Labor per acre? (Man Days)
FI.17.2	17.2	Potash (Bag)
		Potash Rate? (Rs./Bag)
FI.17.2.1	17.2.1	Potash - Avg. Labor per acre? (Man Days)
FI.17.3	17.3	SSP (Bag)
		SSP Rate? (Rs./Bag)
FI.17.3.1	17.3.1	SSP - Avg. Labor per acre? (Man Days)
FI.17.4	17.4	NP (Bag)
		NP Rate? (Rs./Bag)
FI.17.4.1	17.4.1	NP - Avg. Labor per acre? (Man Days)
FI.17.5.0	17.5.0	Have you applied any other Fertilizer?
	1	Yes
	0	No
FI.17.5.1	17.5.1	Other fertilizer name-1?
FI.17.5.2	17.5.2	Other fertilizer-1? (Bag)
		Other fertilizer-1 Rate? (Rs./Bag)
FI.17.5.3	17.5.3	Other fertilizer-1 - Avg. Labor per acre? (Man Days)
FI.17.6.1	17.6.1	Other fertilizer name-2?
FI.17.6.2	17.6.2	Other fertilizer-2? (Bag)
		Other fertilizer-2 Rate? (Rs./Bag)
FI.17.6.3	17.6.3	Other fertilizer-2 - Avg. Labor per acre? (Man Days)
Irrigation		
CI.18.0	18.0	Canal
CI.18.1	18.1	Tube well

CI.18.2	18.2	Labor used for irrigation? (Man Days)
Harvesting		
HT.19.0	19.0	Harvesting, Picking, Threshing and Winnowing (Rs./Acre)
Land Rent & Taxes		
LR.20.0	20.0	Land rent for 6 months (Rs./Acre)
LR.20.1	20.1	Average land Tax (All type of Taxes) for 6 Months (Rs./Acre)
Crop Yield & Price		
CY.21.0	21.0	Have you sold crop in standing condition?
	1	Yes
	0	No
CY.21.1	21.1	Yield? (40-Kg/Acre)
CY.21.2	21.2	Yield Price? (Rs./40-Kg)
CY.21.3	21.3	If crop sold in standing condition? (Rs./Acre)
CY.21.4	21.4	By-product price (lumpsum/Acre)

*Female (Man Day = 0.83)

* Children (Man Day = 0.3)

MT-04: FARMING HOUSEHOLD - WC		
DB Code	Q. #	Field Name
BENEFICIARY'S PERCEPTION ABOUT WATER SAVING		
WB.22.0	22.0	Warabandi practice adopted at your watercourse?
	1	Yes
	0	No
<i>If Selected "Yes" in Q.# 22.0 then continue with Q.# 22.0.1</i>		<i>Otherwise go to Q.# 23.0</i>
WB.22.0.1	22.0.1	Kind of Warabandi?
	1	Katcha
	2	Pakka
WB.22.0.2	22.0.2	Do you think that water is equitably distributed?
	1	Yes
	0	No
<i>If Selected "No" in Q.# 22.0.2 then continue with Q.# 22.0.3</i>		<i>Otherwise go to Q.# 22.0.4</i>
WB.22.0.3	22.0.3	Select reasons for un-equitably distribution?
	1	Influential persons/political persons
	2	PID officials
	3	Weak Banks
	4	low demands
	5	Higher planning of mohga
6	Broken mohga	
WB.22.0.4	22.0.4	What is the timing of your water turn?
WB.23.0	23.0	How much of your land was irrigated before lining in one go? (Percentage)
WB.23.1	23.1	Do you have enough water for crops irrigation?
	1	Yes
	0	No
<i>If Selected "No" in Q.# 23.1 then continue with Q.# 24.0</i>		<i>Otherwise go to Q.# 30.0</i>
MT.24.0	24.0	Did you miss your water turn(s) during the last season?
	1	Yes
	0	No
<i>If Selected "Yes" in Q.# 24.0 then continue with Q.# 24.1</i>		<i>Otherwise go to Q.# 25.0</i>
MT.24.1	24.1	How much in the kharif season?
MT.24.2	24.2	How much in the rabi season?
ET.25.0	25.0	Did you exchange irrigation turns during last season?
	1	Yes
	0	No
<i>If Selected "Yes" in Q.# 25.0 then continue with Q.# 25.1</i>		<i>Otherwise go to Q.# 26.0</i>
ET.25.1	25.1	How much in the kharif season?
ET.25.2	25.2	How much in the rabi season?
PT.26.0	26.0	Did you purchase water during last season?
	1	Yes
	0	No
<i>If Selected "Yes" in Q.# 26.0 then continue with Q.# 26.1</i>		<i>Otherwise go to Q.# 27.0</i>
PT.26.1	26.1	How much in the kharif season?
PT.26.2	26.2	How much in the rabi season?
ST.27.0	27.0	Did you sell water during last season?
	1	Yes
	0	No
<i>If Selected "Yes" in Q.# 27.0 then continue with Q.# 27.1</i>		<i>Otherwise go to Q.# 28.0</i>
ST.27.1	27.1	How much in the kharif season?
ST.27.2	27.2	How much in the rabi season?

SW.28.0	28.0	Was water stolen from your turn during last season?
	1	Yes
	0	No
If Selected "Yes" in Q.# 28.0 then continue with Q.# 28.1		Otherwise go to Q.# 29.0
SW.28.1	28.1	How much in the kharif season?
SW.28.2	28.2	How much in the rabi season?
FH.29.0	29.0	Does the watercourse often clog?
	1	Yes
	0	No
If Selected "Yes" in Q.# 29.0 then continue with Q.# 29.1		Otherwise go to Q.# 30.0
FH.29.1	29.1	Select reason of clogging?
	1	Animal wallowing
	2	Mud fall
	3	Any other? Please specify
FH.30.0	30.0	Authentication by supervisor?
FH.30.1	30.1	Select form submission status?
FH.30.2	30.2	Comments of enumerator? (if any)

MT-05: INPUT PRICES - WC

DB Code	Q. #	Field Name
1. IDENTIFICATION		
ID.1.0	1.0	Select Zone/ Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select survey date
ID.1.4	1.4	Select watercourse ID
7. Input Prices		
IP.2.0	2.0	Select all relevant input prices?
Seeds		
IP.2.1.1	2.1.1	Seed of Wheat? (Rs./Kg)
IP.2.1.2	2.1.2	Seed of Cotton? (Rs./Kg)
IP.2.1.3	2.1.3	Seed of Barley? (Rs./Kg)
IP.2.1.4	2.1.4	Seed of Berseem/Lucerne? (Rs./Kg)
IP.2.1.5	2.1.5	Seed of Sunflower? (Rs./Kg)
IP.2.1.6	2.1.6	Seed of Sesum? (Rs./Kg)
IP.2.1.7	2.1.7	Sorghum-Fodder? (Rs./Kg)
IP.2.1.8	2.1.8	Seed of Rapeseed, Mustard, Canola? (Rs./Kg)
IP.2.1.9	2.1.9	Seed of Maize? (Rs./Kg)
IP.2.1.10	2.1.10	Seed of Maize-Fodder? (Rs./Kg)
IP.2.1.11	2.1.11	Seed of Oats or Javi or Jontari? (Rs./Kg)
IP.2.1.12	2.1.12	Seed of Pulses (Gram)? (Rs./Kg)
IP.2.1.13	2.1.13	Seed of Pulses (Lentil)? (Rs./Kg)
IP.2.1.14	2.1.14	Seed of Okra? (Rs./Kg)
IP.2.1.15	2.1.15	Seed of Tobacco? (Rs./Kg)
Seedling		
IP.2.2.1	2.2.1	Seedling of Rice? (Rs./Acre)
IP.2.2.2	2.2.2	Seedling of Dates? (Rs./Acre)
IP.2.2.3	2.2.3	Seedling of Banana? (Rs./Acre)
IP.2.2.4	2.2.4	Seedling of Apple? (Rs./Acre)
IP.2.2.5	2.2.5	Sets of Sugarcane? (Rs./Acre)
IP.2.2.6	2.2.6	Seedling of Tomato? (Rs./Acre)
IP.2.2.7	2.2.7	Seedling of Chilli? (Rs./Acre)
IP.2.2.8	2.2.8	Seedling of Onion? (Rs./Acre)
IP.2.2.9	2.2.9	Seedling of Lemon? (Rs./Acre)
Land Preparation Prices		
IP.2.3.1	2.3.1	Tractor Use? (Rs./Acre)
IP.2.3.2	2.3.2	Laser Land Leveling? (Rs./Hour)
IP.2.3.3	2.3.3	Farm Yard Manure? (Rs./Trolly)
Fertilizer Prices		
IP.2.4.1	2.4.1	DAP? (Rs./Bag)
IP.2.4.2	2.4.2	Urea? (Rs./Bag)
IP.2.4.3	2.4.3	Potash? (Rs./Bag)
IP.2.4.4	2.4.4	SSP? (Rs./Bag)
IP.2.4.5	2.4.5	NP? (Rs./Bag)
IP.2.5.1	2.5.1	Tube Well Water? (Rs./Hour)

153

Labor		
IP.2.6.1	2.6.1	Family + PHL - Man Days? (Rs./Month)
IP.2.6.2	2.6.2	CHL - Man Days? (Rs./Day)
IP.3.0	3.0	Authentication by supervisor
IP.3.1	3.1	Select form submission status
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
IP.3.2	3.2	Comments of enumerator? (if any) (optional)

ANNEXURE L: WATER STORAGE TANKS IMPACT SURVEY TOOL

MT-01: IDENTIFICATION - WST

DB.#	Q.#	Field Name
IDENTIFICATION		
BP.1.0	1.0	Zone / Unit?
BP.1.1	1.1	Division?
BP.1.2	1.2	District?
BP.1.3	1.3	Tehsil?
BP.1.4	1.4	M&E field team?
BP.1.5	1.5	Union Council?
BP.1.6	1.6	Village?
BP.2.0	2.0	Name of Farmer?
BP.2.0.1	2.0.1	Gender?
	1	Male
	2	Female
BP.2.0.2	2.0.2	Father's name?
BP.2.0.3	2.0.3	CNIC number?
BP.2.0.4	2.0.4	Cell number?
BP.2.1	2.1	Nation Assembly Constituency?
BP.2.2	2.2	Provincial Assembly Constituency?
BP.3.0	3.0	Select date of survey
BP.3.1	3.1	Sources of Irrigation System?
	1	Perennial Canal
	2	Non-Perennial Canal
	3	Tube Well
	4	Perennial Canal+Tube Well
	5	Non-Perennial Canal+Tube Well
	6	Tail Water Recovery Ditch (TWRD)
	7	Stream
	8	Nallah
	9	Spring
	10	Dug Well
BP.3.2	3.2	Area Operated? (Acres)
BP.3.3	3.3	Land Topography?
	1	Even
	2	Un-even
	3	Slightly Sloped
BP.4.0	4.0	Authentication by supervisor?
BP.4.1	4.1	Financial Year?
BP.4.2	4.2	Select form submission status?
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
BP.4.3	4.3	Comments of enumerator? (if any)

MT-02: BENEFICIARIES FEEDBACK - WST

DB.#	Q.#	Field Name
IDENTIFICATION		
ID.1.0	1.0	Select Zone/ Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select survey date
ID.1.4	1.4	Select Water Storage Tank ID
ID.1.5	1.5	Select improvement status of Water Storage Tank
	1	Technical sanction (TS) issued
	2	Final completion report (FCR) issued
<i>If "Technical Sanction Issued" Selected in Q.# 1.5, then covered till Q.# 2.5.1</i>		
Coordinates & Picture		
ID.1.6	1.6	Collect the coordinates? (Turn off wireless or mobile data for precise coordinates)
ID.1.7	1.7	Take picture of Water Storage Tank?
		Take picture of Signboard? (In case of FCR Issued)
BF.2.0	2.0	Name of farmer?
PART-A: Before Construction		
BF.2.1	2.1	How was your application attended by OFWM staff?
	1	Promptly
	2	Took a lot of time
<i>If Selected "Took a lot of time" in Q.#.2.1, then continue with Q.# 2.1.1</i>		<i>Otherwise go to Q.# 2.2</i>
BF.2.1.1	2.1.1	How much period (days) it has taken?
BF.2.2	2.2	How you assess survey and design process?
	1	Fast track
	2	Lengthy
<i>If Selected "Lengthy" in Q.#.2.2, then continue with Q.# 2.2.1</i>		<i>Otherwise go to Q.# 2.3</i>
BF.2.2.1	2.2.1	How much period (days) it has taken?
BF.2.3	2.3	Behavior of OFWM staff?
	1	Friendly / Supportive
	2	Indifferent
BF.2.4	2.4	How do you feel about the maintenance of WST?
	1	Easy
	2	Difficult
Environment-A: Before Construction		
EBF.2.5	2.5	Will any trees be cut down on this WST?
	1	Yes
	0	No
EBF.2.5.1	2.5.1	How many trees to be cut down?
<i>If Selected "FCR issued" Selected in Q. #1.5, then Skip "Part-A" continue with Q. # 3.0</i>		
PART-B: After Construction		
BF.3.0	3.0	Cropping intensity has increased on your farm after WST construction?
	1	Yes
	0	No

If Selected "Yes" in Q.#.3.0, then continue with Q.# 3.0.1		Otherwise go to Q.# 3.1
BF.3.0.1	3.0.1	How much cropping intensity has been increased on your farm after WST construction? (Percentage)
BF.3.1	3.1	Crops / orchards yield has increased after WST construction?
	1	Yes
	0	No
If Selected "Yes" in Q.#.3.1, then continue with Q.# 3.1.1		Otherwise go to Q.# 3.2
BF.3.1.1	3.1.1	How much crops / orchards yield has increased? (Percentage)
BF.3.2	3.2	Area under cultivation has increased after WST construction?
	1	Yes
	0	No
BF.3.3	3.3	Number of irrigation/acre has increased after WST construction?
	1	Yes
	0	No
BF.3.4	3.4	The improved WST is properly maintained?
	1	Yes
	0	No
Environment-B: After Construction		
EBF.3.5	3.5	Were any trees cut down on this WST?
If Selected "Yes" in Q.# 3.5, then continue with Q.# 3.5.1		Otherwise go to Q.# 4.0
	1	Yes
	0	No
EBF.3.5.1	3.5.1	How many trees were cut down? (Nos.)
EBF.3.5.2	3.5.2	How many saplings were planted against each tree cut down?
If Entered "Greater than Zero" in Q.# 3.5.2, then continue with Q.# 3.5.3		Otherwise go to Q.# 4.0
EBF.3.5.3	3.5.3	Were any arrangements made for the protection of newly planted saplings?
	1	Yes
	0	No
EBF.3.5.4	3.5.4	Number of survived trees?
BH.4.0	4.0	Authentication by supervisor?
BH.4.1	4.1	Select form submission status?
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
BH.4.2	4.2	Comments of enumerator? (if any)

MT-03: FARMING HOUSEHOLD - WST

DB Code	Q. #	Field Name
IDENTIFICATION		
ID.1.0	1.0	Select Zone/ Unit
ID.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
ID.1.2	1.2	Select type of survey
	1	Baseline survey
	2	Impact survey
ID.1.3	1.3	Select survey date
ID.1.4	1.4	Select Water Storage Tank ID
BENEFICIARY PROFILE		
FH.2.0	2.0	Name of Farmer?
FH.2.0.1	2.0.1	Select gender?
	1	Male
	2	Female
FH.2.0.2	2.0.2	Father's name?
FARM SIZE AND TEANURIAL STATUS		
FA.3.0	3.0	Area owned? (Acres)
FA.3.0.1	3.0.1	Area rented in? (Acres)
FA.3.0.2	3.0.2	Area rented out? (Acres)
FA.3.0.3	3.0.3	Fallow land? (Acres)
FA.3.1C	3.1C	Total land holding? (Acres)
FA.3.2	3.2	Area not cultivatable? (Acres)
FA.3.3C	3.3C	Total farm area? (Acres)
FH.4.0	4.0	Select tenurial status?
	1	Owner
	2	Owner cum tenant
	3	Tenant
SOURCE OF IRRIGATION WATER		
IS.4.1	4.1	Select main source? (Multiple Choice)
	1	Canal
	2	Tube well
	3	Any other? Please specify
IS.4.1Y	4.1Y	Define other source of irrigation?
If Selected "Tube well" in Q.#.4.1 then continue with Q.#.4.1.1		Otherwise go to Q.#.5.0
IS.4.1.1	4.1.1	Select status of tube well water used?
	1	Owned
	2	Purchased
If Selected "Purchased" in Q.#.4.1.1 then continue with Q.#.4.1.2		Otherwise go to Q.#.5.0
IS.4.1.2	4.1.2	Share of tube well water in irrigation? (%)
LIVESTOCK		
LS.5.0	5.0	Do you own live stock?
	1	Yes
	0	No
If Selected "Yes" in Q.# 5.0 then continue with Q.#.5.1		Otherwise go to Q.# 6.0
LS.5.1	5.1	Select type of live stock you owned?
	1	Buffalo
	2	Cow/Bull
	3	Camel

	4	Goats
	5	Sheep
	6	Poultry
	7	Ducks
Herd Size		
LS.5.1.1	5.1.1	No. of buffalo
LS.5.1.2	5.1.2	No. of cow/bull
LS.5.1.3	5.1.3	No. of camel
LS.5.1.4	5.1.4	No. of goats
LS.5.1.5	5.1.5	No. of sheep
LS.5.1.6	5.1.6	No. of poultry
LS.5.1.7	5.1.7	No. of ducks
FAMILY AND PERMANENT HIRED LABOR		
FM.6.0	6.0	How many members are living in the household?
FM.6.1	6.1	No. of adult? (Male)
FM.6.2	6.2	No. of adult? (Female)
FM.6.3	6.3	No. of children? (Boys)
FM.6.4	6.4	No. of children? (Girls)
Food Consumption Pattern		
FH.7.0	7.0	Select food cooking/consumption patterns
	1	Wheat/Wheat flour
	2	Rice
	3	Maize/Maize flour
	4	Sorghum/Millet flour
	5	Pulses
	6	Vegetables
	7	Chicken
	8	Beef
	9	Mutton
	10	Fish
	11	Egg
	12	Milk
	13	Fruit
	14	Sugar
	15	Oil

MT-04: FARMING HOUSEHOLD (Crops) - WST		
DB Code	Q. #	Field Name
FH.8.0	8.0	Select all Grown Crops
	1	Wheat
	2	Rice
	3	Cotton
	4	Barley
	5	Berseem/Lucern
	6	Sugarcane (Ratoon)
	7	Sugarcane (New)
	8	Sunflower
	9	Sorghum
	10	Rapeseed, Mustard, Canola
	11	Maize
	12	Mango orchard (old)
	13	Mango orchard (new)
	14	Oats or Javi or Jontari
	15	Pulses (gram)
	16	Pulses (lentil)
	17	Dates orchard (old)
	18	Dates orchard (new)
	19	Banana orchard (old)
	20	Banana orchard (new)
	21	Lemon orchard (old)
	22	Lemon orchard (new)
	23	Apple orchard (old)
	24	Apple orchard (new)
	25	Tomato
	26	Chilli
	27	Okra
	28	Onion
	29	Tobacco
	30	Rabi fodder
	31	Kharif fodder
FH.8.0.1	8.0.1	Other kharif crop name?
FH.8.0.2	8.0.2	Other Rabi crops name?
FH.8.0.3	8.0.3	Other Orchard name?
FH.8.0.4	8.0.4	Other Vegetable name?
FH.8.1	8.1	Crop Acreage? (Acre)
Land Preparation		
LP.9.0	9.0	Land preparation area? (Acre)
Ploughing		
LP.9.1	9.1	Ploughing - Avg. No. of operation/Acre
LP.9.2	9.2	Ploughing - Avg. cost per operation/Acre? (Rs./Acre)
LP.9.3	9.3	Ploughing - Avg. Labor per Acre? (Man Days)
Planking		
LP.10.0	10.0	Planking - Avg. No. of operation/Acre
LP.10.1	10.1	Planking - Avg. cost per operation/Acre? (Rs./Acre)
LP.10.2	10.2	Planking - Avg. Labor per Acre? (Man Days)
Seed		
LP.11.0	11.0	Seed Used? (Kg/Acre)
LP.11.1	11.1	Seed Rate? (Rs./Kg)

LP.11.2	11.2	Seed - Avg. Labor per Acre? (Man Days)
Seedling		
LP.12.0	12.0	Nursery/Seedling Used - Avg. cost per operation/Acre? (Rs./Acre)
LP.12.1	12.1	Nursery/Seedling Used - Avg. Labor per Acre? (Man Days)
Uprooting & Transplanting		
LP.13.0	13.0	Uprooting, Transporting & Transplanting - Avg. cost per operation/Acre? (Rs./Acre)
LP.13.1	13.1	Uprooting, Transporting & Transplanting - Avg. Labor per Acre? (Man Days)
Manual Weeding		
WS.14.0	14.0	Manual Weeding - Avg. No. of operation/Acre
WS.14.1	14.1	Manual Weeding - Avg. cost per operation/Acre? (Rs./Acre)
WS.14.2	14.2	Manual Weeding - Avg. Labor per Acre? (Man Days)
Weedicides/Pesticides		
WS.15.0	15.0	Weedicides/Pesticides - Avg. No. of operation/Acre
WS.15.1	15.1	Weedicides/Pesticides - Avg. cost per operation/Acre? (Rs./Acre)
WS.15.2	15.2	Weedicides/Pesticides - Avg. Labor per Acre? (Man Days)
Farm Yard Manure (FYM)		
FY.16.0	16.0	Farm yard manure (FYM) - Avg. No. of Tractor-Trollies/Acre
FY.16.1	16.1	Farm yard manure (FYM) including transport & Application - Avg. cost per Tractor-Trollies/Acre? (Rs./Acre)
FY.16.2	16.2	Farm yard manure (FYM) including transport & Application - Avg. Labor per Acre? (Man Days)
Fertilizer		
FI.17.0	17.0	Urea (Bag)
		Urea Rate? (Rs./Bag)
FI.17.0.1	17.0.1	Urea - Avg. Labor per acre? (Man Days)
FI.17.1	17.1	DAP (Bag)
		DAP Rate? (Rs./Bag)
FI.17.1.1	17.1.1	DAP - Avg. Labor per acre? (Man Days)
FI.17.2	17.2	Potash (Bag)
		Potash Rate? (Rs./Bag)
FI.17.2.1	17.2.1	Potash - Avg. Labor per acre? (Man Days)
FI.17.3	17.3	SSP (Bag)
		SSP Rate? (Rs./Bag)
FI.17.3.1	17.3.1	SSP - Avg. Labor per acre? (Man Days)
FI.17.4	17.4	NP (Bag)
		NP Rate? (Rs./Bag)
FI.17.4.1	17.4.1	NP - Avg. Labor per acre? (Man Days)
FI.17.5.0	17.5.0	Have you applied any other Fertilizer?
	1	Yes
	0	No
FI.17.5.1	17.5.1	Other fertilizer name-1?
FI.17.5.2	17.5.2	Other fertilizer-1? (Bag)
		Other fertilizer-1 Rate? (Rs./Bag)
FI.17.5.3	17.5.3	Other fertilizer-1 - Avg. Labor per acre? (Man Days)
FI.17.6.1	17.6.1	Other fertilizer name-2?
FI.17.6.2	17.6.2	Other fertilizer-2? (Bag)
		Other fertilizer-2 Rate? (Rs./Bag)
FI.17.6.3	17.6.3	Other fertilizer-2 - Avg. Labor per acre? (Man Days)
Irrigation		
CI.18.0	18.0	Canal
CI.18.1	18.1	Tube well

CI.18.2	18.2	Labor used for irrigation? (Man Days)
Harvesting		
HT.19.0	19.0	Harvesting, Picking, Threshing and Winnowing (Rs./Acre)
Land Rent & Taxes		
LR.20.0	20.0	Land rent for 6 months (Rs./Acre)
LR.20.1	20.1	Average land Tax (All type of Taxes) for 6 Months (Rs./Acre)
Crop Yield & Price		
CY.21.0	21.0	Have you sold crop in standing condition?
	1	Yes
	0	No
CY.21.1	21.1	Yield? (40-Kg/Acre)
CY.21.2	21.2	Yield Price? (Rs./40-Kg)
CY.21.3	21.3	If crop sold in standing condition? (Rs./Acre)
CY.21.4	21.4	By-product price (lumpsum/Acre)

*Female (Man day = 0.83)

* Children (Man day = 0.3)

ANNEXURE M: SPOT CHECKING OF WATERCOURSES TOOL

DB Code	Q. #	Field Name
1. IDENTIFICATION		
ID.1.0	1	Select Zone/ Unit
MT.1.1	1.1	Select M&E field team
	1	Team-1
	2	Team-2
	3	Team-3
MT.1.3	1.3	Select survey date
MT.1.4	1.4	Select watercourse ID
MT.1.5	1.5	Select type of watercourse?
	1	Rectangular/Bricks
	2	Parabolic
	3	PVC and RCC pipeline
		Select improvement type of Watercourse
	1	Regular (New)
	2	20 years old (Rehabilitation)
	3	Additional lining
MT.1.6	1.6	Select improvement status of watercourse
	1	Technical sanction (TS) issued
	2	Intermediate Completion Report-1 (ICR-I) issued
	3	Intermediate Completion Report-2 (ICR-II) issued
	4	Final completion report (FCR) issued
<i>If "Technical Sanction Issued" in Q.#1.2 then continue with Q.#2.1 & Covered till Q.#3.11</i>		
<i>If "ICR-1/ICR-2 Issued" in Q.#1.2 then continue with Q.#2.1 & Covered till Q.#3.24</i>		
<i>If "FCR issued" in Q.#1.2 then continue with Q.#2.1 & Covered till End</i>		
Collect the Coordinates at Mogha Point		
MT.2.1.1	2.1.1	Collect the coordinates at the Mogha point?
MT.2.1.2	2.1.2	Take picture at start of Mogha point?
Collect the Coordinates at the end of Lined Portion		
MT.2.2.1	2.2.1	Collect the coordinates at the end of lined portion?
		Take the picture while standing at the end of lined portion? (Facing towards Mogha point) without any person
		Take the picture while standing at the end of lined portion? (Facing towards the katcha portion) without any person
		Take picture of enumerator along with the Measuring Wheel's while measuring the length
Measurement Wheel Info		
		Executed/Improved lining length? (Meters)
		Take picture of measuring wheel's meter while standing at the end of lined portion
		Total Length of watercourse? (Meters)
		Take picture of measuring wheel's meter while standing at the end of katcha portion
Collect the Coordinates at the end of Katcha Portion		
MT.2.3.1	2.3.1	Collect the coordinates at the tail of katcha portion? (end point of watercourse)
		Take the picture of watercourse while standing at the end of katcha portion (Facing toward the Mogha point)
3. Rectangular/ Bricks Watercourse		
MT.3.1	3.1	Removal of vegetation from watercourse properly?
	1	Yes

	2	No
MT.3.2	3.2	Aligning according to design?
	1	Yes
	2	No
MT.3.3	3.3	Proper compaction of soil?
	1	Yes
	2	No
MT.3.4	3.4	Sanctioned discharge? (as per Irrigation Department) (LPS)
MT.3.5	3.5	Is water supply
	1	Adequate
	2	Not-adequate
If 'Adequate' in Q.# 3.5 then continue with Q.# 3.7		Otherwise continue with Q# 3.6
MT.3.5.1	3.6	Is there any additional water supply (via. tube well / lift machine) at the watercourse?
	1	Yes
	2	No
MT.3.6	3.7	Select type of mogha/ outlet?
	1	Open-type
	2	Closed
	3	Closed-pipe
	4	Closed-pump
MT.3.7	3.8	Lining length is as per design?
	1	Yes
	2	No
MT.3.8	3.9	Thickness of wall is as per design?
	1	Yes
	2	No
MT.3.9	3.10	Depth of watercourse is as per design?
	1	Yes
	2	No
MT.3.10	3.11	Width of watercourse is as per design?
	1	Yes
	2	No
MT.3.11	3.12	Thickness of plaster at wall is adequate?
	1	Yes
	2	No
MT.3.12	3.13	Thickness of bed is adequate?
	1	Yes
	2	No
MT.3.13	3.14	Thickness of mortar at wall is adequate?
	1	Yes
	2	No
MT.3.14	3.15	Free board height is as per design?
	1	Yes
	2	No
MT.3.15	3.16	Back collar mortar is adequate?
	1	Yes
	2	No
MT.3.16	3.17	Select quality of plaster?
	1	Good
	2	Satisfactory
	3	Not satisfactory

MT.3.17	3.18	Select back filling of the lining portion?
	1	Good
	2	Satisfactory
	3	Not satisfactory
MT.3.18	3.19	Rehabilitation of Katcha/ earthen portion of watercourse?
	1	Full length improved
	2	Only lined portion
Structures Fixing		
MT.3.19	3.20	Controlled structures for branch watercourse?
MT.3.20	3.21	Pacca naccas in improved area?
MT.3.21	3.22	Pacca naccas in Katcha area?
MT.3.22	3.23	Culverts in improved area?
	3.24	Box culverts in improved area?
MT.3.23	3.25	Pipe culverts in improved area?
MT.3.24	3.26	Siphon in improved area?
MT.3.25	3.27	Drop structure in improved area?
MT.3.26	3.28	Wallow/buffaloes bath in improved area?
MT.3.27	3.29	Washing bay in improved watercourse?
4. Parabolic Watercourse		
MT.4.1	4.1	Removal of vegetation from watercourse properly?
	1	Yes
	2	No
MT.4.2	4.2	Sanctioned discharge (LPS)?
MT.4.3	4.3	Is there a water supply?
	1	Adequate
	2	Not adequate
If 'Adequate' in Q.# 4.3 then continue with Q.# 4.5		Otherwise continue with Q.# 4.4
MT.4.3.1	4.4	If Not adequate, Is there any additional water supply (via. tube well / lift machine) at watercourse?
	1	Yes
	2	No
MT.4.4	4.5	Select type of mogha / outlet?
	1	Open
	2	Closed
	3	Closed-pipe
	4	Closed pump
MT.4.5	4.6	Lining length is as per design?
	1	Yes
	2	No
MT.4.6	4.7	Total length of watercourse is as per design?
	1	Yes
	2	No
MT.4.7	4.8	Select quality of pre-cast parabolic segments?
	1	Good
	2	Poor
MT.4.8	4.9	Select filling of joints of the parabolic segments?
	1	Good
	2	Poor
MT.4.9	4.10	Select slop of the parabolic segments?
	1	As per design
	2	Not as per design
MT.4.10	4.11	Select back filling of Pre-Cast Parabolic Slabs?

	1	Proper
	2	Not proper
Structures Fixing		
MT.4.11	4.12	Controlled structures for branch watercourse?
MT.4.12	4.13	Pacca naccas in improved area?
MT.4.13	4.14	Pacca naccas in Katcha area?
MT.4.14	4.15	Culverts in improved area?
MT.4.15	4.16	Box culverts in improved area?
MT.4.16	4.17	Pipe culverts in improved area?
MT.4.17	4.18	Siphon in improved area?
MT.4.18	4.19	Drop structure in improved area?
MT.4.19	4.20	Wallow/buffaloes bath in improved area?
MT.4.20	4.21	Washing bay in improved watercourse?
5. PVC and RCC Pipeline Watercourse		
MT.5.1	5.1	Excavation of trenches for water supply pipelines are as per specifications?
	1	Yes
	2	No
MT.5.2	5.2	Sanctioned discharge (LPS)?
MT.5.3	5.3	Is there a water supply?
	1	Adequate
	2	Not adequate
If 'Adequate' in Q.# 5.3 then continue with Q.# 5.5		Otherwise continue with Q.# 5.4
MT.5.3.1	5.4	Is additional discharge (via. tube well / lift machine) at watercourse?
	1	Yes
	2	No
MT.5.4	5.5	Select type of mogha / outlet?
	1	Open
	2	Closed
	3	Closed-pipe
	4	Closed-pump
MT.5.5	5.6	Select kind of pipeline has been used?
	1	RCC pipe
	2	PVC pipe
	3	G-I pipe
MT.5.6	5.7	Pipeline length is as per design?
	1	Yes
	2	No
MT.5.7	5.8	Bends as per design?
	1	Yes
	2	No
MT.5.8	5.9	Sockets are as per design?
	1	Yes
	2	No
MT.5.9	5.10	Air Valves are as per design?
	1	Yes
	2	No
MT.5.10	5.11	Reducers are as per design?
	1	Yes
	2	No
MT.5.11	5.12	Flanges are as per design?
	1	Yes
	2	No

MT.5.12	5.13	Tee are as per design?
	1	Yes
	2	No
MT.5.13	5.14	Non-return valves are as per design?
	1	Yes
	2	No
MT.5.14	5.15	Cost iron sluice valve are as per design?
	1	Yes
	2	No
MT.5.15	5.16	Select quality of pipeline?
	1	Good
	2	Satisfactory
	3	Not satisfactory
Structures Fixing		
MT.5.16	5.17	Controlled structures for branch watercourse?
MT.5.17	5.18	Pacca naccas in improved area?
MT.5.18	5.19	Pacca naccas in katcha area?
MT.5.19	6.19	Culverts in improved area?
MT.6.1	6.1	Authentication by supervisor
FF.6.2	6.2	Select form submission status
	1	First Submission
	2	Second Submission (Re-submitted due to the error in previous entry)
	3	Third Submission (Re-submitted due to the error in previous entry)
FF.6.3	6.3	Comments of enumerator (if any) (optional)

ANNEXURE N: SPOT CHECKING TOOL FOR WATER STORAGE TANKS

DB.#	Q.#	Field Name
1. IDENTIFICATION		
MT.1.5	1.1	Status of Water Storage tank (WST) Construction?
	1	Technical Sanction(TS) Issued
	2	Final Completion Report (FCR) Issued
MT.1.6	1.2	Name of Farmer?
2. SPOT CHECK		
MT.2.1	2.1	Coordinates at mogha point?
MT.2.2	2.2	Take Picture of Water Storage tank (WST)?
MT.3.1	3.1	Shape of water storage tank?
	1	Trapezoidal
	2	Rectangular
	3	Brick/Masonry
	4	Geomembrane
	5	PCC
MT.3.1A	6	Any other, specify
MT.3.1.1	3.1.1	Length-1 (Feet)?
MT.3.1.2	3.1.2	Length-2 (Feet)?
MT.3.1.3	3.1.3	Width-1 (Feet)
MT.3.1.4	3.1.4	Width-2 (Feet)
MT.3.2	3.2	Depth (Feet)
MT.4.1	4.1	The farmer completed the WST using his/her own funds before subsidy?
	1	Yes
	2	No
MT.4.2	4.2	What benefits you can expect from WST
	1	Reduce ground water consumption
	2	Reduce water bills
	3	Extend water supply
	4	Improve water quality/less salty water
	5	Reduce soil erosion
MT.4.2A	7	Better control on water supply
MT.4.3	4.3	The WST was completed as per approved standards and specifications?
	1	Yes
	2	No
MT.4.4	4.4	Excavation was done as per standard engineering practices?
	1	Yes
	2	No
MT.4.5	4.5	The NWM Consultants inspected the excavation and quality of geo-membrane and certified as satisfactory?
	1	Yes
	2	No
MT.4.6	4.6	Before filling the WST, the OFWM staff prepared the completion report?
	1	Yes
	2	No
MT.4.7	4.7	Any variations in specifications and material used?
	1	Yes
	2	No

MT.4.8	4.8	Subsidy was paid as per cost estimates based on geo-membrane design?
	1	Yes
	2	No
MT.4.9	4.9	Does the water depth in WST exceed 5 feet?
	1	Yes
	2	No
If "Yes" in Q.#4.9 then continue with Q# 4.9.1		Otherwise go to Q.#4.10
MT.4.9.1	4.9.1	Depth of water?
MT.4.10	4.10	Is the geo-membrane thickness minimum 0.5 mm?
	1	Yes
	2	No
MT.4.11	4.11	Do all joints weld through fusion welding?
	1	Yes
	2	No
If yes in Q#4.11 then continue with Q#4.11.1		Otherwise go to Q.#5.4
MT.4.11.1	4.11.1	Is the testing of Joints welded parts done before filling the water storage tank?
	1	Yes
	2	No
MT.4.5.1	5.1	Financial Year
MT.4.5.2	5.2	Supervisor Confirmation?
MT.4.5.3	5.3	Select Submission Status
MT.4.5.4	5.4	Comments of interviewer - (if any) (optional)

ANNEXURE O: MONITORING TOOLS FOR PLL MTS LASER LAND LEVELING

Precision Laser Land Leveling	
DB.#	Questions
Identification	
1	Province?
2	Division?
3	District?
4	Tehsil?
5	Select survey date?
6	Name of Service Provider?
7	Father name
8	Contact number
9	CNIC number
10	Do you own Agriculture land?
1	Yes
2	No
If selected "Yes" in Q.# 10 then continue with Q.# 11	
Otherwise go to Q.# 12	
11	Area of land? (Acres)
12	Education of the service provider?
1	Illiterate
2	Primary / Middle
3	Matric
4	Intermediate
5	Graduate
6	Masterss/Ph.D.
13	Company name providing Laser Land Levelling?
14	Make and Model of the Machine?
15	Delivery date?
Monitoring	
16	Picture of Laser Land Levelling unit?
17	Coordinates
18	The unit is in physical possession of service provider verified by ME&IE team?
1	Yes
2	No
If selected "Yes" in Q.# 18 then continue with Q.# 19	
Otherwise go to Q.# 20	
19	Condition / Upkeep of the unit?
1	Good
2	Satisfactory
3	Not Satisfactory
20	reason?
1	The service provider did not allow to see the unit
2	It was told that unit was sent for Land Levelling and SP disagree to take the team at workplace
3	Any other please specify _____
21	Do you have trained operator for your equipment?
1	Yes (Operator available)
2	Yes (My Self)
3	No one is trained
22-a	The operator has been given trainings in operation of LLL
1	Yes
2	No

22-b	The operator has been given trainings in trouble shooting
1	Yes
2	No
22-c	The operator has been given trainings in Repair and maintenance
1	Yes
2	No
22-d	Define any other trainings
Feedback	
23	Quality / Durability of the unit?
1	Good
2	Satisfactory
3	Not Satisfactory
4	Do not Know
24	After sale service of the SSC?
1	Good
2	Poor
3	Very Poor
4	I did not need yet
25	Complaints attended by SSC?
1	Promptly
2	Not Promptly
3	I did not need yet
26	Rates charged by SSC to provide the after sale service?
1	Costly
2	Normal
3	I did not need yet
27	Availability of spare parts?
1	When required
2	Takes long time
3	I did not need yet
28	Price charged by the SSC for the spare parts?
1	Costly
2	Normal
3	I did not need yet
29	Spare parts are available?
1	Only with SSC
2	From open market
3	I did not need yet
Leveled Land Data	
30	Do you provide service to other farmers?
1	Yes
2	No
31	Level of record keeping?
1	Complete record
2	Partial
3	Not keeping any record
32	Method of record keeping?
1	Keeps records in log book
2	On loose papers / thing
3	Not in Writing
33	Land leveled during the last crop season (Rabi / Kharif)?
1	Own land (acres) _____

2	Other's land (acres) _____
3	Number of farmers served (No.) _____
4	Duration in months (No.) _____
34	Rates per hour?
1	Rabi (Rs.) _____
2	Kharif (Rs.) _____
35	Hours per Acre?
1	Rabi (hr.) _____
2	Kharif (hr.) _____
Impact	
<div style="display: flex; justify-content: space-between;"> If selected "No" in Q.# 10 then continue with Q.# 36 Otherwise go to Q.# 39 </div>	
36	Beneficiary name? (If Service Provider has no land)
37	Beneficiary's owned land?
38	Beneficiary's leveled land?
1	Rabi (Acres) _____
2	Kharif (Acres) _____
Cultivated Area	
39	Total Cultivated Area?
1	Before (Acres) _____
2	After (Acres) _____
40	Select crops
1	Wheat
2	Sugarcane
3	Rice
4	Cotton
5	Maize (Grains)
6	Vegetables
7	Other Crops
41	Crop irrigation time per acre?
1	Before (hrs) _____
2	After (hrs) _____
42	Crop yield per acre?
1	Before (mound) _____
2	After (mound) _____
43	Supervisor Confirmation?
44	Select Submission Status?
45	Comments of interviewer (if any) (optional)

Recommendation:

Following are the recommendations:

- One of the most important water conservation efforts would be to improve water literacy among farmers so that they avoid existing wastage during current irrigation practices and learn how to minimize its wastage and utilize it in a efficient way to improve their crop productivity. Besides, continuous support through public extension services, media slogans, and awareness and community mobilization programs may benefit farmers to conserve water as a social responsibility.
- The subsidies on the energy especially in Balochistan for extraction of ground water has been the major policy concerns. This is unfortunate that our planners and farmers have no concern on the true economic and ecosystem value of water. Policymakers must bring a fundamental shift in the conception of the water problem, and bring water at the centre of their policies. This is a time that in Pakistan strictly we have to fix water pricing.
- Government of Pakistan has to provide water-saving technologies on subsidy. On water lining , water storage tanks and Precise land levelling schemes, incentives may be provided to farmers, for operation and maintenance of these systems. In the absence of these incentives, farmers are reluctant to opt new technologies. It is also necessary to focus on the local availability and supply of the system and spare parts through a competitive market.

Reference:

- Arshad, M., Ahmad, N., Usman, M. and Shabbir, A. (2009) Comparison of water losses between unlined and lined watercourse in Indus Basin of Pakistan. Pak. J. Agri. Sci, 46(4), 2076–0906
- Arshad, M and Ahmad, N. (2011). Performance assessment of irrigation system in rice-wheat cropping zone using modern techniques. ICID 21st International Congress on Irrigation and Drainage, 15-23 October 2011, Tehran, Iran.
- Basharat M and Rizvi, SA (2016). Irrigation and drainage efforts in Indus basin – a review of past, present and future requirements. 2 World irrigation forum. 6-8 November, Chiang Mai, Thailand
- Barkhordari, S., S.M. Hashemy Shahadany, S. Taghvaeian, A.R. Firoozfar, J.M. Maestre (2020) “Reducing losses in earthen agricultural water conveyance and distribution systems by employing automatic control systems,” Computers and Electronics in Agriculture, 168, pp. 105–122. Available at: <https://doi.org/10.1016/j.compag.2019.105122>.
- Copland. 1987. Technical economic feasibility. Report for Khushab Salinity Control and Reclamation Project. Copland and Co., Consulting Economists to Asian Development Bank.
- Javaid F, Arshad M, Khan AM, Shabbir A, Shakoor A. 2012. Performance Assessment of Lined Watercourses in District Jhang. Pakistan Journal Agricultural Science 49(1), 73-77.
- Kraatz, D.B. (1977) Irrigation canal lining: Food and Agriculture Organization of the United Nations. Italy: Rome
- Kulkarni, A.A. and Nagarajan, R. (2018) “Conveyance loss modelling and conservation planning for irrigation canals – A geo-spatial approach,” International Journal of Engineering and Technical Research, 8(1), pp. 384–389.
- Lund, A.A.R. et al. (2021) “Field evaluation of a polymer sealant for canal seepage reduction,” Agricultural Water Management, 252, 106898. Available at: <https://doi.org/10.1016/j.agwat.2021.106898>
- Minhas, P.S. Ramos, T.B, Ben-Gal. A, L.S. Pereira LS.(2020). Coping with salinity in irrigated agriculture: crop evapotranspiration and water management issues
- Agr. Water Manag, 227: 105832, 10.1016/j.agwat.2019.105832
- Pirzada M. Moshabbir, Hafiz Qaiser Yasin, Malik M. Akram, Arsam Ahmad Awan. (2018). Determining economically feasible watercourse lining length in the irrigated area of Punjab, Pakistan. Journal of Biodiversity and Environmental Sciences (JBES) ISSN: 2220-6663 (Print) 2222-3045 (Online) Vol. 12, No. 2, p. 221-229
- Plusquellec, H. (2019) Overestimation of benefits of canal irrigation projects: Decline of performance over time caused by deterioration of concrete canal lining. Irrigation and Drainage., 68(3), 383–388. <https://doi.org/10.1002/ird.2341>
- National Water Policy of Pakistan (2018) Ministry of water resources, Government of Pakistan.
- Qureshi, A.S., M.N. Asghar, S. Ahmad, I. Masih, 2004. Sustaining crop production under saline groundwater conditions: A case study from Pakistan. Australian Journal of Agricultural Sciences. Vol. 54 (2): 421-431.
- Qureshi A.S, McCornick P.G, M. Qadir M, Aslam, Z (2008). Managing salinity and waterlogging in the Indus Basin of Pakistan. Agricultural Water Management. Volume 95, Issue 1, 1-10
- Shah, Z, Hamza Gabriele, Sajjad Haider, Turab Jafri (2020) “Analysis of seepage loss from concrete lined irrigation canals in Punjab, Pakistan,” Irrigation and Drainage, 69(4), pp. 668–681. Available at: <https://doi.org/10.1002/ird.2474>
- Sepaskhah, A. and Salemi, H. (2004) An empirical model for prediction of conveyance efficiency for small earth canals. Iranian Journal of Sciences and Technology, 28, 623–628.

- Sultan, T., Latif, A., Shakir, A., Kheder, K. and Rashid, M. (2014) Comparison of water conveyance losses in unlined and lined watercourses in developing countries. University of Engineering and Technology Taxila. Technical Journal, 19(2), 23
- Swamee, P.K., Mishra, G.C. and Chahar, B.R. (2000) Design of minimum seepage loss canal sections. Journal of Irrigation and Drainage Engineering, 126(1), 28–32
- Snyder, R. L.; Melo-Abreu, J. P. (2005). Frost protection: fundamentals, practice, and economics. Vol. 1. Food and Agriculture Organization of the United Nations. ISBN 978-92-5-105328-7. ISSN 1684-8241
- Syed, N.S.B. et al. (2021) “Analysis of conveyance losses from tertiary irrigation network,” Civil Engineering Journal, 7(10), pp. 1731– 1740. Available at: <https://doi.org/10.28991/CEJ-2021-03091756>.
- William J. Young, Arif Anwar, Tousif Bhatti, Edoardo Borgomeo, Stephen Davies, William R. Garthwaite III, E. Michael Gilmont, Christina Leb, Lucy Lytton, Ian Makin, and Basharat Saeed (2019). Pakistan Getting More from Water. Published by The World Bank International Bank for Reconstruction and Development The World Bank Group 1818 H Street NW, Washington, DC 20433 USA
- World Bank (2024). Water in Agriculture. Available at <https://www.worldbank.org/en/topic/water-in-agriculture>.