Project Administration Manual

Project Number: 49372-002
Loan Number: LXXXX
November 2021

Islamic Republic of Pakistan: Greater Thal Canal Irrigation Project

ABBREVIATIONS

ADB	–	Asian Development Bank
AES	–	agriculture extension service
CAD	–	command area development
CSP	–	country strategy partnership
DGA	–	Directorate General Agriculture
EIRR	–	economic internal rate of return
GDP	–	gross domestic product
ha	–	hectare
HEIS	–	high efficiency irrigation system
IBIS	–	Indus Basin Irrigation System
km	–	kilometer
LARP	–	land acquisition and resettlement plan
m^3/s	–	cubic meter per second
M&E	–	monitoring and evaluation
O&M	–	operation and maintenance
OCR	–	ordinary capital resources
OFWM	–	on-farm water management
PAD	–	Punjab Agriculture Department
PID	–	Punjab Irrigation Department
PIO	–	project implementation office
PMO	–	project management office
WUA	–	water users association

CONTENTS

Appendixes:

1. Detailed project descriptions
2. Community participation contracts for command area development activities
3. Draft outline terms of references of the PID project management and construction supervision consulting service package
4. Draft outline terms of references for command area development support consulting services package

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Government of Pakistan, Punjab Irrigation Department (PID), and Punjab Agriculture Department (PAD) are wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by PID and PAD of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan agreement. Such agreement shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the loan agreement, the provisions of the loan agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. The project will contribute to enhancing food security and rural economic growth in Punjab province. It will increase the agricultural production and productivity of the project area by developing a new irrigation system. The Greater Thal Canal (GTC) irrigation scheme will convert a total of 704,000 hectares (ha) of low productive rainfed (*barani*) lands in Bhakkar, Jhang, Muzaffargarh, Khushab and Layyah districts of Punjab to irrigated and productive lands. It will provide reliable irrigation water supplies during the monsoon (*kharif*) season from April to October. The government has constructed its Main Canal and the first branch (Mankera) system.[1] The proposed project will support the construction of the irrigation canal network in the second branch (Choubara) system and the on-farm command area development (CAD) in the Main Canal, Mankera branch, and Choubara branch areas covering about 263,000 ha. The project will also enhance the capacity of relevant government entities and water users for: (i) efficient water management; (ii) introduction of advanced technologies, and (iii) improved and climate resilient agricultural practices and (iv) sustainable infrastructure.

2. Water allocation for the entire GTC scheme was determined and approved by the Indus River System Authority in 2002. It is within the provincial allocation for Punjab province, as defined under the Water Apportionment Accord.[2] The project will not alter or exceed the approved provincial water allocation. The GTC irrigation scheme is non-perennial and will use water only during the monsoon (*kharif*) season from about April to October.

3. The project is aligned with the following impacts: food security enhanced[3] and rural poverty in Punjab reduced.[4] The project will have the following outcome: agricultural production and productivity in the project area increased.[5]

4. **Output 1: Irrigation system infrastructure for Choubara system constructed.** This output will construct irrigation canals in the Choubara branch system and associated structures. Major activities will include (i) construction of the Choubara branch system; (ii) tree planting along irrigation canals for the Main Canal and Mankera and Choubara branch systems as wind breakers to prevent sediment deposits entering the irrigation canals; (iii) desilting of the Main Canal and Mankera branch systems; (iv) construction and renovation of operational and administration site buildings for the Punjab Irrigation Department (PID); and (v) the implementation of a social development action plan to receive an increased population in agricultural labor. This includes equipment procurement for a basic health unit, upgrading a girls' school and vocational training (para. 36). The Choubara branch system includes the construction of 72 kilometers (km) total length of the branch canal, 251 km total length of 11 secondary canals and 127 km total length of 11 tertiary canals.

5. **Output 2: On-farm command area developed with enhanced beneficiaries' capacity.** CAD activities in the Main Canal, Mankera and Choubara branch areas will include: (i) on-farm community watercourses, (including development and construction of field channels using farmer

[1] The overall GTC irrigation system comprises one Main Canal, and 4 branch canal systems. The Main Canal and Mankera branch canal were completed in 2009 under federal government financing.

[2] Government of Pakistan. 1991. The Water Accord -1991 https://mowr.gov.pk/wp-content/uploads/2018/05/Water-Accord-1991.pdf

[3] Government of Pakistan, Planning Commission. 2015. *Pakistan 2025: One Nation, One Vision*. Islamabad.

[4] In line with the provinces' aim of regional equalization. Planning and Development Board, the Government of Punjab. 2019. *Punjab Growth Strategy 2023*. Lahore.

[5] The design and monitoring framework is in Appendix 1 of the report and recommendation of the President to the Board of Directors.

construction contracts), social mobilization and WUA formation; (ii) piloting for improved water productivity, such as increased lining of watercourses, laser land leveling, high efficiency irrigation systems (HEIS) including drip irrigation systems, water storage ponds, and piped watercourses; (iii) awareness campaign and capacity development of farmers on improved on-farm water management and improved and climate resilient agricultural practices including extension services like farmer field schools and provision of high yielding seeds; (v) the construction of site/ office/ training buildings for the Punjab Agriculture Department (PAD); and (vi) capacity development of PAD

6. **Output 3: Institutional system for irrigation scheme and water resource management strengthened.** This output will enhance the PID's institutional capacity for improved water resources management and O&M of irrigation systems for sustainability. Activities will include support for: (i) geographic information system (GIS)-based asset management system development; (ii) installation of groundwater monitoring equipment and developing ground water modelling for the entire GTC area; (iii) canal flow water measurement system installation for monitoring efficient water use; (iv) capacity development activities for the PID staff including long-term and short-term training; (v) GIS-based monitoring and evaluation system development; and (vi) implementation of other institutional capacity strengthening that will be programmed under ADB's ongoing capacity development technical assistance for the PID.[6] These activities may include asset management decision making system development and actions for the implementation of the Punjab Water Act 2019.

7. Detailed project activities are described in **Appendix 1**.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

8. The project has high readiness. The project will be implemented by the well experienced existing project management office under the Punjab Irrigation Department (PID), the executing agency, and the project implementation office under the Punjab Agriculture Department (PAD), the implementing agency for the command area development activities. The detailed design for the entire GTC was completed by the federal government in 2006. The PID-financed national consultant team updated the detailed design for the Choubara branch system in 2018-2020. The PID and PAD have been preparing for advance procurement of the Choubara civil works package and project implementation support consultants. Draft PC-1s also have been prepared well in advance. Land acquisition for the Choubara branch system has been partially completed. The remaining land acquisition activities are in progress. ADB's technical assistance has supported project preparation for ADB and government approval. The readiness activities are summarized in Table 1.

Table 1: Project Readiness Activities

Indicative Activities	2021										2022				Responsibility
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
PC-1 PDWP approval					X										GOPB
Choubara Irrigation System works package procurement								X	X	X	X	X			PID

[6] ADB. 2016. *Technical Assistance to the Islamic Republic of Pakistan for Institutional Transformation of the Punjab Irrigation Department to a Water Resources Department*. Manila (TA 9255-PAK)

Indicative Activities	2021										2022				Responsibility
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
CAP and draft LARP preparation and disclosure	X	X	X	X	X	X	X	Disclosed in Sep 2021.							PID with help of TRTA consultant
Draft EIA preparation and disclosure	X	X	X	X	X	X	1st draft: disclosed in Feb 2020. 2nd draft disclosed in Sep 2021.								PID with help of TRTA consultant
PID supervision and project implementation support consultant recruitment							X	X	X	X	X	x			PID
PAD command area development consultant recruitment								X	X	X	X	X	X	X	PAD
PC-1 CDWP clearance								X							GOP
Loan negotiations								X							GOP, ADB
ADB Board consideration										X					ADB
Government budget inclusion		X	X	X											PID, PAD
PC-1 ECNEC approval									X						GOP
Loan signing										X					GOP, ADB
Loan effectiveness												X			GOP, ADB

ADB = Asian Development Bank, CAP = corrective action plan, CDWP = Central Development Working Party, ECNEC = Executive Committee of the National Economic Council, EIA = environmental impact assessment, GOP = Government of Pakistan, GOPB = Government of Punjab, LARP = land acquisition and resettlement plan, PAD = Punjab Agriculture Department, PID = Punjab Irrigation Department, PDWP = Provincial Development Working Party.
Source: Asian Development Bank estimates.

B. Overall Project Implementation Plan

Table 2: Overall Project Implementation Plan

No	Activities	2021				2022				2023				2024				2025				2026				2027				2028				2029			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Project Approved				●																															
	Signing				●																															
	Project Effectivness					●																														
A	**Output 1: Irrigation Infrastructure**																																			
1	Complete PMO staffing																																			
2	Procurement of Irrigation Works																																			
3	LARP implementation in remaining sections																																			
4	Construction of irrigation system section 1 (0-70)																																			
5	Construction of irrigation system section 2 (70-152)																																			
6	Construction of irrigation system section 3 (152-End)																																			
7	PID key operational staff recruitment																																			
8	PID full operational staff recruitment																																			
9	De-siltation of existing irrigation system																																			
B	**Output 2: Command Area Development**																																			
1	Complete PIO Staffing																																			
2	Command Area Development Consultants Recruitment																																			
3	Institutional Capacity Enhancement of PAD																																			
B1	*Main Canal and Mankera Canal Command Area Development*																																			
1	Establish water user's associations																																			
2	Construct watercourses with farmers' participation																																			
3	Rough Land Levelling																																			
4	Laser Land Levelling																																			
5	Construction of Water Storage Ponds																																			
6	Installation of Power System at HEIS Sites																																			
7	Install High Efficiency Irrigation System																																			
8	Farmer Fairs and Other Knowledge Sharing Events																																			
9	Private Agriculture Support Services																																			
10	Conduct Farmer Field Schools and Farmers' Training																																			
B2	**Chaubara Canal Command Area Development**																																			
1	Water User Formation																																			
2	Construct watercourses with farmers' participation																																			
3	Rough Land Levelling																																			
4	Laser Land Levelling																																			
5	Water Storage Ponds and Pumping Stations																																			
6	Install High Efficiency Irrigation System																																			
7	Farmer Fairs and Other Knowledge Sharing Events																																			
8	Private Agriculture Support Services																																			
9	Conduct Farmer Field Schools and Farmers' Training																																			
C	**Output 3: Institutional Capacity Strengthened**																																			
1	Groundwater Modelling and Monitoring													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
2	Development of M&E System																					x	x	x	x	x	x	x	x	x	x	x	x			
3	Training of PID Staff																																			
4	Updating O&M and Asset Database													x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
5	GAP Action Plan																																			
6	PID Capacity Enhancement																																			

Physical Completion 31 December 2028

Loan Closing 30 June 2029

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

9. **Project steering committee.** The project steering committee (PSC) will serve as an oversight body. The PSC will be chaired by the Chairman, Punjab Planning and Development Board (P&DB) and include Secretaries of PID, PAD, Forest, Wildlife, and Fisheries (FWF) Department, Punjab Environment Department, and Punjab Finance Department. Member Board of Revenue, the Project Directors of Project Management Office (PMO) under the PID and project implementation office (PIO) under the PAD, and the team leader of the project implementation consultant may also participate in PSC when necessary.

10. **CAD implementation committee (also called PAD project implementation committee).** The coordination committee will ensure better interdepartmental coordination and provide overall guidance on implementation and operational issues. This will be particularly on command area development activities, especially on *chakbandi* and coordinating irrigation system development and operations with command area development.[7] The committee will be chaired by Secretary, Agriculture, with representation from PMO, PIO, Irrigation Secretariat, relevant wings of the PAD, district administration and any other department, if needed. The committee will advise the Project Steering Committee proceedings.

11. **Executing and implementing agencies.** The PID will be the executing agency for the project and will be responsible for the management and implementation of the entire project. It is directly responsible for the project's Output 1 (Choubara irrigation system construction) and Output 3 (PID institutional capacity strengthening). The PAD will be the implementing agency responsible for Output 2 (CAD) of the project, which includes capacity strengthening of PAD and farmers.

12. **Project management office and project implementation office.** The existing PID PMO for Barrages will be responsible for project implementation. The PMO will be strengthened through additional staff resources, enabling it to manage project implementation without affecting existing projects' responsibilities. The project director of PMO will manage the overall project implementation, coordinate and manage implementation of Outputs 1 and 3, and facilitate PSC and working meeting proceedings. The PID had created an implementation and coordination unit at project site since inception of the main GTC and Mankera irrigation system implementation. This unit reports to PMO. The PMO will be supported by a project implementation consultant team.

13. The PID established a divisional office - the Choubara canal division, by recruiting an executive engineer and three sub-divisional officers in 2021 for the implementation of the project. The Choubara canal division will be responsible for joint implementation and operations management with PMO and seamless transition to takeover completed facilities at project completion.

14. The PAD will appoint Director General Agriculture (on-farm water management) as the project director responsible for overseeing the implementation of Output 2 in coordination with the PMO. Under the supervision of the PAD project director, a PIO will be established. The PAD will ensure that the PIO will have dedicated staff from allied directorates of agriculture field, extension

[7] This is the entire process of collection of data for working out details of gross commanded and culturable commanded areas of channels as a whole or of individual outlets for working out the chak boundary. Chak boundary is the boundary of areas reserved for irrigation from any particular outlet.

and adaptive research, and soil survey and maintain intradepartmental coordination. The existing PAD field offices will be strengthened through additional staff. The PIO will be supported by a command area development consultant team.

15. For close coordination, staff from PMO, PIO and two project management consultant teams will hold monthly meetings and report to the government and ADB. This will ensure regular comprehensive reviews, decision making and problem solving. The monthly meetings will be co-chaired by the project directors, PMO and PIO and the members will include PMO, PIO, project implementation consultants, command area development consultants.

Table 3: Roles and Responsibilities of Project Implementation Organizations

Project Implementation Organizations	Management Roles and Responsibilities
Project steering committee	• provide policy guidance to oversee project implementation; • ensure smooth inter-departmental coordination; and • resolve project implementation issues that require higher level interventions.
CAD implementation committee (also called PAD project implementation committee)	• ensure better intradepartmental coordination and provide overall guidance on operational issues, especially on command area development activities, including *chakbandi* and coordinating irrigation system development and operations with command area development; • discuss and approve work plans, beneficiary selection criteria and other decisions on the implementation of the CAD activities; • conduct quarterly (or more frequently if needed) project review of the CAD activities; and • advise Project Steering Committee.
PID (executing agency)	• oversee entire project implementation, and coordinate with PAD; • recruit PMO staff for the project; • ensure adequate and timely provision of counterpart funds; • ensure transparency in procurement and financial management; • ensure quality and timely completion of the project; • have project accounts audited in a timely manner, and respond to audit observations and recommendations; • ensure full compliance with relevant loan and project covenants; • monitor the sustained O&M of the project facilities after project completion; and • approve procurement and resolve any finance-related issues.
PMO (within the PID)	• manage entire project and directly manage Outputs 1 and 3; • facilitate PSC meetings by inviting representatives from the PID, PAD and other departments; • coordinate with PIO for consistent implementation in each output and organize working level coordination committee meetings; • undertake timely recruitment of consultants; • review and endorse engineering design, bidding documents, and contract awards; • ensure compliance with ADB safeguards policy and government laws, rules and regulations; • ensure that final/implementation ready LARPs are approved and disclosed prior to award of civil works contracts and that civil works commence only after completion of LARP implementation has been verified by an external monitor;

Project Implementation Organizations	Management Roles and Responsibilities
	• ensure the implementation of EMP, TMP and GAP; • undertake periodic M&E of project activities and outputs, and prepare review reports, including issues and actions taken; • manage and accountable for the advance account; • comply with the project's public disclosure, safeguards monitoring and grievance redress mechanism requirements; • Monitor and promptly address complaints, and ensure their effective and adequate resolution; • supervise and ensure quality of works and services of consultants and counterpart staff; • advance fund account operations, and direct withdrawal and liquidation applications submission to ADB, maintenance of accounting records, submission of periodic financial progress reports, implementation of financial management action plan, audit and submission to ADB of annual audited project financial statements; and • prepare and submit to ADB periodic progress reports, periodic safeguards and GAP monitoring reports, and project completion reports in a timely manner.
PAD (implementing agency)	• Coordinate with PID on project implementation; • recruit PIO staff for the project; • ensure transparency in procurement and financial management; • ensure quality and timely completion of output 2; • ensure adequate and timely provision of counterpart funds; • have project accounts audited in a timely manner, and respond to audit observations and recommendations; • ensure full compliance with relevant loan and project covenants; • ensure compliance with ADB safeguards policy and government laws, rules and regulations; • monitor the sustained O&M of the project facilities after project completion; and • approve procurement and resolve any finance-related issues.
Project Implementation Office (within PAD)	• directly manage Output 2; • undertake periodic M&E of project activities and outputs, and prepare review reports, including issues and actions taken; • manage and accountable for the advance account; • undertake recruitment of consultants; • supervise and ensure quality of works and services of consultants and counterpart staff; • ensure compliance with ADB safeguards policy and government laws, rules and regulations; • monitor and promptly address complaints, and ensure their effective and adequate resolution; • ensure the implementation of GAP; and • advance fund account operations, and direct withdrawal and liquidation applications submission to ADB, maintenance of accounting records, submission of periodic financial progress reports, implementation of financial management action plan, audit and submission to ADB of annual audited project financial statements; assist the PMO under the PID in preparing periodic progress reports, periodic safeguards and

Project Implementation Organizations	Management Roles and Responsibilities
	GAP monitoring reports, and project completion reports in a timely manner
Government of Punjab	• sign the Project Agreement; • ensure transparency in procurement and financial management; • ensure quality and timely completion of the project; • ensure timely allocation and release of counterpart funds, and timely approval of project cost, financing and other documents; • inform ADB major policy changes in the sector that may affect the implementation and future performance of the project; • ensure compliance with the loan covenants; and • ensure compliance with resettlement and environmental safeguard as per EPA rules and regulations and ADB safeguard policy.
Ministry of Economic Affaires	• sign the Loan Agreement and allocate and release annual funds; • endorse to ADB the authorized staff with approved signatures for withdrawal applications processing; and • process and submit to ADB any request, when required.
ADB	• assist the EA and PMO in providing timely guidance for smooth implementation of the project in accordance with the agreements; review all the documents that require ADB approval; • conduct periodic loan review missions, a mid-term review, and a project completion mission; • monitor compliance with loan covenants, social and environmental safeguards and technical and financial requirements; • timely process withdrawal applications and release eligible funds; • ensure compliance with financial audit recommendations; • regularly update the project performance review reports with the assistance of the project management office; and • regularly post on ADB website the updated project information documents for public disclosure, and the safeguards documents as per disclosure provision of the ADB safeguards policy statement.

ADB = Asian Development Bank, CAD = command area development, EMP = environment management plan, EPA = Environmental Protection Agency, GAP = gender action plan, LARP = land acquisition and resettlement plan, M&E = monitoring and evaluation, O&M = operation and maintenance, PAD = Punjab Agriculture Department, PIO = project implementation office, PMO = project management office, PSC = project steering committee, TMP = tree management plan.

B. Key Persons Involved in Implementation

Executing Agency

Punjab Irrigation Department	Mr. Saif Anjum Secretary, Irrigation Government of Punjab, Irrigation Secretariat, Old Anarkali Lahore, Pakistan Telephone: +92 42 9212117-8 E-mail: sec_irr@punjab.net.pk
PMO Barrages under PID	Mr. Ijaz Kashif Project Director Telephone: +92-42-99 250 351 E-mail: pmoipd@yahoo.com

Implementing Agency

Agriculture Department	Mr. Asad Rehman Gillani Secretary, Agriculture
PIO under PAD	Mr. Malik Muhammad Akram Director General, OFWM Directorate Agriculture House, 21-Agha Khan (Davis) Road, Lahore Telephone: +92 42 99200703 Muhammad Zafar Yab Haider Director General, Agriculture Extension Directorate Agriculture House, 21-Agha Khan (Davis) Road, Lahore Telephone: +92 42 99200703 E-mail: cadgtcwm@gmail.com

ADB

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C. Key PMO and PIO staff

Table 4: Key PMO Staff

Sr. No.	Staff Title	Number
1	Head / Project Director	1
	Engineering Unit	
2	Deputy Project Director / Director Technical	1
3	Deputy Director Technical	1
4	Deputy Director Implementation and Coordination	1
5	Deputy Director Mechanical	1
6	Deputy Director M&E	1
7	Deputy Director GIS	
8	Assistant Director Quality Control	1
9	Assistant Director Engineering	1
10	Assistant Director / Office Engineer	1
11	Assistant Director Electrical	1
12	Assistant Director Implementation and Coordination	3

	Procurement Unit	
13	Director (Procurement & Contract Administration)	1
14	Deputy Director (Contracts & Claims)	1
15	Deputy Director (Procurement)	1
16	Assistant Director (Contracts & Claims)	1
	Social & Environment Unit	
17	Director (Social & Environment)	1
18	Deputy Director (Environment)	1
19	Deputy Director (Social)	1
20	Deputy Director (Resettlement & Development Assistance)	1
21	Deputy Director (Communication)	1
	Finance & Administration Unit	
22	Director (Finance & Administration)	1
23	Manager Administration	1
24	Deputy Director Information Systems	1
25	Deputy Director (Finance)	1
26	System Analyst	1
27	Internal Auditor	1
28	Accounts Officer	1

Table 5: Key PIO Staff

Sr. No.	Staff Title	Number
1	Director General Agriculture (OFWM) / Project Director	1
	PIO Office [a]	
2	Deputy Project Director	1
3	Focal Person of Field Wing for Coordination with PIO [b]	1
4	Focal Person of Agriculture Extension for Coordination with PIO [b]	1
5	Deputy Director Technical	1
6	Deputy Director Finance/Financial Management Specialist	1
7	Assistant Director Technical	1
8	Procurement Specialist	1
9	Assistant Agronomist	1
10	Accounts Officer	1
11	Contract Management Specialist/ Legal Advisor	1
	Field Office - OFWM Dera Ghazi Khan [c]	
12	Director Agriculture	1
13	Deputy Director Agriculture Layyah	1
14	Assistant Director Agriculture Choubara	1
	Field Office - OFWM Sargodha [c]	
15	Director Agriculture	1
16	Deputy Director Agriculture Khushab	1
17	Deputy Director Agriculture Bhakkar	1
18	Assistant Director Agriculture Nurpur	1

19	Assistant Director Agriculture Mankera	1
20	Assistant Director Agriculture Derya Khan	1

[a] Support staff provided for OFWM, Agriculture Extension, Field Wings, and other Support Staff.
[b] Equivalent of Director or Deputy Director responsible for coordination with respective directorates and field offices
[c] Assistant Agriculture Engineer, Water Management Officers, Water Management Supervisors, Computer Operators, and other Support Staff

D. Project Organization Structure

16. The reporting lines and essential internal structures of key organizations involved in project implementation are in the organizational chart in **Figure 1**. The Organizational structures of the PMO, PIO and PID Choubara Canal Division are in **Figures 2 to 4**, respectively. As shown in **Figure 2**, the Choubara canal division key staff will report to the Project Director, PMO, as Director and Assistant Directors ('existing PID staff' in Figure 2) to ensure close coordination between the PMO and PID Choubara Canal Division office.

Figure 1: Project Organization Structure

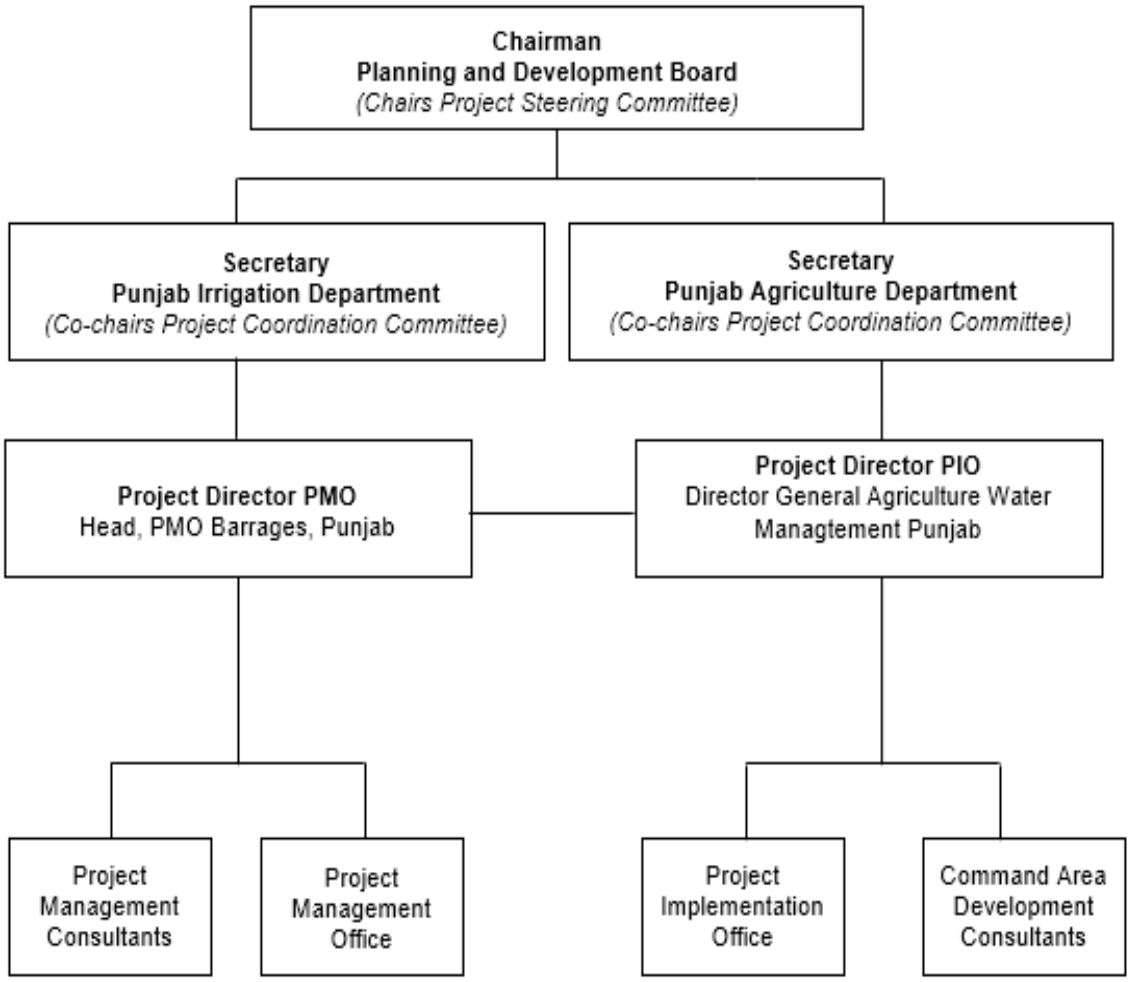


Figure 2: Project Management Office Organization Structure

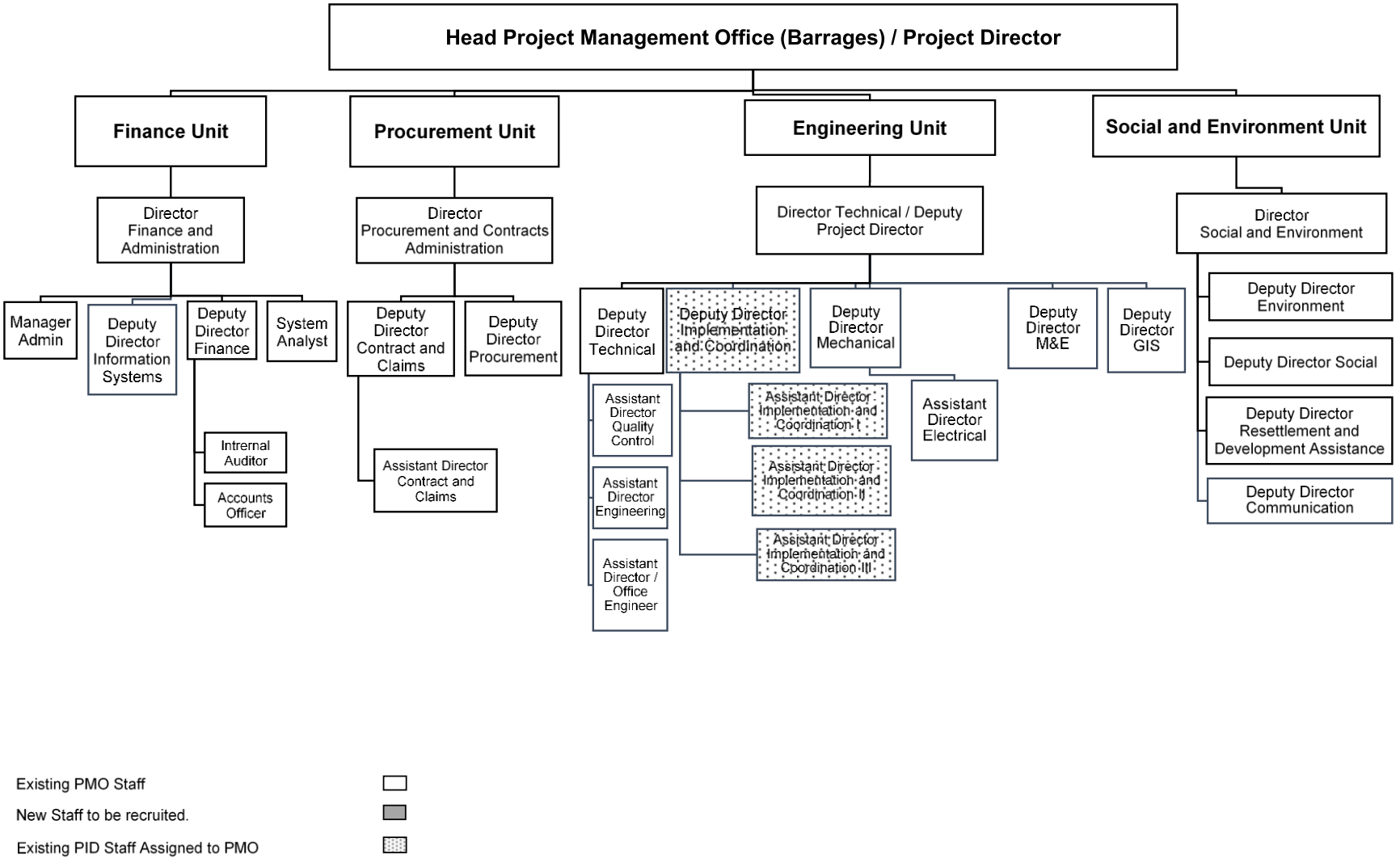
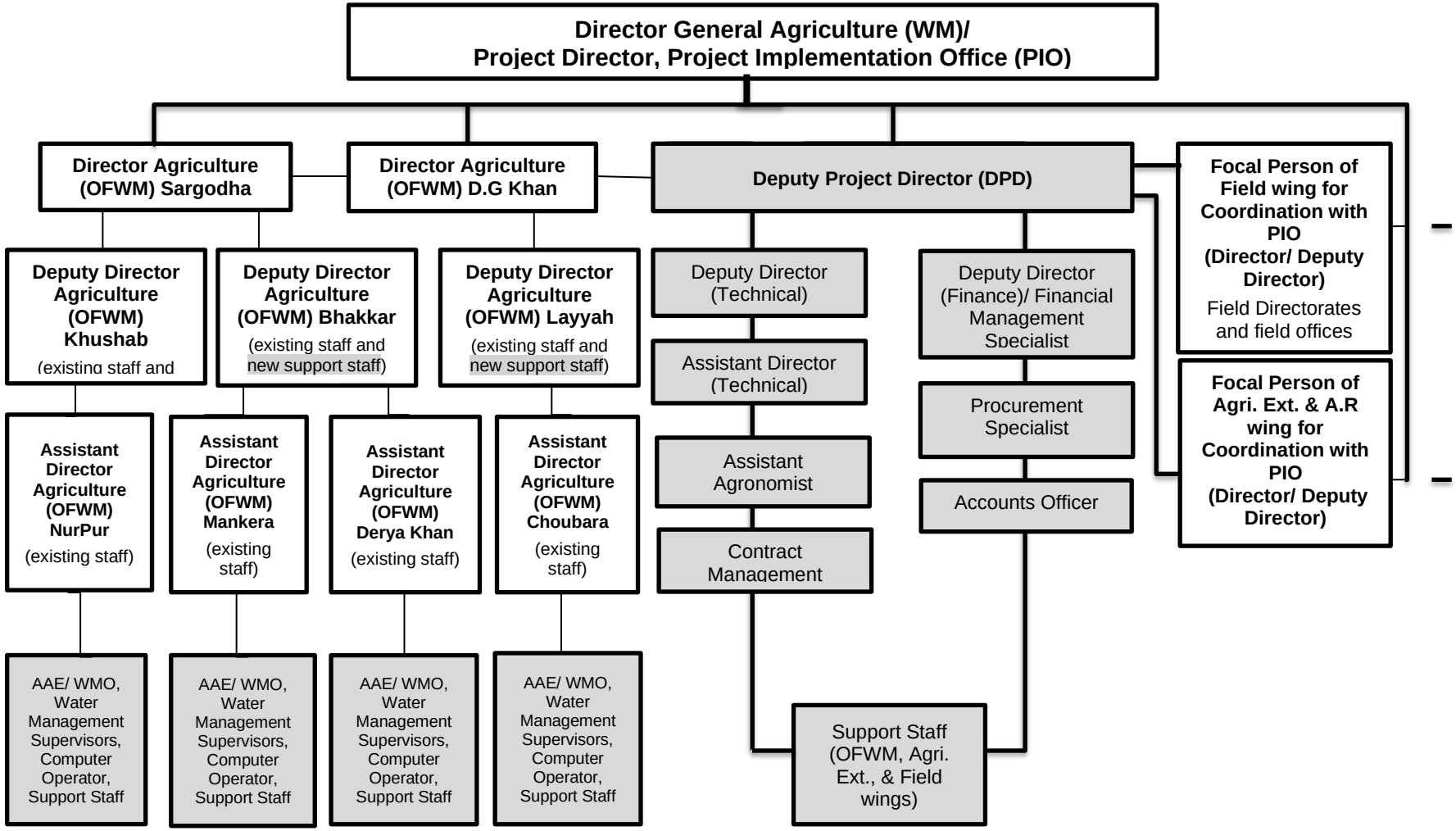
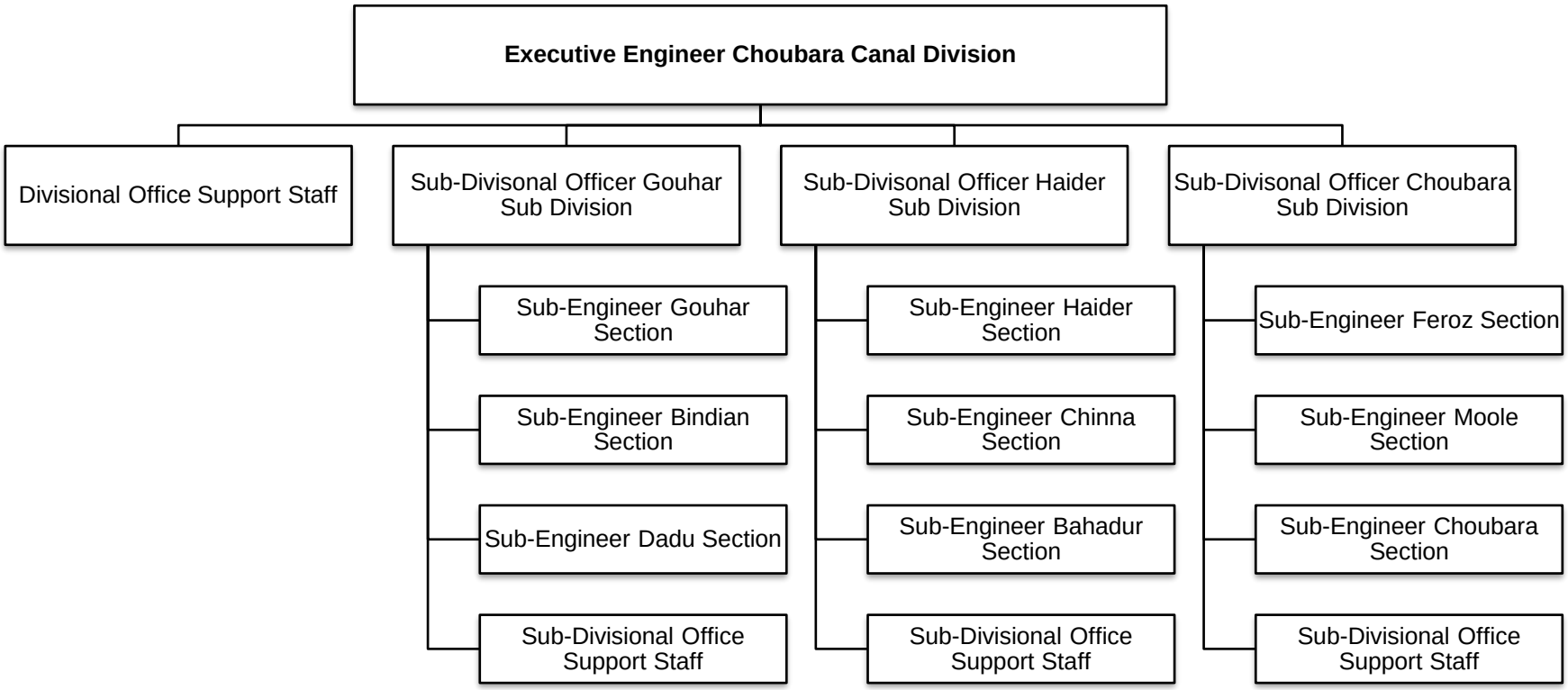


Figure 3: Project Implementation Office Organization Structure



New Staff to be recruited.

Figure 4: PID Choubara Canal Division Organization Structure



IV. COSTS AND FINANCING

17. The project is estimated to cost ¥27,979.6 million ($249.3 million equivalent) (Table 7). The major expenditure items include civil works, on-farm CAD activity support, consulting services, and institutional capacity strengthening and project management. ADB will finance the expenditures in relation to works, equipment, on-farm CAD activities, institutional capacity development, consulting services, resettlement compensation and project management. The ADB loan financing will cover non-land compensations, while land costs will be financed by the government. Farmers, i.e., beneficiaries, will contribute fixed percentages to selected CAD activities, such as field water course construction, installation of high efficiency irrigation systems.

A. Cost Estimates Preparation and Revisions

18. The PMO and PIO estimated capital costs for their respective assigned components, in close consultation with relevant sections of the PID and PAD. PID institutional capacity strengthening costs were prepared by the PID and the consultant financed under the project preparation transactional technical assistance (TRTA). The overall project cost was estimated by the TRTA consultant. Cost estimates may be updated by the PMO and/or PIO during project implementation, according to actual awarded contracted amounts and other considerations, if any.

B. Key Assumptions

19. The following key assumptions underpin the cost estimates and financing plan:

(i) Exchange rate: PRs159.84 = $1.00 (12 months average of August 2020 to July 2021). ¥112.24 = $1.00 (as on 13 October 2021)

(ii) Price contingencies based on expected cumulative inflation over the implementation period are as follows:

Table 6: Escalation Rates for Price Contingency Calculation

Item	2021	2022	2023	2024	2025	2026	2027	Ave.
Foreign rate of price inflation	1.6%	1.7%	1.7%	1.8%	1.8%	1.8%	1.8%	1.74%
Domestic rate of price inflation	8.7%	7.5%	7.0%	6.5%	6.5%	6.5%	6.5%	7.03%

Source. Asian Development Bank. 19 July 2021

C. Detailed Cost Estimates by Expenditure Category

Table 7: Detailed Cost Estimates by Expenditure Category

Item	In PRs millions			In $ millions			In ¥ million			% of Base Cost
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total	
A. Investment Costs										
1. Civil works	**2,918.4**	**20,069.4**	**22,987.8**	**18.26**	**125.56**	**143.82**	**2,049.38**	**14,093.14**	**16,142.53**	**66.01%**
a. Civil Works (PID)	2,542.4	10,655.1	13,197.5	15.91	66.66	82.57	1,785.33	7,482.20	9,267.53	37.90%
b. Civil Works (PAD)	376.0	9,414.3	9,790.4	2.35	58.90	61.25	264.06	6,610.94	6,875.00	28.11%
2. Equipment and Machinery	**1,907.5**	**2,977.0**	**4,884.5**	**11.93**	**18.63**	**30.56**	**1,339.47**	**2,090.51**	**3,429.98**	**14.03%**
a. Equipment and Machinery (PID)	12.2	21.8	34.0	0.08	0.14	0.21	8.60	15.29	23.88	0.10%
b. Equipment and Machinery (PAD)	1,895.2	2,955.2	4,850.5	11.86	18.49	30.35	1,330.87	2,075.22	3,406.09	13.93%
3. Training	**140.4**	**217.1**	**357.5**	**0.88**	**1.36**	**2.24**	**98.58**	**152.48**	**208.99**	**1.03%**
a. Training (PID)	140.4	110.9	251.3	0.88	0.69	1.57	98.58	77.91	176.48	0.72%
b. Training (PAD- institutional)	0.0	45.9	45.9	0.00	0.29	0.29	0.00	32.23	32.23	0.13%
c. Training (PAD-beneficiaries)	0.0	60.3	60.3	0.00	0.38	0.38	0.00	42.34	0.28	0.17%
4. Studies	**133.1**	**133.1**	**266.1**	**0.83**	**0.83**	**1.66**	**93.44**	**93.44**	**186.87**	**0.76%**
5. Services	**974.9**	**897.3**	**1,812.2**	**6.10**	**5.61**	**11.34**	**684.59**	**630.09**	**1,272.54**	**5.20%**
a. Services (PID)	956.9	113.0	1,069.9	5.99	0.71	6.69	671.95	79.35	751.30	3.07%
b. Services (PAD-WMD) - CAD consultants	0.0	742.3	742.3	0.00	4.64	4.64	0.00	521.24	521.24	2.13%
c. Services (PAD-WMD) - laser levelling	18.0	42.0	60.0	0.11	0.26	0.38	12.64	29.49	42.13	0.17%
6. LARP	**0.0**	**1,655.6**	**1,655.6**	**0.00**	**10.36**	**10.36**	**0.00**	**1,162.57**	**1,162.57**	**4.75%**
a. Land Acquisition	0.0	1,078.8	1,078.8	0.00	6.75	6.75	0.00	757.58	757.58	3.10%
b. Resettlement	0.0	576.7	576.7	0.00	3.61	3.61	0.00	404.99	404.99	1.66%
7. Project Management and Operations	**260.0**	**2,539.7**	**2,799.7**	**1.63**	**15.89**	**17.52**	**182.57**	**1,783.44**	**1,642.45**	**8.04%**
a. Project Management and Operations (PAD)	37.6	1,256.3	1,293.9	0.24	7.86	8.09	26.40	882.19	908.58	3.72%
b. Operational costs for CAD (PAD)	185.3	277.9	463.2	1.16	1.74	2.90	130.12	195.17	1.74	1.33%
c. Project Management and Operations (PID)	37.1	1,005.5	1,042.6	0.23	6.29	6.52	26.06	706.08	732.14	2.99%
Subtotal (A)	**6,334.2**	**28,489.2**	**34,823.4**	**39.63**	**178.24**	**217.87**	**4,448.02**	**20,005.67**	**24,453.69**	**100.00%**
B. Contingencies										
1. ADB Loan										
a. Physical Contingency	276.3	1,314.2	1,590.5	1.73	8.22	9.95	194.01	922.86	1,116.88	4.57%
b. Price Contingency	280.7	1,932.9	2,213.6	1.76	12.09	13.85	197.08	1,357.35	1,554.44	6.36%
Subtotal (B)	**556.9**	**3,247.2**	**3,804.1**	**3.48**	**20.32**	**23.80**	**391.10**	**2,280.22**	**2,671.32**	**10.92%**
C. Financing Charges During Implementation	**1,490.3**	**0.0**	**1,490.3**	**7.61**	**0.00**	**7.61**	**854.54**	**0.00**	**854.54**	**3.49%**
Total Project Cost (A+B+C)	**8,381.5**	**31,736.3**	**40,117.8**	**50.73**	**198.56**	**249.28**	**5,693.66**	**22,285.89**	**27,979.55**	**114.42%**

Note: Amounts may not tally precisely because of rounding.
Source: Asian Development Bank estimates.

D. Allocation and Withdrawal of Loan Proceeds

Table 8: Allocation and Withdrawal of Loan Proceeds

ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS				
Number	Item	Total Amount Allocated for ADB Financing ¥		Basis for Withdrawal from the Loan Account
		Category	Subcategory	
1	Works	13,156,000,000		87% of total expenditure claimed
2	Equipment and Vehicles	2,493,800,000		85% of total expenditure claimed
3	Consulting Services	1,221,530,000		83.7% of total expenditure claimed
4	Training for Command Area Development	19,210,000		100% of total expenditure claimed
5	Services and Operations for Command Area Development (PAD)	226,220,000		85% of total expenditure claimed
6	Resettlement	404,990,000		100% of total expenditure claimed
7	Project Management, Training, Workshops and Other Recurrent Costs	1,862,070,000		100% of total expenditure claimed
8	Interest and Commitment Charges	854,540,000		100% of amounts due
9	Unallocated	2,209,640,000		
	TOTAL	22,448,000,000		

E. Detailed Cost Estimates by Financier

Table 9: Detailed Cost Estimates by Financier

Item	Total Cost Incl. farmer (JPY mil)	Tax & Duties (JPY mil)	Tax%to Total cost	Farmers' Contributio (JPY mil)	Total Cost excl. farmer (JPY mil)	Loan Catrg *)	ADB Financing (JPY mil)	ADB Financing %to excl farmer	GOV Financing (JPY mil)	GOV Financing %to excl farmer
A. Investment Costs										
1. Civil works	16,142.53	1,857.13	11.50		16,142.53					
a. Civil Works (PID)	9,267.53	1,099.79	11.87		9,267.53	1	8,062.75	87	1,204.78	13
b. Civil Works (PAD)	6,875.00	754.16	10.97	1,020.70	5,854.30	1	5,093.24	87	761.06	13
2. Equipment and Machinery	3,429.98	398.65	11.62		3,429.98					
a. Equipment and Machinery (PID)	23.88	3.50	14.65		23.88	2	20.30	85	3.58	15
b. Equipment and Machinery (PAD)	3,406.09	395.15	11.60	496.10	2,910.00	2	2,473.50	85	436.50	15
3. Training	251.06	3.04	1.21		251.06					
a. Training (PID)	176.48	-	-		176.48	7	176.48	100	-	-
b. Training (PAD institutional)	44.87	2.53	5.63		44.87	7	44.87	100	-	-
c. Training (PAD-beneficiaries)	29.70	0.51	1.72	10.50	19.21	4	19.21	100	-	-
4. Studies (PID)	186.87	28.73	15.38		186.87	3	156.41	83.7	30.46	16
5. Services	1,314.68	212.36	16.15		1,314.68					
a. Consulting Services (PID)	751.30	122.49	16.30		751.30	3	628.84	83.7	122.46	16
b. Services (PAD-WMD) - CAD consultants	521.24	84.98	16.30		521.24	3	436.28	83.7	84.96	16
c. Services (PAD-WMD) - laser levelling	42.13	4.89	11.60	8.43	33.71	5	28.65	85	5.06	15
6. LARP	1,162.57	-	-		1,162.57		-		-	
a. Land Acquisition	757.58	-	-		757.58		-	-	757.58	100
b. Resettlement	404.99	-	-		404.99	6	404.99	100	-	-
7. Project Management and Operations	1,966.01	80.74	4.11		1,966.01		-		-	
a. Project Management and Operations (PAD)	908.58	28.82	3.17		908.58	7	908.58	100	-	-
b. Operational costs for CAD (PAD)	512.71	80.74	15.75	92.86	232.43	5	197.57	85	34.86	15
c. Project Management and Operations (PID)	732.14	-	-		732.14	7	732.14	100	-	-
Subtotal (A)	**24,453.69**	**2,580.65**		**1,628.58**	**22,825.11**		**19,383.81**		**3,441.31**	
B. Contingencies										
a. Physical Contingency	1,116.88	120.87			1,116.88	9	923.06		193.82	
b. Price Contingency	1,554.44	-			1,554.44	9	1,286.59		267.85	
Subtotal (B)	**2,671.32**	**120.87**		**-**	**2,671.32**		**2,209.65**		**461.67**	
C. Financing Charges During Implementation	**854.54**	**-**		**-**	**854.54**	8	**854.54**		**-**	
Total (A+B+C)	**27,979.55**	**2,701.52**		**1,628.58**	**26,350.97**		**22,448.00**		**3,902.98**	

Note: Amounts may not tally precisely because of rounding.
* Loan category number in Loan Allocation Table (Table 8)
Source: Asian Development Bank estimates.

F. Detailed Cost Estimates by Outputs and/or Components

Table 10: Detailed Cost Estimates by Outputs and/or Components

(¥ million)

Item	Total Cost	Output 1		Output 2		Output 3	
		Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category
A. Investment Costs							
1. Civil works	**16,142.53**	**9,195.68**	**57.0%**	**6,946.85**	**43.0%**	**0.00**	**0.0%**
a. Civil Works (PID)	9,267.53	9,195.68	99.2%	71.85	0.8%	0.00	0.0%
b. Civil Works (PAD)	6,875.0	0.0	0.0%	6,875.0	100.0%	0.0	0.0%
2. Equipment and Machinery	**3,429.98**	**23.32**	**0.7%**	**3,406.09**	**99.3%**	**0.56**	**0.0%**
a. Equipment and Machinery (PID)	23.88	23.32	97.6%	0.00	0.0%	0.56	2.4%
b. Equipment and Machinery (PAD)	3,406.09	0.00	0.0%	3,406.09	100.0%	0.00	0.0%
3. Training	**251.06**	**29.35**	**11.7%**	**74.58**	**29.7%**	**147.13**	**58.6%**
a. Training (PID)	176.48	29.35	16.6%	0.00	0.0%	147.13	83.4%
b. Training (PAD- institutional)	32.23	0.00	0.0%	32.23	100.0%	0.00	0.0%
c. Training (PAD-beneficiaries)	42.34	0.00	0.0%	42.34	100.0%	0.00	0.0%
4. Studies	**186.87**	**168.53**	**90.2%**	**0.00**	**0.0%**	**18.34**	**9.8%**
5. Services	**1,314.68**	**638.95**	**48.6%**	**563.38**	**42.9%**	**112.36**	**8.5%**
a. Services (PID)	751.30	638.95	85.0%	0.00	0.0%	112.36	15.0%
b. Services (PAD-WMD) - CAD consultants	521.24	0.00	0.0%	521.24	100.0%	0.00	0.0%
c. Services (PAD-WMD) - laser levelling	42.13	0.00	0.0%	42.13	100.0%	0.00	0.0%
6. LARP	**1,162.57**	**1,162.57**	**100.0%**	**0.00**	**0.0%**	**0.00**	**0.0%**
a. Land Acquisition	757.58	757.58	100.0%	0.00	0.0%	0.00	0.0%
b. Resettlement	404.99	404.99	100.0%	0.00	0.0%	0.00	0.0%
7. Project Management and Operations	**1,966.01**	**607.59**	**30.9%**	**1,355.47**	**68.9%**	**2.95**	**0.2%**
a. Project Management and Operations (PAD)	908.58	0.00	0.0%	908.58	100.0%	0.00	0.0%
b. Operational costs for CAD (PAD)	325.29	0.00	0.0%	325.29	100.0%	0.00	0.0%
c. Project Management and Operations (PID)	732.14	607.59	83.0%	121.60	16.6%	2.95	0.4%
Subtotal (A)	**24,453.69**	**11,825.99**	**48.4%**	**12,346.36**	**50.5%**	**281.34**	**1.2%**
B. Contingencies							
a. Physical Contingency	1,116.88	531.36	47.6%	577.08	51.7%	8.44	0.8%
b. Price Contingency	1,554.44	486.20	31.3%	1,059.28	68.1%	8.96	0.6%
Subtotal (B)	**2,671.32**	**1,017.56**	38.1%	**1,636.36**	61.3%	**17.40**	0.7%
C. Financing Charges During Implementation	**854.54**	**453.74**	**53.1%**	**390.35**	**45.7%**	**12.46**	**1.5%**
Total Project Cost (A+B+C)	**27,979.55**	**13,297.30**	**47.5%**	**14,373.07**	**51.4%**	**311.19**	**1.1%**

		PID	PAD
B. Contingencies	**Total**	**Outputs 1 and 3**	**Output 2**
a. Physical Contingency	1,116.88	539.80	577.08
b. Price Contingency	1,554.44	495.16	1,059.28
Subtotal (B)	**2,671.32**	**1,034.96**	**1,636.36**
C. Financing Charges During Implementation	**856.54**	**466.20**	**390.35**

Note: Amounts may not tally precisely because of rounding.
Source: Asian Development Bank estimates.

G. Detailed Cost Estimates by Year

Table 11: Detailed Cost Estimates by Year
(¥ million)

Item	Total Cost	2022	2023	2024	2025	2026	2025	2028
A. Investment Costs								
1. Civil works	**16,142.53**	**2,635.73**	**3,090.37**	**3,454.75**	**3,535.36**	**2,355.08**	**1,071.25**	**0.00**
a. Civil Works (PID)	9,267.53	2,315.16	1,854.66	2,317.46	1,853.51	926.75	0.00	0.00
b. Civil Works (PAD)	6,875.00	320.58	1,235.71	1,137.29	1,681.85	1,428.33	1,071.25	0.00
2. Equipment and Machinery	**3,429.98**	**1,152.50**	**480.00**	**483.23**	**478.13**	**477.88**	**358.24**	**0.00**
a. Equipment and Machinery (PID)	23.88	14.58	2.49	5.72	0.62	0.37	0.11	0.00
b. Equipment and Machinery (PAD)	3,406.09	1,137.92	477.51	477.51	477.51	477.51	358.13	0.00
3. Training	**251.06**	**54.90**	**56.69**	**60.57**	**48.18**	**25.63**	**5.09**	**0.00**
a. Training (PID)	176.48	39.72	38.23	45.59	35.30	17.65	0.00	0.00
b. Training (PAD- institutional)	32.23	6.45	8.06	6.45	6.45	3.22	1.61	0.00
c. Training (PAD-beneficiaries)	42.34	8.74	10.40	8.54	6.44	4.75	3.48	0.00
4. Studies	**186.87**	**1.83**	**9.17**	**87.93**	**87.93**	**0.00**	**0.00**	**0.00**
5. Services	**1,314.68**	**154.25**	**307.36**	**255.04**	**223.09**	**159.20**	**179.98**	**35.77**
a. Services (PID)	751.30	101.04	212.06	159.74	127.79	63.89	86.78	0.00
b. Services (PAD-WMD) - CAD consultants	521.24	51.10	86.87	86.87	86.87	86.87	86.87	35.77
c. Services (PAD-WMD) - laser levelling	42.13	2.11	8.43	8.43	8.43	8.43	6.32	0.00
6. LARP	**1,162.57**	**813.80**	**348.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
a. Land Acquisition	757.58	530.31	227.27	0.00	0.00	0.00	0.00	0.00
b. Resettlement	404.99	283.49	121.50	0.00	0.00	0.00	0.00	0.00
7. Project Management and Operations	**1,966.01**	**233.91**	**337.57**	**344.88**	**348.24**	**308.74**	**261.34**	**131.31**
a. Project Management and Operations (PAD)	908.58	89.08	151.43	151.43	151.43	151.43	151.43	62.35
b. Operational costs for CAD (PAD)	325.29	31.89	54.21	54.21	54.21	54.21	54.21	22.32
c. Project Management and Operations (PID)	732.14	112.94	131.93	139.24	142.60	103.10	55.70	46.63
Subtotal (A)	**24,453.69**	**5,046.93**	**4,629.92**	**4,686.40**	**4,720.94**	**3,326.52**	**1,875.90**	**167.08**
B. Contingencies								
a. Physical Contingency	1,116.88	200.20	210.13	223.60	226.39	160.27	88.50	7.78
b. Price Contingency	1,554.44	-95.21	-12.27	304.16	429.83	397.92	281.61	248.40
Subtotal (B)	**2,671.32**	**104.99**	**197.86**	**527.76**	**656.22**	**558.19**	**370.11**	**256.18**
C. Financing Charges During Implementation	854.54	**46.82**	**72.79**	**99.99**	**129.23**	**154.66**	**171.52**	**179.54**
Total Project Cost (A+B+C)	**27,979.55**	**5,198.74**	**4,900.57**	**5,314.15**	**5,506.38**	**4,039.37**	**2,417.53**	**602.81**
%Total Project Cost		**18.58%**	**17.51%**	**18.99%**	**19.68%**	**14.44%**	**8.64%**	**2.15%**

Note: Amounts may not tally precisely because of rounding.
Source: Asian Development Bank estimates

H. Contract and Disbursement S-Curve

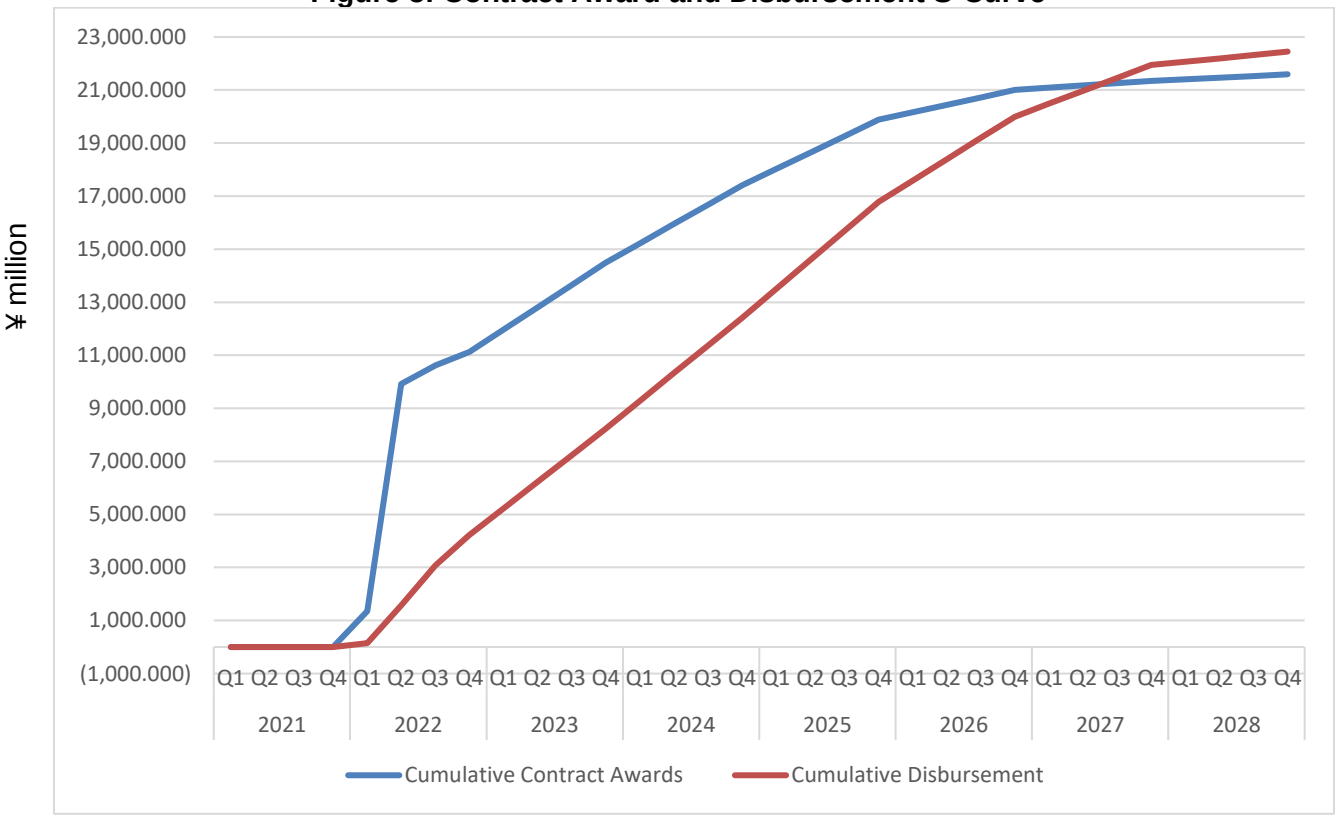
20. Preliminary S-curves for contract awards and disbursements over the project life are shown below. The S-curves will be updated upon the loan effectiveness, based on the updated project implementation schedule.

Table 12: ADB's OCR Loan
(¥ million)

Projections for Contract awards							Projections for Disbursements						
Year	Q1	Q2	Q3	Q4	Total	Cum.	Year	Q1	Q2	Q3	Q4	Total	Cum.
2021	0.000	0.000	0.000	0.000	0.000	0.000	2021	-	-	-	-	-	-
2022	1346.880	8566.157	702.622	507.325	11,122.984	11,122.984	2022	143.892	1,430.162	1,500.424	1,147.474	4,221.952	4,221.952
2023	841.800	841.800	841.800	841.800	3,367.200	14,490.184	2023	1,002.864	1,002.864	1,002.864	1,002.864	4,011.456	8,233.408
2024	729.560	729.560	729.560	729.560	2,918.240	17,408.424	2024	1,044.954	1,044.954	1,044.954	1,044.954	4,179.816	12,413.224
2025	617.320	617.320	617.320	617.320	2,469.280	19,877.704	2025	1,090.973	1,090.973	1,090.973	1,090.973	4,363.892	16,777.116
2026	280.600	280.600	280.600	280.600	1,122.400	21,000.104	2026	804.761	804.761	804.761	804.761	3,219.044	19,996.160
2027	85.764	85.764	85.764	85.764	343.056	21,343.160	2027	486.560	486.560	486.560	486.560	1,946.240	21,942.400
2028	62.194	62.194	62.191	62.191	248.770	21,591.930	2028	121.316	121.428	131.428	131.428	505.600	22,448.000

Note: ¥112.24 = $1.00 (as of 13 October 2021)

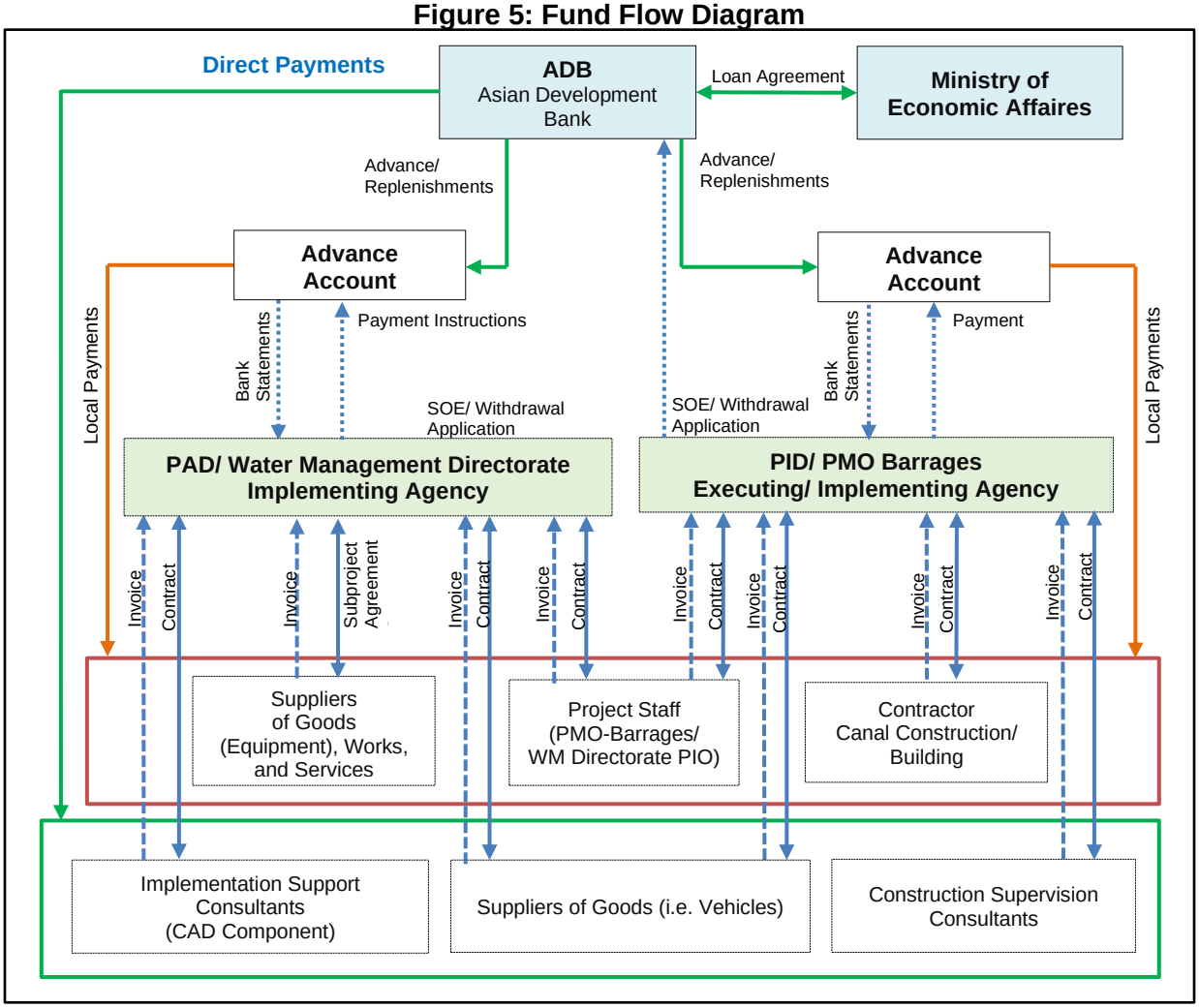
Figure 5: Contract Award and Disbursement S-Curve



I. Fund Flow Diagram

21. Fund flows from ADB to the executing and implementing agencies, and various suppliers and service providers are shown as a schematic diagram in the following figure.

Figure 5: Fund Flow Diagram



ADB = Asian Development Bank, CAD = command area development; MOF = Ministry of Finance, PAD = Punjab Agriculture Department, PID = Punjab Irrigation Department, PIO = project implementation office, PMO = project management office, SOE = statement of expenditures, WM = water management.
Source: Asian Development Bank

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

22. The financial management assessment (FMA) was conducted during the project processing till June 2021 in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects and the Financial Due Diligence: A Methodology Note. The FMA assessed the financial management capacity of the PID and PAD including funds-flow arrangements, staffing, accounting and financial reporting systems, financial information systems, and internal and external auditing arrangements were assessed. Based on the assessment, it was concluded that the incumbent financial management staff is adequately qualified and experienced in the financial management of ADB projects and implementation of Government specified financial rules and regulations. External audits of ongoing ADB funded projects implemented by the PID and PAD have shown satisfactory results,[8] [9] [10] adequate and appropriate documentation of internal controls is available in the form of various national and provincial financial management rules and regulations, and the controls over administrative assets are robust. However, the financial management staff strength is insufficient which likely hinders segregation controls over accounting and financial reporting functions, the absence of independent internal audit function and use of manual systems for accounting and financial reporting impedes the effectiveness of internal controls, while the management of operating assets is weak. Accordingly, the overall pre-mitigation financial management risk was assessed to be substantial. The PID and PAD were assessed to possess sufficient capacity to manage advance fund and maintain adequate documentation for the use of statement of expenditure (SOE) procedures.

23. Efficiency of the financial management systems had improved as both agencies continue to incorporate measures for improving their financial management functions. However, both agencies recognize the need for further improvements. The PID and PAD have agreed to implement an action plan as key measures to address the residual gaps. The financial management action plan is provided in the table below.

Table 13: Financial Management Action Plan

S. no.	Risk	Action Item	Responsibility
1	The existing financial management departmental structures are not appropriately designed to ensure segregation of accounting and reporting functions. Further, the financial management staff strength at PID/PMO and PAD/PIO is not sufficient in view of expected enhanced scale of activities expected from the proposed Project.	By no later than loan effectiveness, the PID/PMO and PAD/PIO financial management departments will be structured to segregate the accounting and financial reporting sections, with staff job descriptions duly documented and authorized by competent authority. By no later than loan effectiveness, the PID/PMO will complete the hiring of vacant position of Deputy Director – Finance. In addition, two Accounts Officers will be hired,	PID and PAD

[8] ADB. Islamic Republic of Pakistan: Trimmu and Panjnad Barrages Improvement Project. https://www.adb.org/sites/default/files/project-document/100137/47235-001-rrp.pdf.
[9] ADB. Islamic Republic of Pakistan: Punjab Water Resources Management Projects. https://www.adb.org/sites/default/files/project-documents/51359/51359-001-prfr-en.pdf.
[10] ADB. Islamic Republic of Pakistan: Jalalpur Irrigation Project. https://www.adb.org/sites/default/files/project-documents/46528/46528-002-rrp-en.pdf.

S. no.	Risk	Action Item	Responsibility
		each assigned to the accounting and reporting sections. By no later than loan effectiveness, the PAD/PIO will hire an Accounts Officer.	
2	Internal audit function is absent at the PID/PMO, whereas the internal controls function performed at the PAD/PIO is not considered to be independent and in accordance with the International Professional Practices Framework (IPPF) framework of The Institute of Internal Auditors (IIA), USA.	By no later than six months from the date of loan effectiveness, the PID will operationalize a dedicated independent internal audit department by: a. Formally notifying the departmental structure, employing two internal audit officers, reportable directly to the respective Secretaries of the PID and PAD. b. Developing and approving internal audit charter and internal audit manual, developed in accordance with the International Professional Practices Framework issued by the Institute of Internal Auditors, USA. c. Approving the first and successive risk-based annual internal audit plans, duly including the ADB project in said plan. d. Ensuring submission of internal audit reports, for each financial year, with respect to ADB project, within three months from the completion of internal audit process.	PID and PAD
3	While the Government SAP accounting software is used for the recording and reporting of departmental level functions, the project level accounting is performed using MS Excel based manual tools.	No later than six months from the loan effectiveness, the PID/PMO and PAD/PIO will deploy an accounting software, sufficient to meet the FM accounting and reporting requirements under the Project.	PID and PAD

B. Disbursement

1. Disbursement Arrangements for ADB Funds

24. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook*[11] (2017, as amended from time to time), and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.[12] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

25. PID and PAD will be responsible for (i) preparing disbursement projections; (ii) requesting budgetary allocations for counterpart funds; (iii) collecting supporting documents; and (iv) preparing and sending withdrawal applications to ADB for the respective project activities.

26. **Direct payment.** The procedures will generally be used for civil works contracts and consulting services, subject to the minimum value per withdrawal application.

27. **Advance fund procedure.** Separate advance accounts should be established and maintained by PID and PAD for each funding source at the National Bank of Pakistan. The currency of the advance accounts is the Japanese Yen. The advance accounts are to be used exclusively for ADB's share of eligible expenditures. The PID and PAD who administer the advance accounts are accountable and responsible for proper use of advances to the advance account including advances to any sub-accounts.

28. The total outstanding advance to the advance accounts should not exceed the estimate of ADB's share of expenditures to be paid through the advance accounts for the forthcoming 6 months or 10% of the loan amount. The PID and PAD may request for initial and additional advances to the advance accounts based on an Estimate of Expenditure Sheet[13] setting out the estimated expenditures to be financed through the accounts for the forthcoming 6 months. Supporting documents should be submitted to ADB or retained by the government in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) when liquidating or replenishing the advance accounts.

29. **Statement of expenditure (SOE) procedure.**[14] The SOE procedure may be used for reimbursement of eligible expenditures or liquidation of advances to the advance accounts. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full documentation when submitting the withdrawal application to ADB.

30. **Withdrawal application.** Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign

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[11] The handbook is available electronically from the ADB website (https://www.adb.org/documents/loan-disbursement-handbook).
[12] Disbursement eLearning. http://wpqr4.adb.org/disbursement_elearning
[13] Estimate of Expenditure sheet is available in Appendix 8A of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).
[14] SOE forms are available in Appendix 7B and 7D of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

the withdrawal applications on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per WA is stipulated in the *Loan Disbursement Handbook* (2017, as amended from time to time). Individual payments below such amount should be paid (i) by the PID and/or PAD and subsequently claimed to ADB through reimbursement, or (ii) through the advance fund procedure, unless otherwise accepted by ADB. The borrower should ensure sufficient category and contract balances before requesting disbursements. ADB reserves the right not to accept WAs below the minimum amount. WAs and supporting documents will demonstrate, among other things that the goods, and/or services were produced in or from ADB members and are eligible for ADB financing. Use of ADB's Client Portal for Disbursements (CPD)[15] system is encouraged for submission of withdrawal applications to ADB.

2. Disbursement Arrangements for Counterpart Fund

31. All disbursements under government financing will be carried out in accordance with regulations of the Islamic Republic of Pakistan relevant to co-financing of the projects financed by the Multilateral Financing Organizations. PID and PAD shall open and maintain the separate advance account for government counterpart funds. The Government will finance local taxes. Value added tax (VAT) will be claimed by the contactors, suppliers, and consultants in his interim payment certificate (IPC), and PMO-Barrages will approve the invoices including VAT. PMO Barrages will pay the claimed VAT to Punjab Revenue Authority (PRA). PMO Barrages will pay the rest of the amount to the contractors, suppliers and consultants. Income tax will be deducted from the invoice of the contractors, suppliers and consultants. The deducted income tax will be paid by PMO-Barrages to the FBR (Federal Board of Revenue). The deducted income tax will be reflected in the income of contractors, suppliers and consultants when submitting their finance balance sheets to PRA.

C. Accounting

32. The PID and PAD will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following the International Public Sector Accounting Standard for cash-based accounting. The PID and PAD will prepare project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

33. The PID and PAD detailed project financial statements will be audited in accordance with International Standards on Auditing by an independent auditor acceptable to ADB. The audited project financial statements together with the auditor's opinion will be presented in the English language to ADB within 6 months from the end of the fiscal year by the PID and PAD.

34. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan were used only for the

[15] The Client Portal for Disbursement facilitates online submission of WA to ADB, resulting in faster disbursement. The forms to be completed by the Borrower are available online at https://www.adb.org/documents/client-portal-disbursements-guide.

purpose(s) of the project; and (iii) whether the borrower or executing agency was in compliance with the financial covenants contained in the legal agreements (where applicable).

35. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

36. The government, PID and PAD have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[16] ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

37. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Public Communications Policy 2011.[17] After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter and additional auditor's opinions will not be disclosed.[18]

[16] ADB's approach and procedures regarding delayed submission of audited project financial statements:
(i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
(ii) When audited project financial statements are not received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next 6 months.
(iii) When audited project financial statements are not received within 12 months after the due date, ADB may suspend the loan.

[17] Public Communications Policy: http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications

[18] This type of information would generally fall under public communications policy exceptions to disclosure. ADB. 2011. *Public Communications Policy*. Paragraph 97(iv) and/or 97(v).

VI. PROCUREMENT AND CONSULTING SERVICES

38. **Value for Money.** Value for money of the procurement shall be achieved by (i) proposing the major works package to attract both international and national bidders based on market assessment; and (ii) open competitive bidding shall be used for all packages excluding the community participation component.

A. Advance Contracting and Retroactive Financing

39. All advance contracting and retroactive financing will be undertaken in conformity with ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). The issuance of invitations for bidding under advance contracting and retroactive financing will be subject to ADB approval. The borrower, the Government of Punjab, PID and PAD have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

40. **Advance contracting** will be used for recruitment of consulting services, and procurement of goods and civil works. The steps to be concluded in advance include (i) preparation of bidding documents, tendering, and bid evaluation for civil works packages, materials and equipment; (ii) evaluation of bids; and (iii) recruitment of consultants.

41. **Retroactive financing** is envisaged relating to project implementation support consultants, command area development consultants, civil works, command area development activities, project management costs for PID and PAD and other expenditures eligible for ADB loan-financing. The maximum amount of eligible expenditures under retroactive financing is the equivalent of 20% of the total ADB loan, incurred before loan effectiveness, but not more than 12 months before the signing of the loan agreement.

B. Procurement of Goods, Works, and Consulting Services

42. All procurement of goods, works and consultant selection will be undertaken in accordance with ADB Procurement Policy (2017, as amended from time to time) and the Procurement Regulations for ADB Borrowers (2017, as amended from time to time). Major civil works contracts include irrigation canals, i.e., main branch canal, distributary and minor canals, gated regulators, associated structures and field office buildings. Open competitive bidding (international advertisement) will be used for the Choubara irrigation canal construction civil works package. Most of the goods and works contracts shall be used using open competitive bidding, (national advertisement). Request for quotations (RFQ) will be used for goods and works packages up to $200,000.

43. Before the start of any procurement, ADB and the government will review the public procurement laws of the federal and provincial governments to ensure consistency with ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).

44. A comprehensive procurement plan for the first 18-month indicating threshold and review procedures of all packages is detailed in Section C.

45. The command area development component includes watercourse construction. This comprises earthen construction of watercourses, lining in critical sections, and up to 50% of the

watercourse length, water control structures, culverts, drop structures, and allied works.[19] The procurement will be carried out through community participation by involving 1,247 WUAs.[20] This will enhance community mobilization, involvement, ownership, and employment of labor-intensive techniques through cost-sharing mechanism. WUA and PAD will enter an agreement by which WUA will execute the works. WUA will purchase the construction materials through an RFQ procedure by inviting at least three quotations, preferably from local suppliers. Labor component of the subprojects will be extended by the members of the community, provided adequate expertise exists, who should be reimbursed adequately for the services rendered. In case the WUA cannot identify adequately skilled labor within the community, the works can be let out by inviting quotations from three local contractors. The cost estimates for the works will be based on PAD approved rates (updated from time to time). The command area development consultant team will supervise the works with PAD oversight. The details of community contracting are given in **Appendix 2.**

46. The CAD includes additional works components: water storage ponds, high efficiency irrigation systems, laser land levelling, high efficiency irrigation systems and tubewell water course lining. The PAD will invite applications from the beneficiary farm owner(s) and finalize the scope of intervention based on the selection criterion. Once agreement is reached between PAD and the beneficiary farm owner(s), the PAD will invite at least three quotations by using ADB's (RFQ procedures. The RFQ will be issued to contractors or suppliers who have adequate experience and capacity. They will then evaluate and award the work and inform the farmer. Contractors and suppliers will execute the works or install the equipment under the supervision of CAD consultants with PAD oversight and in coordination with beneficiary farmers.

47. Consulting services packages for the project are described in Section D.

48. All consultants will be recruited according to ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). The terms of reference for consulting services are detailed in Section D.

49. For the PID project management consultant package, an estimated 984 person-months (national) of consulting services are required to (i) facilitate project management, (ii) construction supervision support, and (iii) project monitoring and evaluation support. For the PAD on-farm command area development support package, an estimated 2,070 person-months (national) of consulting services are required to (i) facilitate project management, (ii) on-farm CAD support, (iii) capacity strengthening support for the PAD and WUAs; and (iv) project monitoring and evaluation support. Consulting firms will be engaged using the quality and cost-based selection (QCBS) method with a standard quality cost ratio of 90:10.

C. Procurement Plan

Basic Data

Project Name: Greater Thal Canal Irrigation Project	
Project Number: 49372-002	**Approval Number:**
Country: Pakistan	**Executing Agency**: Irrigation Department of the Government of Punjab through

[19] The remaining water course length will remain unlined as further reduction in water losses beyond 50%–60% lining is small, compared to the cost of lining.

[20] One WUA needs for each water course. There are 609 watercourses in the Choubara branch area to be constructed and 728 watercourses in the Main Canal and Mankera branch areas to be set-up or improved. Out of 728 watercourses in the Main Canal and Mankera branch areas, 94 watercourses have partly functional WUA exists. These 94 watercourses have been lined to 22% on average and will need to be lined to 50%.

	PMO-Barrages
Project Procurement Risk: Medium	**Implementing Agency**: Agriculture Department, Government of the Punjab through OFWM Division
Project Financing Amount: ¥27,979,550,000 (US$ 249,300,000 equivalent) **ADB Financing:** ¥22,448,000,000 (US$ 200,000,000 equivalent) **Cofinancing (ADB Administered):** **Non-ADB Financing:** ¥5,299,120,000 (US$ 49,300,000 equivalent)	**Project Closing Date:** 30 June 2029
Date of First Procurement Plan: 15 October 2021	**Date of this Procurement Plan**: 15 October 2021
Procurement Plan Duration: 18 **months**	**Related to COVID-19 response efforts:** No
Advance Contracting: Yes	**Use of e-procurement (e-GP):** No

A. Methods, Review and Procurement Plan

Except as the Asian Development Bank (ADB) may otherwise agree, the following methods shall apply to procurement of goods, works, and consulting services.

Procurement of Goods and Works	
Method	**Comments**
Open Competitive Bidding (OCB-national) for Goods	Subject to Prior Review.
Request For Quotation for Goods	Up to $200,000. First package subject to Prior Review.
Open Competitive Bidding (OCB-international) for Works	Subject to prior review. For the construction of Choubara branch canal, its distributaries, minors and related structures
Open Competitive Bidding (OCB-national) for Works	Subject to prior review. For canal re-sectioning works, PAD office buildings.
Request For Quotation for Works	Up to $200,000. First package subject to Prior Review.
Community Participation in Procurement for Works	Up to $200,000. First package of similar packages subject to Prior Review.

Consulting Services	
Method	**Comments**
Quality- and Cost-Based Selection for Consulting Firm (national)	Subject to Prior Review. Quality and cost based on 90:10 quality-cost weighting.
Consultant's Qualification Selection for Consulting Firm	Subject to Prior Review.
Least-Cost Selection for Consulting Firm	Subject to Prior Review.
Competitive for Individual Consultant	Subject to Prior Review.

B. Lists of Active Procurement Packages (Contracts)

The following table lists goods, works, non-consulting and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan duration.

Agriculture Department, Government of the Punjab

Goods and Works							
Package Number	**General Description**	**Estimated Value**	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter/year)	**Comments**
PAD/GTCIP /CPP/001	Development and Lining of Watercourses	¥3,342,731,680 ($29,782,000)	CPP	Prior		Q1 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No

							High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /CPP/002	Development of Irrigation Schemes (lining of tubewell watercourses)	¥261,519,200 ($2,330,000)	CPP	Prior		Q2 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /CPP/003	Construction of Water Storage Ponds	¥41,528,800 ($370,000)	CPP	Prior		Q2 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP/OCB/001 – Plant and Machinery							
PAD/GTCIP /OCB/001a	Bulldozers and loader for bulldozers	¥659,410,000 ($5,875,000)	OCB	Prior	1S1E	Q4 / 2021	Non-Consulting Services: No Advertising: International/ No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: No Bidding Document: Goods High Risk Contract: No Covid-19 Response? No

PAD/GTCIP /OCB/001b	Service Supply Van and Service Van Equipment	¥6,523,950 ($58,125)	OCB	Prior	1S1E	Q4 / 2021	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: No Bidding Document: Goods High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/003	Agricultural Machinery for Demonstration	¥9,821,000 ($87,500)	RFQ	Prior		Q4 / 2021	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/004	Furnitures and Fixtures	¥9,764,880 ($87,000)	RFQ	Prior		Q4 / 2021	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP/RFQ/001 - Vehicles							
PAD/GTCIP /RFQ/001b	Single Cabin (4*4)	¥15,783,750 ($140,625)	RFQ	Prior		Q3 / 2022	Non-Consulting Services: No No. Of Contracts: 1

							Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/001c	1000 CC Car	¥19,642,000 ($175,000)	RFQ	Prior		Q3 / 2022	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/001d	Motorcycles	¥5,612,000 ($50,000)	RFQ	Prior		Q3 / 2022	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP/RFQ/002 – IT Equipment							
PAD/GTCIP /RFQ/002a	Laptop, Macbook, Desktop Computers, LaserJet Printers	¥3,665,309.44 ($32,656)	RFQ	Prior		Q3 2022	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/002b	Scanner, Multimedia Screen/LED, GPS meters	¥578,036 ($5,150)	RFQ	Prior		Q3 2022	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk

							Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/002c	Photocopier	¥1,683,600 ($15,000)	RFQ	Prior		Q3 2022	Non-Consulting Services: No No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
Civil Works							
PAD/GTCIP /OCB/002	Office Building Construction for PAD	¥22,448,000 ($200,000)	OCB	Prior		Q1 / 2022	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/003	Laser Land Levelling	¥44,896,000 ($400,000)	RFQ	Prior		Q1 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PAD/GTCIP /RFQ/004	Installation of High Efficiency Irrigation System (HEIS)	¥44,896,000 ($400,000)	RFQ	Prior		Q1 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No

							Covid-19 Response? No
PAD/GTCIP /RFQ/005	Installation of Power System at HEIS Sites	¥44,896,000 ($400,000)	RFQ	Prior		Q1 / 2022	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No Covid-19 Response? No

Irrigation Department of the Government of Punjab

Goods and Works							
Package Number	**General Description**	**Estimated Value**	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter/year)	**Comments**
PID/GTCIP/ OCB/001	Choubara Branch Canal Construction Project/ GTC	¥9,259,800,000 ($82,500,000)	OCB	Prior	1S2E	Q4 / 2021	Non-Consulting Services: No Advertising: International No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: Yes Bidding Document: Large Works High Risk Contract: No Covid-19 Response? No
PID/GTCIP/ OCB/001-1	Re-sectioning of Channels of Mankera Canal Division (Package 1)	¥63,135,000 ($563,000)	OCB	Prior	1S1E	Q1 2022	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Prequalification of Bidders: No

							Domestic Preference Applicable: No Advance Contracting: Yes Bidding Document: Works High Risk Contract: No Covid-19 Response? No
PID/GTCIP/ OCB/001-2	Re-sectioning of Channels of Mankera Canal Division (Package 2)	¥57,397,000 ($511,400)	OCB	Prior	1S1E	Q1 2023	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: No Bidding Document: Works High Risk Contract: No Covid-19 Response? No
PID/GTCIP/ OCB/003	Groundwater Monitoring Equipment including delivery/installation at site	¥18,182,880 ($162,000)	OCB	Prior	1S1E	Q1 / 2022	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: No Bidding

							Document: Goods High Risk Contract: No Covid-19 Response? No
PID/GTCIP/ OCB/004	Vehicles for PMO/PID	¥33,672,000 ($300,000)	OCB	Prior		Q2/ 2022	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Advance Contracting: No High Risk Contract: No Covid-19 Response? No
PID/GTCIP/ RFQ/002	Vehicles for PMO/PID	¥12,795,360 ($114,000)	RFQ	Prior		Q2 / 2023	Non-Consulting Services: No No. Of Contracts: Multiple Advance Contracting: No High Risk Contract: No Covid-19 Response? No

Agriculture Department, Government of the Punjab

Consulting Services							
Package Number	**General Description**	**Estimated Value**	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date** (quarter/year)	**Comments**
PAD/GTCIP /CS/002	Command Area Development Consultants	¥448,960,000 ($4,000,000)	QCBS	Prior	FTP	Q3 / 2021	Non-Consulting Services: No Type: Firm Assignment: National Quality-Cost Ratio: 90:10 Advance Contracting: Yes Covid-19 Response? No

Irrigation Department of the Government of Punjab

Consulting Services							
Package Number	**General Description**	**Estimated Value**	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date** (quarter/year)	**Comments**
PID/GTCIP/CS/001	Construction Supervision Consultants for Chaubara Branch Canal Construction	¥765,476,800 ($6,820,000)	QCBS	Prior	FTP	Q3 / 2021	Non-Consulting Services: No Type: Firm Assignment: National Quality-Cost Ratio: 90:10 Advance Contracting: Yes Covid-19 Response? No
PID/GTCIP/CS/002	GW Modeler	¥1,683,600 ($15,000)	Competitive	Prior		Q1 / 2022	Non-Consulting Services: No Type: Individual Assignment: National Expertise: Groundwater modelling Advance Contracting: No Covid-19 Response? No
PID/GTCIP/CS/003	Third Party Safeguards Monitor (2 positions)	¥1,683,600 ($15,000)	Competitive	Prior		Q4 / 2021	Non-Consulting Services: No Type: Individual Assignment: National Expertise: Safeguards monitoring Advance Contracting: Yes Covid-19 Response? No

C. List of Indicative Packages (Contracts) Required Under the Project

The following table lists goods, works, non-consulting and consulting services contracts for which procurement activity is expected to commence beyond the procurement plan duration and over the life of the project (i.e., those expected beyond the current procurement plan duration).

Agriculture Department, Government of the Punjab

Goods and Works						
Package Number	**General Description**	**Estimated Value**	**Procurement Method**	**Review**	**Bidding Procedure**	**Comments**
PAD/GTCIP/CPP/004	Development and lining of watercourses	¥3,342,731,680 ($29,782,000)	CPP	Prior		Non-Consulting Services: No

						No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/CPP /005	Development of irrigation schemes (lining of tubewell watercourses)	¥261,519,200 ($2,330,000)	CPP	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/CPP /006	Construction of water storage ponds	¥41,528,800 ($370,000)	CPP	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/RFQ /006	Laser Land Levelling	¥44,896,000 ($400,000)	RFQ	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/RFQ /007	Installation of High Efficiency Irrigation System	¥44,896,000 ($400,000)	RFQ	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/RFQ /008	Installation of Power System at HEIS sites	¥44,896,000 ($400,000)	RFQ	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No
PAD/GTCIP/RFQ /009	Agricultural inputs (support to farmers and FFS)	¥44,896,000 ($400,000)	RFQ	Prior		Non-Consulting Services: No No. Of Contracts: Multiple Covid-19 Response? No

Irrigation Department, Government of the Punjab

Goods and Works						
Package Number	**General Description**	**Estimated Value**	**Procurement Method**	**Review**	**Bidding Procedure**	**Comments**
PID/GTCIP/OCB/ 001-3	Re-sectioning of Channels of Mankera Canal Division (Package 3)	¥94,689,000 ($843,700)	OCB	Prior	1S1E	Non-Consulting Services: No Advertising: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: No Bidding Document: Works

						High Risk Contract: No Covid-19 Response? No

Consulting Services						
Package Number	**General Description**	**Estimated Value**	**Selection Method**	**Review**	**Type of Proposal**	**Comments**
None						

D. Consultant's Terms of Reference

50. The project will have the following consulting services packages:
- i) project management consultant for PID
- ii) command area development (CAD) consultants; and
- ii) Other minor packages like ground water modelers, and safeguards third party monitors.

51. Draft outline terms of references for the PID project management consultant package is in **Attachment 3**. **Attachment 4** contains the draft outline terms of references for the PAD on-farm command area development support package. The terms of references of the other minor packages will be prepared by the PID, PAD or project management consultant teams during the project implementation.

VII. SAFEGUARDS

A. Environment

52. The project is classified as category A for environmental safeguards. The environmental impact assessment (EIA) has been prepared by PID in accordance with ADB's Safeguard Policy Statement (SPS), 2009. The first draft EIA was disclosed on the ADB website in February 2020. The second draft EIA that incorporates second round of an ecological survey, biodiversity action plan (BAP), and stakeholders engagement plan (SEP) was disclosed on the ADB website in September 2021. The EIA concludes the project will result in positive impacts by converting semi-arid rainfed low productive lands to irrigated agricultural lands resulting to increased agricultural productions and improved livelihoods of local population. The key negative impacts are construction-related[21] and during operations of the canal, such as hydrological changes in the project area, socio-economic impacts, increased pesticide use, and potential habitat modification of the range lands *(rakhs),*[22] which are classified as protected forests under the Forest Act and providing habitat for a limited range of wildlife species.

53. **Environmental Management Plan.** The EIA includes an environmental management plan (EMP) which specifies mitigation measures, environmental monitoring and reporting requirements, safeguard institutional arrangements, safeguard capacity development for the PMO and PIO, cost estimates, performance indicators, and actions to ensure compliance with ADB SPS, applicable laws and regulations. The EMP will be incorporated into the bidding and contract documents, giving contractors the primary responsibility for implementation of construction-related mitigation measures. Prior to start of civil works, the contractor will be required to submit to PMO and PIO a site-specific EMP (SSEMP) that will include pre-works photo-documentation, detailed mitigation measures and environmental monitoring program, and subplans[23] such as but not limited to health and safety plan, waste management plan, and traffic management plan. If some residual impacts are likely to remain significant after mitigation, the SSEMP will also include appropriate compensatory measures (offset) that aim to ensure that the project does not cause significant net degradation to the environment. The contractor(s) shall reinstate all properties, whether public or private, which are damaged as consequence of execution of works to at least pre-works conditions.

54. To address potential operational impacts on hydrogeological changes in the area, Output 3 of the project includes installation of groundwater monitoring equipment for the entire GTC area, developing ground water modelling, and institutional capacity for improved water resources management and O&M of irrigation systems to ensure sustainability. On increased pesticide use, the project under Output 2 includes farmers' capacity enhancement of appropriate agricultural practices including pesticide management. On potential habitat modification, the EIA includes a proposed BAP to offset potential losses of biodiversity values in the *rakhs* due to the project. The project will also not allow agricultural command area development activities in the *rakh* areas to prevent land use changes, complying with the Forest Act. The BAP provides institutional strengthening measures to enhance capacity of the various government departments, create an interface with other relevant stakeholders in the area, particularly Bhakkar District, measures for sustainable agricultural and livestock development alongside eco-tourism potential, to enhance

[21] Potential environmental impacts that may occur during construction include such as noise, dust, waste generation, localized increase in traffic, occupational health and safety risks, exposure to biological hazard (e.g. viruses) and spread to the community (community health and safety)

[22] Most of the project area is located within a declared game reserve, but it serves the purpose of controlled hunting of mainly Houbara bustard and other wildlife by permit holders, and not of environmental conservation.

[23] The EIA includes details of the subplan and suggested outlines.

livelihood opportunities for the local communities. During the project implementation phase, the BAP will need to be presented to the Forest Department and other NGO's working in the area (e.g., WWF and IUCN) for further discussion and agreement on the actions and timelines. The EIA also included a tree management plan (TMP) for trees to be planted along the irrigation canals (to act as a wind barrier) and to delineate roles and responsibilities between various parties for the planting and maintenance of trees during and beyond project implementation period.

55. **Recommendations of the EIA.** The EIA has analyzed in detail all the potential environmental and socio-economic impacts during various project phases. The EIA concludes that with the described mitigation and biodiversity offset measures and capacity building effectively implemented and monitored as outlined in the Environmental Management Plan and Biodiversity Management Plan and the implementation of the Biodiversity Action Plan (BAP), the project will achieve its goals of significant benefits for farming communities while keeping environmental impacts at an acceptably low level. It will also put in place awareness programs and conservation planning and resourcing which will target a no-net-loss outcome for biodiversity.

56. **Update/revision of the EIA.** The EIA will be updated to include feedback from stakeholders and affected people, if any, or in the event of any unanticipated environmental impacts during project implementation. The PMO will submit the updated/revised EIA(s) to ADB for review and concurrence. The PMO shall ensure any additional requirements due to the updating/revision are communicated to the contractor(s) in a timely manner and issue contract variations, if needed, to meet the safeguard compliance requirements. Any update in the EIA during implementation will also be disclosed on ADB and project websites. No relevant additional works shall be allowed until ADB approves the updated EIAs.

57. **Statutory clearances and applicable standards.** Implementation of the project will be governed by Governments of Pakistan and Punjab environmental acts, rules, policies, and regulations. All statutory clearances shall be obtained prior to commencement of works. The PMO and PIO will inform the contractor(s) for any environmental clearance conditions related to execution of works and will ensure these are considered in the SSEMPs. During the design, construction, and operation of the project, ADB SPS requires the PMO and PIO to apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's (WBG) environment, health, and safety (EHS) Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. In general, Government of Pakistan standards for environmental quality correspond to the WBG EHS Guidelines, however in case of differences, more stringent standards are applicable. The EIAs, IEEs and EMPs provide the applicable environmental standards on water quality, air quality, noise level, and vibrations.

58. **Occupational and Community Health and Safety (OHS).** ADB requires that the PMO and PIO, through the contractors, will ensure that the workers are provided with a safe and healthy environmental, considering risks inherent to the sector and specific classes of hazards in the subproject areas including physical, chemical, and biological hazards. The PMO and PIO will establish preventive measures and plans to address risks and impacts and potential exposure of surrounding communities to both accidental and natural hazards, especially where the structural elements of the project are accessible to members of the affected community or where their failure could result in injury to the community. The PMO and PIO will avoid or minimize the exacerbation of impacts caused by natural hazards, such as landslides or floods, that could result from project activities. The PMO and PIO shall be prepared to respond to accidental and emergency situations. This preparation shall include response planning document(s) that addresses the training,

resources, responsibilities, communications, procedures, and other aspects required to respond effectively to emergencies associated with project hazards.

59. **Consultation and Stakeholders Participation.** Stakeholders to be affected by the project activities have been consulted during preparation of the EIA. During project implementation, meaningful consultations[24] will be carried out with affected people and other concerned stakeholders including civil societies and facilitate their informed participation. The EIA includes a Stakeholders Engagement Plan (SEP) developed to ensure balanced and sustainable relationship between the executing and implementing agencies, PMO, PIO, and affected communities throughout the project cycle. The SEP identified the project stakeholders and external stakeholders, timing for engagement, issues and risks to the project, and resources required. SEP. The goal of the SEP is smooth implementation of overall project activities while maintaining good relationship with external stakeholders, to help the project team to understand stakeholders' concerns and perceptions, and to provide feedbacks and anticipation in a timely manner. A dedicated PMO staff under the Environmental Safeguards Unit, (Deputy Director Communication or higher) would be assigned for effective implementation of the SEP. SEP activities and its results are to be documented and included in the periodic monitoring reports to be submitted to ADB.

60. **Information Disclosure.** The PID, PMO, and POI shall ensure that the EIA, monitoring reports and corrective action plans, if any, are disclosed by: (i) uploading on project websites, (ii) translating the EIA's Executive Summary, monitoring reports, and corrective action plan into Urdu; (iii) placing hard copies of approved EIA and with the translated Executive Summary in the offices of PMO, PIO and representatives of affected people; and (iv) informing affected communities of significant potential hazards in a culturally appropriate manner. Appropriate information about the project's emergency preparedness and response activities, resources, and responsibilities shall also be disclosed to affected communities.

61. **Grievance Redress Mechanism.** The PMO and PIO will establish the grievance redressal mechanism (GRM) to receive and facilitate resolution of affected people's concerns, complaints and grievances about the project and its subprojects' environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. The Contractors will be required to assist in receiving, recording, and coordinating with PMUs on field-level complaints/grievances. The detailed project-level GRM is included in the EIA and may be tailored to consider contractor's roles and project-specific site conditions.

62. **Environmental safeguards implementation arrangement**. The PMO has established an Environment and Social Unit with a full-time Director (Social and Environment) and a Deputy Director (Environment). The PMO will be assisted by construction supervision consultant's (CSC's) environment specialists. The PMO will ensure that:

(i) Over-all compliance of the project with ADB SPS requirements and applicable laws, rules, and regulations on environment, health, and safety;

[24] Per ADB SPS, meaningful consultation is defined as "a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues"

(ii) the latest EIA report is submitted to the Punjab Environmental Protection Department and environmental clearance is sought before commencement of civil works;
(iii) the EMP is included in bidding and contract documents;
(iv) all contractors will prepare the SSEMP and submit to the PMO for approval at least 10 days before taking possession of any work site;
(v) no access to the site will be allowed until the SSEMP is approved by the PMO;
(vi) implementation of the SSEMP is regularly supervised and monitored by the CSC;
(vii) a non-compliance notice will be issued if the contractors are not in compliance with requirements of EIA, EMP/SSEMP, and/or contractual documents. In case of non-compliance the contractor is required to prepare a timebound corrective action plan (CAP) to be agreed with the PMO;
(viii) all applicable environmental laws, rules, and regulations are complied;
(ix) resources (staff, logistics, equipment, and budget) are allocated for implementation of environment, health and safety requirements;
(x) provide orientation to bidders (during bid stage) and contractor upon mobilization regarding environmental safeguards requirements of the project;
(xi) Implement the stakeholder engagement plan (SEP);
(xii) provide inputs to progress reports and the project completion report;
(xiii) semi-annual environmental monitoring reports are submitted to ADB for review and disclosure within 1 month after the reporting period,
(xiv) external monitoring report is submitted to ADB as part of the project report; and
(xv) in case of unpredicted environmental impacts occurring during project implementation, the environmental impacts are assessed and CAP are prepared and implemented.

63. The CSC included environmental specialists to be assigned in the head and field office who will support the PMO and PIO in the supervision and monitoring activities. The main tasks include but not limited to are to:

(i) Update the EIA to account for any change due to feedback from stakeholders, design/location or unanticipated impacts during implementation phase;
(ii) identify requirements and prepare detailed TORs of technical experts that may be needed in the updating/finalizing the EIA and/or during implementation;
(iii) ensure contractor submits SSEMP before start of works and assist PMO and PIO in the review, clearance, and monitoring of contractors SSEMP;
(iv) review the SSEMP for adequacy in terms of compliance with the requirements of the EMP and instruct amendments and additions as necessary;
(v) provide guidance to contractors on ADB SPS requirements on environmental safeguards, health, safety, and applicable laws, rules and regulations;
(vi) prepare a project-focused Occupational Health and Safety Plan (OHS) to be adopted by contractors and subcontractors;
(vii) ensure contractor establish a system to monitor environmental safeguards of the project, including monitoring the indicators set out in the monitoring plan of the SSEMP;
(viii) facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g., location clearance certificates, environmental clearance certificates, etc.), as relevant;
(ix) ensure that relevant OHS provisions in the contract are abided by the contractor and subcontractors during the construction, commissioning and operation;

(x) prepare environmental monitoring checklists and safeguards monitoring report templates for completion of the contractors;
(xi) together with the external environmental monitoring expert: review, monitor, and evaluate the effectiveness with which the SSEMP is and recommend necessary corrective actions to be taken as necessary;
(xii) consolidate monthly environmental monitoring reports from contractors and provide to external environmental monitoring expert for preparation and submission of quarterly monitoring reports to ADB (until commissioning and project completion report has been issued by ADB);
(xiii) prepare semi-annual environmental monitoring report and submit to External Environmental Monitoring Expert for review/clearance prior to submission to ADB (commencing 6 months after loan effectiveness until project completion report has been issued by ADB);
(xiv) address any grievances brought about through the grievance redress mechanism in a timely manner;
(xv) visit worksites during construction and provide guidance relating to supervision and compliance monitoring;
(xvi) visit completed works and prepare post-construction audit reports; and
(xvii) prepare training materials and implement programs in environmental management;
(xviii) ensure the implementation of the mitigation measures suggested in EMP;
(xix) supervise and monitor environmental activities being performed at site;
(xx) organize periodic environmental training programs and workshops for the consultant's and contractor's staff;
(xxi) assist with establishing environmental monitoring procedures for the operation phase of the improved infrastructure.
(xxii) implementation of the BAP during various project phases (with assistance from BAP consultants);
(xxiii) Monitor implement of Tree Management Plan; and
(xxiv) suggest any additional mitigation measures if required.

64. The CSC will engage a BAP consultant team (as a subconsultant) to support in the finalization of the BAP prepared during project preparation, consultations with the regulatory agencies, identification and implementation of activities to be covered by the project, capacity development of key stakeholders, and support in identification of resources for implementation of action after project completion.

65. The CSC may engage additional specialists to comply with site-specific environmental safeguard requirements per ADB SPS or conduct technical studies to address issues/concerns that may arise during project implementation. The PMO may seek support of ADB in the preparation of TORs to undertake the required technical studies.

66. **Contractors.** The Contractor shall appoint an Environment, Health and Safety (EHS) Staff/Engineer who will be responsible on a day-to-day basis in (i) ensuring implementation of SSEMP, (ii) coordinating with the PMUs and environment specialists of project consultant teams; (iii) community liaison,[25] consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting. Prior to commencement of the work, the contractor will submit a pre-

[25] Reasonable size social outreach team (SOT) to be appointed by contractor to facilitate community liaison, consultations and R&R implementation (including resolution of grievances). Requirement of SOT will be included in bid document.

works condition report together with the SSEMP to the PMO and PIO. The PMO Environment and Social Unit, with the assistance of the CSC environment specialists, will review the pre-works report and SSEMP and conduct site verification. No works will be allowed until PMO confirms completeness of the SSEMP. The Contractors will be required to provide workers with environmental awareness and SSEMP orientation prior to deployment to work sites, and regular trainings on health and safety in construction sites. The Contractor shall submit to PMO and PIO a monthly SSEMP implementation report and to implement the corrective action plan and any written directives by PMO and PIO to address non-compliances. The PMO, PIO or CSC environment specialists will undertake site verifications of the monthly SSEMP implementation report and advise contractors for corrective actions, if necessary.

67. The PMO will retain an external environmental monitoring expert to monitor the implementation of the project's EMP and contractor SSEMP, compliance with ADB SPS, and conditions of the environmental permits/clearances. The external environmental monitoring expert will also be responsible for reviewing the environmental monitoring reports before submission to ADB. S/he will also recommend corrective actions to address non-compliances. The tasks are:

(i) assessing and reporting overall safeguards performance of the project;
(ii) identifying key issues/concerns resulting to environmental safeguard non-compliances;
(iii) assessing and reporting compliance of CSC and contractors on contractual obligations and applicable laws, rules, and regulations related to environment, health and safety;
(iv) monitoring the progress regarding implementation of environmental safeguards as provided in EMP/SSEMP;
(v) monitoring progress of monitoring programs as given in EMP/SSEMP;
(vi) randomly checking whether monitoring of the environmental aspects of the project during construction phase is being properly carried out; and
(vii) preparing external semi-annual environmental monitoring reports.

68. ADB will ensure that:

(i) monitoring and supervision of the project is carried out on an ongoing basis until a project completion report is issued; and
(ii) project review missions regularly visit project sites to ascertain the status of implementing the EMP with detailed review by ADB's safeguard specialists, officers and/or consultants.

B. Land Acquisition and Resettlement

69. The project is classified as category A for involuntary resettlement. About 2,279 ha (5,632 acre) of land (of which 1,488 ha are privately owned and 791 ha are government land) will be required for the right of way of irrigation canals of the Choubara branch system under output 1. Approximately 4,686 households (29,628 persons) will be affected. Of these, 35 households will need to be relocated. In total, approximately 123,186 trees and crops on 4,395 acres will be affected. The number of affected structures will be approximately 226.

70. Of the 1,488 ha of privately owned land, approximately 1,481 ha. of land (99.5% of the private land required) have been acquired between 2008 and 2011. This is well in advance of ADB's financing to the Choubara branch system which was discussed in early 2019. It was identified, however, nearly half of the landowners (of the impacted area) were not compensated when the progress and status of the government's land acquisition process was assessed in

February 2020. To address this legacy issue, the PID has agreed to take the following measures: (i) complete all the outstanding land compensation payment based on the original compensation rate determined in 2006, (ii) provide additional allowances for unpaid landowners to bridge the gap between the original compensation rate and current market rate, and (iii) meet any other ADB SPS requirements. For the already acquired land (2,272 ha of land), a Corrective Action Plan (CAP) has been prepared based on the due diligence conducted, agreement between the Government of Punjab and ADB, and any other ADB SPS requirements. On the other hand, approximately 7 ha. of private land (among 1,488 ha. of total private land) will need to be newly acquired for the right of way. A Land Acquisition and Resettlement Plan (LARP) has been prepared for this purpose.

71. Compensation will be provided for land and any other affected assets above the entire 2,279 ha. of land. These include crops, trees, structures etc. as per ADB SPS requirements. Intensive public consultations and information dissemination campaigns which covered all the affected villages and settlements in the project area have been conducted all through the project preparation period. The CAP and LARP were disclosed on ADB website in August 2021. Although intensive due diligence was conducted, additional assessment and data collection will be required during CAP implementation stage. This is to avoid missing any eligible AHs and APs of the project and to ensure ADB SPS requirement. Additional surveys and assessments are for: (i) poverty assessment and vulnerability profiling, (ii) impact assessment and livelihood profiling (especially. Livestock farming) in Rakh areas, and (iii) preparation of community development program based on the findings from the assessments mentioned earlier. With regards to output 2, land will be required for the construction of watercourses. The required land and any asset will be provided by the farmers and local communities as counterpart support. Involuntary resettlement is not involved. Safeguard measures to ensure that contributions are voluntary and documented are explained below.

72. Based on the above, the project is categorized A for involuntary resettlement safeguard. The government through PID and PMO will ensure that the design of the GTC Irrigation Project minimizes land acquisition and resettlement impacts by exploring design alternatives and all other activities under the project are carried out in full compliance with all applicable laws and regulations of Pakistan, ADB's SPS (2009), and the approved CAP/LARP. PID and PMO shall ensure that:

(i) the final and implementation-ready LARP following the final detailed design and notification of Section 5 of the LAA is submitted to ADB for review and approval prior to its implementation;
(ii) the final and implementation ready LARP duly endorsed by PID are disclosed to displaced persons (DPs) in their local language in accordance with the ADB's SPS (2009);
(iii) a qualified and experienced external resettlement monitor, acceptable to ADB, is timely recruited to verify CAP and LARP implementation progress and recommend issuance of no-objection by ADB to commencing of civil works;
(iv) Handling over of site/commencing of civil works is made only upon completion of the CAP and LARP implementation as verified by an external resettlement monitor;
(v) all land and rights of way required by the project shall be cleared and made available in a timely manner in accordance with the schedule as agreed in the relevant civil works contract;
(vi) CAP and LARP implementation shall be monitored internally by PMO with support of PIC following monitoring parameters specified in the CAP and LARP (particular attention needs to be paid to the progress and result of the relocation of the vulnerable households). The PMO Social and Environment Unit assisted by PIC

will conduct day to day internal supervision and monitoring of LARP implementation progress to ensure compliance with the provisions of the LARPs for work package. The LARP implementation progress shall be consolidated into semi-annual internal resettlement monitoring reports to be shared with ADB for review. While bi-annual monitoring and evaluation reports prepared by an external monitor will be submitted to ADB for review and clearance throughout project implementation period. Upon clearance of bi-annual monitoring reports by ADB, these will be disclosed by uploading on PID and ADB websites;

(vii) without limiting the application of the Involuntary Resettlement Safeguards or the LARP, PID and PMO shall ensure that no land shall be acquired for the purpose of the project under the emergency acquisition provisions of Pakistan's Land Acquisition Act (1894), as amended from time to time;

(viii) the activities of the civil works contractor for the project are in compliance with the approved LARP and no physical displacement or economic displacement shall occur and section or part of a section is handed over to the civil works contractor until: (a) compensation at full replacement cost has been paid to all affected persons in accordance with the final LARP for relevant civil works contract packages or sections that are ready to be constructed; (b) other entitlements listed in the CAP and LARP have been provided to affected persons; and (c) CAP and LARP implementation report prepared by the external monitor is submitted to ADB and determined as satisfactory;

(ix) Continued efforts shall be made to link DPs, especially those who are severely affected and vulnerable, to access project-related jobs, other livelihood opportunities and available livelihood support programs and training in the project area; and

(x) In case landowners have grievances on the amount of compensation for land, project level GRM will review them in coordination with revenue department. If such grievance redress efforts cannot resolve the grievances, PID/PMO will engage an independent valuer to ascertain the full replacement cost of the land plots, where grievances are filed, and provide additional compensation/allowance to bridge the gap between the full replacement cost and original land compensation rate, if any.

73. Any unanticipated land acquisition and resettlement (LAR) impacts encountered during implementation of project will be dealt in accordance with the ADB approved CAP and LARP and ADB's SPS 2009 requirements. However, change to the scope, location or alignment of the project shall be avoided. If during the implementation of the project, any such change to the scope, location or alignment of the project is identified, it shall not be made without prior approval of ADB. Any new LAR-related impacts as a result of changing in project scope, location or alignment will require a new LARP or LARP addendum which should be submitted to ADB for its approval. The additional plan should be prepared following ADB's SPS and its required guidelines. No construction activities shall be commenced in the sections with new/additional LAR impacts before full implementation of ADB approved LARP is confirmed and cleared by ADB.

74. Under Output 2 of the project, a total of 1,347watercourses will be constructed. These will be planned, designed, and constructed through close consultation with, and participation by the beneficiary farmers, who will be organized into water users' associations (WUAs). These will be responsible for O&M of watercourses and associated structures. The formation of WUAs will be guided and the capacity of WUAs will be strengthened by trainings under technical supervision and guidance by PAD. The land is provided by the farmer beneficiaries and local communities as counterpart support including other assets such as trees and labor, therefore involuntary

resettlement is not involved. As a safeguard measure, PAD and PIO, with support from the PMC shall undertake the following:

(i) Early screening of the watercourse development will be undertaken to fully determine the land requirements, impacts and existence of dispute and any other encumbrances on the land required. Meaningful consultations will be undertaken in good faith with all potential land donors throughout the screening, planning and implementation phases of each project. Consultations will be recorded in detail and will include all discussions in relation to the donation of land, if applicable.

(ii) Where land donation is required, written agreements must be obtained from each person donating land. For community or collective land, donation can only occur with the consent of all individuals using or occupying the land.

(iii) No physical displacement should occur as a result of land donation (not only the landowners themselves but also tenants or labor, if any). Furthermore, donation should not result in more than 10% of total productive agricultural land holding donated by any individual household, or more than 10% loss of any other productive or income generating asset. No individual household should be impoverished by the land donation.

(iv) Donated lands for the watercourse will be legally transferred to the WUA. Only watercourse alignment where there is written confirmation of agreement among all concerned landowners/farmers will be included under the Project.

(v) The progress and status of the voluntary land donation will be monitored by PAD and will be shared with ADB through semi-annual social safeguard monitoring report.

(vi) A grievance redress mechanism will be put in place under the PAD and PIO, with representation of the farmer beneficiaries, and local government. A grievance log will be established prior to project implementation and will be available for inspection and reporting by project monitors.

75. **Grievance Redress**: The PID and PMO shall ensure (i) efficient grievance redress mechanisms are in place and functional prior starting CAP and LARP implementation and contractor's mobilization to assist DPs resolve queries and complaints, if any, in a timely manner; (ii) all complaints are registered, investigated and resolved in a manner consistent with the provisions of Grievance Redress Mechanism as agreed in the ADB approved CAP and LARP; (iii) the Complainants/aggrieved persons are kept informed about status of their grievances and remedies available to them; and (iv) adequate staff and resources are available for supervising and monitoring the implementation progress of the CAP and LARP. Similarly, PAD and PIO will set up an efficient grievance redress mechanism prior to mobilization of farmers and WUAs under Output 2 of the project to ensure that disputes and concerns among farmer beneficiaries are acted upon and resolved timely, including issues related to land donations and other contributions.

76. **Information Disclosure and Stakeholder Participation**: PID and PMO shall ensure that the CAP, LARP and monitoring reports are disclosed by: (i) uploading the CAP and LARP on PID and ADB websites, (ii) placing hard copies of approved CAP and LARP translated into Urdu in the offices of PMO, District Revenue Department, PIC and representatives of DPs, and (iii) translating the executive summary of ADB approved CAP and LARP, bearing information on project impacts, asset valuation, entitlements, compensation budget and provisions with institutional arrangements in place and providing to the affected community. PMO, with support from the PIC shall: (i) conduct additional consultations and regular field visits during updating and implementation of the CAP and LARP; (ii) inform DPs about: (a) resettlement impacts, asset valuation, entitlements and compensation payment modalities with timelines, (b) rehabilitation and income restoration measures suggested for the DPs; and (iii) hold regular meetings with

surrounding communities and DPs including women and vulnerable groups to share project related information during project implementation period.

C. Indigenous Peoples

77. The project is screened as category C for Indigenous peoples planning requirement under SPS 2009 as there are no known IP communities within the project area. If during implementation, any change to the scope, location or alignment of the canal IPs are identified and found to be affected by the project, PID shall take all steps required to ensure that the project complies with the applicable laws and regulations of Pakistan and the ADB's Safeguard Policy Statement 2009.

78. **Prohibited investment activities.** Pursuant to ADB's SPS (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS (2009).

VIII. GENDER AND SOCIAL DIMENSIONS

79. The rural population comprises 63% of the country's total population in 2019.[26] Farm-based economic activities contribute 40% of rural households' income. About 75% of women and girls in the labor force[27] are employed in the agriculture sector, but only 19% of them are in paid employment. The high cost of quality agricultural inputs, limited access to land, and lack of access to processing and storage facilities are among the problems that women farmers face in Pakistan.[28] Poverty incidence is higher in rural areas. In Punjab, about 27% of the population still live below the poverty line.[29]

80. Agriculture generates about 40% of the provincial labor force and remains the dominant source of income and livelihoods in rural Punjab. About 66% percent of women in the province's labor force are in the agriculture sector compared to men, of whom only 29% are employed in agriculture in 2018.[30] The proposed project will benefit rural people living in about 80 villages, whose main sources of livelihood are agriculture and livestock rearing which are declining. Direct target beneficiaries will be smallholder farmers. There are estimated 35,000 farming households (or 217,000 persons) in the target area which will directly benefit from the project. It is likely that with command area development this will increase with potentially up to 84,500 farming households (or 524,000 persons). Households headed by women in the project area comprise 1%.

81. The project's baseline study shows that patriarchal practices are strongly observed in the villages, which restrict women's involvement in activities outside of the home. Women household members perform all unpaid care and domestic work. They also contribute to seasonal agricultural work as unpaid family labor. Kitchen gardens are not common in the villages. Livestock production and marketing at the village level are women's main economic activities. Women have weak access to health and education services as facilities are located in towns. In the project area, literacy rate among adult women is only 22% compared to 58% for men. The lack of middle schools and high schools in the villages contribute to the high dropout rate among girls.

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[26] World Bank. 2021. *Open Data. Rural Population – Pakistan*.
[27] Women and girls aged 10 and above
[28] Zaidi Y., Farooq S. et al. 2018. Rural Women in Pakistan - Status Report 2018 UN Women Pakistan.
[29] ADB. *Proposed Loan to the Islamic Republic of Pakistan: MFF Punjab Intermediate Cities Improvement Investment Program*. Manila.
[30] Ministry of Statistics – Government of Pakistan. 2018. *Employment Trends*.

82. The project is classified as effective gender mainstreaming (EGM) and will address the gender issues identified through the following measures: (i) installation of irrigation system infrastructure with washing points, cattle baths, and crossing points in strategic locations of the irrigation system, (ii) inclusion of women as members of WUAs, (iii) training women in irrigated agricultural practices crop production, and on-farm water management; (iv) organizing of women's community-based groups who are non-WUA members; and (v) increasing the number of female extension workers and trainers in PAD for social mobilization of women in the project areas. The project will design and implement a social development program to help address human and social development needs of women and girls, with the following target actions: (i) conduct vocational training for women who are not engaged in farming to expand their income sources; (ii) provide basic social services on health and education such as procurement of equipment for basic health unit; and (iii) upgrade a girls' primary school to middle school.

83. The executing and implementing agencies through the PMO and PIO, is responsible for the achievement of the GAP targets and will ensure the implementation, monitoring, and reporting of the project's gender targets in the GAP. Resources will be allocated for gender activity monitoring and reporting. The Gender Specialist as project implementation consultant, will provide technical support for implementing, monitoring, and reporting on the GAP targets

Table 14: Gender Action Plan

Activity	Performance Targets/ Indicators	Responsibility	Timeframe
Outcome: Agricultural production in the project area increased			
Monitor increases in cropping intensity and number of farmers benefitting from this improvement	Annual cropping intensities increased to 104.6% in 263,000 ha of the Main Canal, Mankera and Choubara branch areas benefitting about 539,400 person (of whom about 269,700 are women) (2019 baseline: 83.0%)	PMO	Yrs 1-3
Output 1: Irrigation system infrastructure for Choubara system developed			
1.1 Construct infrastructure to facilitate women's passage and access to domestic and livestock water uses.	1.1.1 106 cattle baths, water supply outlets, and passage bridges in strategic locations of the irrigation system constructed[b] (2019 Baseline: 0)	PMO[a]	Yrs 1-3
1.2 Implement a social development program that addresses human development needs of women and girls.	1.2.1 At least one girls' primary school upgraded to middle school (2019 Baseline: 0) 1.2.2 1 basic health unit with improved pre- and post-natal facilities (2019 Baseline: 0) 1.2.3 11,168 women accessed prenatal, postnatal childcare, growth monitoring, and vaccination at the basic health unit (2019 Baseline: 0) 1.2.4 250 people with improved skills in drafting and pattern marking (at least 75% of whom are women) (2019 Baseline: 0) 1.2.5 250 people with improved skills on home-based business (at least 75% of whom are women) (2019 Baseline: 0) 1.2.6 250 people with improved skills on food processing, handicraft and marketing (at least 75% of whom are women) (2019 Baseline: 0) 1.2.7 250 people with improved skills on electrification (at least 75% of whom are women) (2019 Baseline: 0)	PMO	Yrs 2-3
Output 2: On-farm command area developed with enhanced beneficiaries' capacity			
2.1 Increase women's participation in WUAs	2.1.1 56,000 farm households, with at least 560 female headed households, enrolled as WUA members,[c] (2019 Baseline: 0)	PAD-WMD and consultants	Yrs 1 - 6
2.2 Organize women's community-based groups for non-WUA members	2.2.1 At least 4 community-based women's groups organized (2019 Baseline: 0) 2.2.2 At least 2 women-only meetings held per year (2019 Baseline: 0) 2.2.3 Minutes of meetings with consolidated views of women farmers, are included in documentation of WUA meetings (2019 Baseline: 0)	PAD-WMD and consultants	Yrs 1 - 6
2.3 Conduct capacity building activities for women farmers on on-farm water management, good agricultural practices, and livestock development	2.3.1 26,460 farmers, of which at least 606 women, enhanced knowledge and application on use of water efficient cropping, appropriate farming exercises, and high efficiency water technologies (2019 baseline: 0)	PAD (WMD and AED) and consultants	Yrs 1 - 6

Activity	Performance Targets/ Indicators	Responsibility	Timeframe
2.4 Partner with ongoing support programs for women and other vulnerable groups in the target command area	2.4.1 Linkage with National Rural Support Program and Punjab Rural Support Program forged to provide subsidized farming inputs and training on income generation and food security activities, e.g., off-season vegetables, kitchen gardening, and tunnel farming for women and vulnerable groups	PAD-PIO and consultants	Yrs 1 - 6
2.5 Increase female trainers and extension workers in PAD	2.5.1 At least 4 women (one per tehsil as incremental staff) recruited in PAD-AED for social mobilization under the project (2019 baseline: not yet) 2.5.2 PAD-WMD and PAD-AED staff, including all women incremental staff for social mobilization improved knowledge and skills on social mobilization of women (2019 baseline: not yet)	PAD	Yrs 1 - 6
Project management			
a. Recruit women staff in PIO and PMO	a.1 National Gender Specialist in PMO and PIO recruited to lead in the implementation, monitoring, and reporting on the GAP (baseline: 0)	PID and PAD	Yr 1
b. Collect and utilize sex-disaggregated data for planning, implementation and monitoring.	b.1 Project monitoring and information system included gender indicators and regularly populated with age- and sex-disaggregated data (baseline: Not applicable)	PMO and PIO	Yrs 1 - 6

AED = Agriculture Extension Directorate, HEIS = high efficiency irrigation system, LAR = land acquisition and resettlement, PAD = Punjab Agriculture Department, PID = Punjab Irrigation Department, PIO = project implementation office, PMO = Project Management Office, TRTA = transactional technical assistance, WMD = Water Management Directorate, WUA = water users association

[a] Responsible for procuring equipment and civil works contractor. Once equipment procured handed over to health department

[b] Women's gender roles in the project areas hold them responsible for water collection for household use and care for livestock. The construction of passage bridges will allow women to draw and carry water safely, for household cleaning, and for their kitchen gardens. The construction of cattle baths will enable women to provide their cattle with access to water, and to ensure the safety of their cattle. This facilitates women's work in the household as well as in their roles in livestock production.

[c] The baseline study for the project shows that households headed by women comprise about 1% of all households and that 93% of households are farming households engaged in crop production and livestock raising. The Punjab Khal Panchayat Act 2019 does not prohibit women farmers from becoming members of the Khal Panchayat for water users associations. The Punjab Khal Panchayat Authority is mandated to have at least two female members..

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

Table 15: Design and Monitoring Framework

Impacts the Project is Aligned with Food security enhanced (Pakistan 2025)[a] Rural poverty in Punjab reduced (Punjab Growth Strategy 2030)[b]			
Results Chain	**Performance Indicators**	**Data Sources and Reporting Mechanisms**	**Risks and Critical Assumptions**
Outcome Agricultural production and productivity in the project area increased	By 2029 a. Annual cropping intensities increased to 104.6% in 263,000 ha of the Main, Mankera and Choubara branch areas benefitting about 539,400 persons (of whom about 269,700 are women) (2019 baseline: 83.0%) (OP 2.1.4 and OP 5.1) b. Crop yield of high value crops increased to 11.3 tons per ha in the project area (melons) (2019 baseline: 7.5 tons per ha) (OP 5.3)	a. PAD's annual agricultural statistics data and PPMS satellite data analysis results b. PAD's annual agricultural statistics data	A: Climate change is within the projected range. R: Inadequate cost recovery and budget support lead to deteriorated infrastructure and unreliable irrigation water supply.
Outputs 1. Irrigation system infrastructure for Choubara branch system constructed 2. On-farm command area developed with enhanced beneficiaries' capacity	By 2028 1a. 72 km of primary canal, 251 km of secondary canals (distributaries), and 127 km of tertiary canals (minors) for the Choubara branch system in operation (2019 baseline: 0) (OP 1.3.1, OP 5.1.1) 1b.106 cattle baths, water supply outlets, and passage bridges in strategic locations of the irrigation system constructed[c] (2019 baseline: 0) (OP 1.3.1, OP 2.4.1) 2a. 56,000 farm households enrolled with at least 560 households headed by women[d] as water users association members (2019 baseline: 0) 2b. High efficiency irrigation system pilots to improve water use efficiency established for supplying water to additional 4,000 ha (2019 baseline: 1,689 ha) (OP 5.3.1)	1a.–1b. Project's quarterly progress and completion reports 2a.–2b. Project's quarterly progress and completion reports	A: The government's development priority will not change significantly. R: Inadequate cost recovery and budget support lead to deteriorated infrastructure and unreliable irrigation water supply.

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
	2c. 26,460 farmers, of which at least 606 are women, reported an increase in knowledge on water use efficient cropping patterns; appropriate farming exercises and high efficiency water technologies (2019 baseline: 0) (OP 1.1.1, OP 3.2.2, OP 5.3.2) 2d. Agriculture development and land use plan for the project area applied by the PAD's command area development support activities (2019 baseline: Not applied) (OP 6.1)	2c. Survey of training participants 2d. Project's quarterly progress and completion reports	
3. Institutional system for irrigation scheme and water resource management strengthened	3a. Data acquired from groundwater monitoring system for the GTC irrigation scheme included in the PID's data system for the province (2019 baseline: Not included) (OP 6.1) 3b. PPMS with satellite and remote sensing technology for the GTC irrigation scheme used by the PID (2019 baseline: Not used) (OP 6.1) 3c. Platform for asset management system developed (2019 baseline: Not developed) (OP 6.1)	3a.–3c. Project's quarterly progress and completion reports	

Key Activities with Milestones

1. Irrigation system infrastructure for Choubara branch system constructed

1.1 Complete land acquisition and resettlement (Q1 2023)

1.2 Conduct capital sediment deposit removal in the Main Canal and Mankera branch canals (Q1 2022–Q1 2023)

1.3 Complete construction works of primary, secondary and tertiary canals, and associated structures, with tree windbreak planting along the canals (Q4 2024)

1.4 Complete site office building construction (Q4 2024)

1.5 Conduct a social development action plan in the Choubara branch area, including upgrading of one girls' school, vocational training, and equipment supply to a basic health unit (Q2 2022–Q4 2024)

2. On-farm command area developed with enhanced beneficiaries' capacity

2.1 Establish 1,253 water users associations (Q2 2021–Q3 2022)

2.2 Construct or improve 1,347 watercourses (about 5,100 km) with community participation, including 1,140 watercourses with at least 50% with precast concrete parabolic segment lining, 177 with 100% lining, and 30 with concrete pipes (Q1 2022–Q4 2024)

2.3 Complete piloting of improved on-farm water management technologies, such as land leveling, high efficiency irrigation system installation, tubewell watercourses lining, and water storage ponds construction (Q1 2022–Q4 2028)

Key Activities with Milestones
2.4 Conduct 243 training events for 4,860 farmers on water use efficient cropping pattern and high efficiency water technologies; set up 120 farmer field schools (at least 5 led by women) for training 21,600 (with at least 10 women trained at each school i.e., 1,200 in total) (Q1 2022–Q4 2028)
2.5 Provide high-quality seed varieties to farmers (Q1 2022–Q4 2028)
2.6 Conduct 83 capacity development training events for PAD staff (Q1 2022–Q4 2028)
2.7 Develop agriculture development and land use plan (Q2–Q4 2022)
3. Institutional system for irrigation scheme and water resources management strengthened
3.1 Install groundwater monitoring system and develop ground water modelling for the entire GTC scheme (Q1 2022–Q4 2023)
3.2 Install flow monitoring system (Q1 2022–Q4 2023)
3.3 Develop PPMS using satellite and remote sensing technology for the GTC Irrigation Scheme (Q1 2022–Q4 2025)
3.4 Develop operation and maintenance budgetary needs plan (Q1 2022–Q4 2023)
3.5 Conduct capacity development training for PID staff (Q1 2022–Q4 2028)
Project Management Activities
Recruit a PID project management consultant team (Q3 2021–Q1 2022)
Recruit a PAD CAD support consultant team (Q3 2021–Q2 2022)
Procure a Choubara branch system construction works package (Q4 2021–Q1 2022)
Inputs
Asian Development Bank: ¥22,448,000,000 or $200,000,000 equivalent (ordinary capital resources loan)
Government: ¥5,531,600,000 or $49,300,000 equivalent inclusive of beneficiaries' contributions

A = assumption, CAD = command area development, GTC = Greater Thal Canal, ha = hectare, km = kilometer, OP = operational priority, PAD = Punjab Agriculture Department, PCPS = precast concrete parabolic segment, PID = Punjab Irrigation Department, PPMS = project performance monitoring system, Q = quarter, R = risk.

[a] Government of Pakistan, Planning Commission. 2015. *Pakistan 2025: One Nation, One Vision*. Islamabad.

[b] Government of Punjab. Planning and Development Department. 2019. *Punjab Growth Strategy 2023*. Lahore

[c] Women's gender roles in the project areas hold them responsible for water collection for household use and care for livestock. The construction of passage bridges will allow women to draw and carry water safely, for household cleaning, and for their kitchen gardens. The construction of cattle baths will enable women to provide their cattle with access to water, and to ensure safety of their cattle. This facilitates women's work in the household as well as in their roles in livestock production.

[d] The baseline study for the project shows that households headed by women comprise about 1% of all households and that 93% of households are farming households engaged in crop production and livestock raising. The Punjab Khal Panchayat Act 2019 does not prohibit women farmers from becoming members of the *khal panchayat* (field channel user group) for water users associations. The Punjab Khal Panchayat Authority is mandated to have at least two female members.

Contribution to Strategy 2030 Operational Priorities

Expected values and methodological details for all OP indicators to which this operation will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President to the Board of Directors). In addition to the OP indicators tagged in the design and monitoring framework, this operation will contribute results for

OP 3.1: Total annual greenhouse gas emissions reduction (tons of carbon dioxide equivalent per year)

Source: Asian Development Bank.

B. Monitoring

84. **Project performance monitoring.** The PID will develop a comprehensive project performance monitoring and evaluation (M&E) system. It will closely monitor the progress of project activities, outputs, and outcomes based on the project performance monitoring system in accordance with the DMF. In particular, the project performance monitoring system will assess the following outputs and indicators (i) progress of planned activities according to the milestones; (ii) progress in achieving each project output and project outcome according to the performance targets and indicators indicated in DMF, and (iii) social and economic benefits with focus on the poor and women. The PAD will provide inputs of relevant data to the monitoring system. The PAD's activities will continue after PID complete their activities. The M&E system will be handed over to the PAD upon the completion of PID's activities, and the PAD will be responsible for updating the M&E data until the end of the project

85. Information and data gathered during project implementation period will be analyzed and measured against the targets and published regularly on the project website. The PID and PAD will prepare separate progress and completion reports. Refer to **D. Reporting** below.

86. All project assurances including policy, legal, financial, economic, physical, environmental, gender, and other safeguard measures will be monitored through progress reports, and during project review missions. Refer to **C. Evaluation** and **D. Reporting** below.

87. ADB will also monitor the progress of achievement of each output and outcome based on performance indicators with targets, and each activity based on milestones indicated in the DMF through a project management information system (i.e., eOps).

88. **Compliance monitoring.** All project assurances including policy, legal, financial, economic, physical, environmental, gender, and other safeguard measures will be monitored through quarterly progress reports and twice a year during ADB loan review missions.

89. **Safeguards monitoring.** ADB's monitoring and supervision on safeguards compliance will be carried out on an ongoing basis until the project completion report is issued. The project quarterly progress report shall include the external monitoring report on environmental safeguards compliance, issues/concerns/complaints, and recommended corrective actions for non-compliances, if any. The external monitoring report will be disclosed on ADB website. The PMO Environment and Social Unit, with support of the CSC environmental specialists, will prepare the semi-annual environmental monitoring report (SAEMR) for submission to ADB commencing six months after loan effectiveness until ADB issues the project completion report. The SAEMR covering January to June will be due by 30 July, and SAEMR covering July to December will be due by 30 January. Once concurrence from the ADB is received the SAEMRs will be disclosed on ADB website.

90. The PMO resettlement specialist will oversee the internal resettlement monitoring of CAP and LARP implementation, with support from the consultant safeguards team. External resettlement monitoring and compliance monitoring will be conducted by an independent external monitoring agency (EMA) or individual external monitor to be hired by PMO. Internal and external resettlement monitoring reports will be submitted on a semi-annual basis to ADB for review and disclosure. All monitoring reports will also be disclosed to the displaced persons including the preparation of corrective action plan(s). As a condition of ADB for no-objection in handing over of site for commencing civil works for packages with LAR impacts, an internal and external resettlement report confirming completion of compensation activities, provision of

transition/rehabilitation allowances and fulfillment of all LAA requirements for land award will be submitted to ADB for review and approval.

91. **Gender and social dimensions monitoring.** The PMO and PIO will be supported by the gender specialist in the project implementation support consultant teams. The PMO and PIO will be responsible for monitoring the implementation of the gender action plan and the PMO will report consolidated progress data on the progress of GAP implementation through its periodic progress reports. All the gender targets will be monitored using ADB's GAP monitoring framework. This will be informed through regular collection of data disaggregated by sex, age, and where possible, disability, relevant to the indicators and targets in the GAP and DMF. The PMO gender specialist will provide information to review missions, including the mid-term review mission and project completion mission.

C. Evaluation

92. **Inception mission.** ADB will conduct an inception mission within three months of loan effectiveness to assess project readiness and start-up activities, including staffing of PMO, PIOs, opening of an advance account, progress of recruitment of two consulting services packages, and progress of the Choubara branch construction works package procurement. The updated project implementation schedule will also be discussed.

93. **Review mission.** ADB will regularly field review missions to (i) assess the progress of project activities, (ii) monitor the implementation of GAP and safeguard compliance with ADB Safeguard Policy Statement (2009), (iii) review compliance with loan agreements and related matters, and (v) resolve any project implementation issues that may arise.

94. **Midterm review mission.** ADB will conduct a midterm review in the third year of project implementation. The midterm review will (i) assess the project performance and achievement against targets and milestones in the DMF; (ii) review the initial outcomes, benefits, and impact of the project, and (iii) identify gaps, if any, and recommend necessary changes to strengthen implementation arrangements or modify project design.

95. **Project completion review mission.** ADB will field a project completion review mission upon physical completion of the project to commence preparation of ADB's project completion report. The mission will (i) assess the project performance against targets, indicators, and benchmarks; (ii) evaluate initial benefits and outcome of the project across outputs, and (iii) identify any incomplete activities and agree on the necessary actions.

D. Reporting

96. The PID and PAD will prepare separate reports The PID through PMO and the PAD through PIO will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the audited financial statement together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

97. Project information will be strategically disseminated through media at main milestones including loan signing, contract awards and project completion. A grievance redress mechanism will be established at the PMO Barrages, by phone and email, and through public consultation events. The documents to be disclosed are in the table below.

Table 16: ADB Public Communications Strategy

Project Documents	Means of Communication	Responsible Party	Frequency	Audience(s)
Project data sheet (PDS)	ADB's website	ADB	Initial PDS posted on the website no later than two weeks after approval of the concept paper; updated at least twice a year	General Public
Environmental Impact Assessment	ADB's website	ADB	Post fact-finding mission and 120 days before Board Approval of the project (done in Feb 2020). Upon ADB's approval of updated EIAs, subsequently.	General Public, project-affected people in particular
Draft Land Acquisition and Resettlement Plan and Corrective Action Plan	ADB's website brochures	ADB	Post fact-finding mission, before the project approval.	General Public, project-affected people in particular
Final Land Acquisition and Resettlement Plan and Corrective Action Plan	ADB's website brochures	ADB PID	After finalizing rates and approval by ADB	General Public Project-affected people
Reports and Recommendations of the President	ADB's website	ADB	Within two weeks of Board approval of the loan	General Public
Legal Agreements	ADB's website	ADB	Within two weeks of loan signing (early disclosure unless Borrower agrees to)	General Public
Summary of Poverty Reduction and Social Strategy	ADB's website	ADB	Within two weeks of Board approval of the loan	General Public
Project Administration Manual	ADB's website	ADB	Within two weeks of Board approval of the loan	General Public
Social and Environmental Safeguard Monitoring Reports	ADB's website	ADB	After ADB's clearance. Reporting due 1 month after each 6 month monitoring period	General Public, project-affected people in particular
Audited project financial statements and the auditors' report	ADB's website	ADB	No later than 14 calendar days of ADB's confirmation of their acceptability	General Public

Project Documents	Means of Communication	Responsible Party	Frequency	Audience(s)
Project Completion Report	ADB's website	ADB	Within two weeks of circulation to the Board for information	General Public
Evaluation Report	ADB's website	ADB	Within two weeks of circulation to Management and the Board	General Public

Source: Asian Development Bank.

X. ANTICORRUPTION POLICY

98. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[31] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[32]

99. To support these efforts, relevant provisions are included in the loan agreement and the bidding documents for the project. The Government will comply with, and will ensure that PID complies with, ADB's Anticorruption Policy (1998, as amended to date). The Government, consistent with its commitment to good governance, accountability and transparency, agrees (a) that ADB has the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive or coercive practices relating to the project; and (b) to cooperate fully with any such investigation and to extend all necessary assistance, including providing access to all relevant books and records, as may be necessary for the satisfactory completion of any such investigation. In addition, the Government will (a) conduct periodic inspections on the contractors' activities related to fund withdrawals and settlements; (b) ensure that all contracts financed by ADB in connection with the project include provisions specifying the right of ADB to audit and examine the records and accounts of all contractors, suppliers, consultants, and other service providers as they relate to the project; and (c) the project implementation consultant shall verify the contractors' invoices in accordance with working drawings and contract specifications.

XI. ACCOUNTABILITY MECHANISM

100. Persons who are, or in future may be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[33]

[31] Anticorruption Policy: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[32] ADB's Integrity Office web site: http://www.adb.org/integrity/unit.asp
[33] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp.

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

101. Record of revisions and/or updates during the course of implementation is in the table below.

Table 17: Record of PAM Revisions and Updates

	Date	Revisions and updates
1.	xxx 2021	Original PAM (Loan approval)

APPENDIX 1: DETAILED PROJECT DESCRIPTION

I. Overall Scope and History

1. The Greater Thal Canal (GTC) irrigation scheme will convert about 704,000 hectares (ha) of arid or semiarid unproductive lands in Bhakkar, Jhang, Muzaffargarh, Khushab and Layyah districts of Punjab to irrigated productive lands. Detailed structural design for the entire GTC scheme was completed by the federal government, namely the Water and Power Development Authority (WAPDA) in 2005, and the Main Canal and the first branch system (Mankera) that cover about 144,000 ha of command areas have been constructed by WAPDA in 2009. On-farm command area development (CAD) activities were not included in the original investments by WAPDA, and were being partially conducted in the main canal and Mankera branch areas by the provincial government's financing with a partial support of the World Bank's project.

2. The development of the GTC scheme was shifted from WAPDA to the Government of Punjab. Detailed structural design for the Choubara branch system was updated by a team of national consultants financed by the Punjab Irrigation Department (PID) in 2017-2019. However, the construction of the Choubara and subsequent branch system has not been commenced and the progress of CAD has been slow. Only 25% to 30% of command areas in the Main Canal and Mankera command areas have been developed. **Table A1-a1** at the end of this appendix - summarizes the current status of each branch system of the GTC scheme and **Figure A1-a1** shows the overall GTC scheme. **Table A1-a2** summarizes chronogeny.

3. The proposed ADB-financed project will support the construction of the second branch system (Choubara) covering about 119,000 ha, along with support for on-farm CAD for the Main Canal, Mankera and Choubara areas and capacity development of the government entities and water users for efficient water uses and management, improved agricultural practices and sustainability of infrastructure. The proposed project is designed as the first project of potential phased-support for sequentially completing the development of the entire GTC scheme as in the indicative table below.

Table A1: Indicative Sequencing of Proposed ADB-financed Projects for the GTC

	Irrigation canal construction up to minors	Command area development	Indicative cost estimate	Years
1st ADB Project	Choubara (72 km)	Main + Mankera + Choubara	¥22,448 million ($200 million equivalent) (ADB financing amount)	2021 firm
2nd ADB Project	Dhingana (91 km) + Mahmood (54 km)	Follow up of Choubara + Dhingana	$300 million	tentatively from 2024
3rd ADB Project	Nurpur (58 km)	Follow up of Dhingana + Mahmood + Nurpur	$140 million	to be determined
Total;			$640 million	

Note: Tentative plan and estimates. The project design including sequencing will be examined during the project preparation. Detailed project costs will be examined during the processing of each project.

II. Overall Approach

4. The project will contribute to enhancing food security and rural economic growth in Punjab Province. It will increase the agricultural production of the project area by developing a new irrigation system.

5. The proposed project is built onto lessons learnt from the government's interventions in the Main Canal and Mankera branch areas. Irrigation canals in these areas were constructed in 2009, but only about 25%-30% of command areas have been developed. A CAD component was not included in the previous interventions and studies. Key challenges identified for the CAD in the GTC area are: (i) 6-months nonflow period in a non-perennial irrigation scheme during which unlined channels may be buried by blowing sands, and (ii) water conveyance and application to farms in the undulated terrain.

6. Major lessons are: (i) support for on-farm CAD should be integrated into infrastructure development; (ii) CAD should be coupled with capacity development of farmers for better agricultural practice and efficient water uses; (iii) higher extent of water course lining than other areas is to be considered for the project area with sandy and undulated topography; (iv) awareness campaign, demonstrations and subsidies for high efficiency irrigation and other technologies applicable to sandy undulated lands are to be included; (v) measures for minimizing sediment deposits or structural design for easier sand removal are to be applied to irrigation canals and field watercourses for a non-perennial system with sand dunes, (vi) close coordination between the PID and PAD will create the environment of quicker CAD; (vii) water use efficiency and conjunctive use of surface and ground waters need to be considered in the CAD planning; and (iv) on-farm command area development including the construction of watercourses should adapt a participatory approach to increase the ownership of farmers which will contribute to sustainability of the structures. Overall project design, components, activities and implementation arrangement are developed accordingly.

7. Water allocation for the entire GTC scheme has been determined and approved by the Indus River System Authority in 2002 within the provincial allocation under the Water Apportionment Accord. The proposed ADB-financed project will not alter the approved water allocation.

III. Proposed Project

9. The proposed ADB-financed project will include the components, namely anticipated outputs, below:

- Output 1 (PID): Irrigation system infrastructure for Choubara system developed.
- Output 2 (PAD): On-farm command area developed with enhanced capacity of stakeholders including PAD and beneficiaries; and
- Output 3 (PID): Institutional system for irrigation scheme and water resource management strengthened.

A. Output 1 (PID): Irrigation system infrastructure for Choubara system developed

10. This component will include (i) construction of the Choubara branch system up to tertiary canals (minors), (ii) tree planting along irrigation canals for the Main Canal and Mankera and Choubara branch systems, (iii) de-siltation of the existing Main Canal and Mankera Branch systems to revive their functions, (iv) construction of PID operational administration buildings (colonies and a site office), and implementation of a social development action plan.

11. **Construction of the Choubara branch system.** The construction will include 72 km of the branch main canal; totaling 251 km of 11 secondary canals, i.e., distributaries; totaling 127

km of 11 tertiary canals, i.e., minors and associated structures, such as gated regulators and canal crossing bridges.

12. The branch main Choubara branch canal (72 km) and the longest distributary (Choubara distributary, 50 km) with Choubara minor (34km) are designed to be lined. The other distributaries and minors are planned to be unlined. The complete lining is expected to bring more stable canal sections, higher water conveyance efficiency, less water losses, and easier maintenance especially easier sand deposited removals of the non-perennial canals in sandy topography. Meanwhile, the partial lining is expected to bring improved economic viability with reduced total construction cost and groundwater recharging. In addition, as canals are impacted by wind-blown (sandstorm) sand movement which is highly likely to be deposited into an empty canal during the dry (rabi) season, desilting and removal of sediment is required. Concrete lined canals require careful machinery operation during cleaning and damage to the lining is possible. One of key points for lining decision is groundwater quality. Groundwater recharge is beneficial only when groundwater quality is suitable for irrigation. However, existing groundwater quality data are not adequate to determine temporary distributions of lining necessity. A windbreak effect of the proposed tree planting along canals could also mitigate siltation of the irrigation canals. Hence, the proposed project will start with partial lining of the irrigation canals and groundwater monitoring equipment installation (paras. 29 to 30). Additional lining may be discussed during the project implementation after acquiring groundwater quality and silt deposit data in the project area.

13. Management, operation and maintenance roles and responsibilities for the system infrastructure are highlighted in a separate supplementary document to the RRP.

14. **Tree planting along canals** (branch, distributaries and minors) for the Main canal and Mankera and Choubara branch systems is to be included as a wind break that mitigates sedimentation in the canals (and to reduce evapotranspiration losses) - three rows of tree windbreaks each side of the main branch canal and two rows each side of the secondary and tertiary canals (distributaries and minors). The existing right of way (ROW) delineated by WAPDA includes tree planting spaces along the canals, but trees were not planted when the Main Canal and Mankera branch systems were constructed. The planting will be included in the civil works contract, but the PID will prepare cost estimate and technical specifications based on technical advice from the Forest, Wildlife, and Fisheries (FWF) Department.

15. **De-siltation of Main Canal and Mankera Branch system.** Many of existing canals have silt deposits as the current flows are less than the design capacity due to low water demand in the underdeveloped command areas. The proposed project will cover sediment removal for the existing Main Canal and Mankera branch system, to facilitate the possible earliest commencement of CAD activities. In total, approximately 1.9 million m^3 will need to be removed:

- Main Canal - 1,489,843 m^3
- Mankera Main Branch - 156,035 m^3
- Mankera distributaries and minors - 290,873 m^3

16. Silt can be deposited on the side of the canal to act as an additional windbreak or for land levelling if there are depressions. Thereafter there will be regular desilting using PID's O&M budget.

17. The canals are likely to be quickly re-silted under the current low flow due to low water demand. Hence, canal de-siltation by the PID and CAD planning by the PAD require coordination. The PID and PAD will jointly develop and implement distributary/minor-wise phasing (sequencing)

desilting plan for the Main Canal and Mankera system areas by incorporating PAD's CAD activity priority. The phased approach will enable efficient use of the budget. The desiltation planning will also consider hydraulics in the Main Canal and Mankera main branch canal. Full de-siltation is not required in these canals before the completion of entire CAD so that the water levels in the canals remain high enough to feed the distributaries during the transition period.

18. **PID operational administration buildings.** Due to the vast size of the project area, the PID needs field operational administration buildings in the project area for efficient project implementation and irrigation canal operation. This will include construction of five new staff quarters (colonies) in Bhakkar, Adhikot, Choubara, Gouhar Wala and Haiderabad for those staff who will working on the management of the GTC scheme. Design has already been completed by the GTC Consultants.

19. **Social development action plan.** As a result of the project, the population of the project area may increase due to returning landlords and an increase in the need for agricultural labor. To ensure that there is enough social infrastructure to cope with this influx a social development action plan will be implemented. The plan will include the upgrading of a girls' primary to a middle school, the provision of pre- and post-natal equipment for a basic health unit, and vocational training for 1,000 males and females.

20. The vocational training may include 1 month training on drafting and pattern marking, 1 month training on home-based businesses, 1 month training on food processing and handicrafts, and 1 month training on marketing, and 1 month training on electrification (including electrification for food processing) and other activities that will contribute to local residents' livelihoods.

B. Output 2 (PAD): On-farm command area developed with enhanced capacity of stakeholders including PAD and beneficiaries

21. This component will cover the Main Canal, Mankera branch and Choubara branch areas and will be designed in due consideration of lessons learnt in the previous interventions in the Main Canal and Mankera branch areas. CAD activities will include a combination of (i) strategic agriculture land development planning; (ii) field channels, i.e. watercourses, construction and lining of already constructed unlined watercourses, which includes social mobilization and water users association (WUA) formation; (iii) piloting for CAD and improved water productivity, such as rough and laser land leveling, high efficiency irrigation systems (HEIS), water storage ponds, and pipe lining of watercourses, etc.; (iv) capacity development of farmers on improved on-farm water management and good agricultural practices including awareness campaign for farmers, extension services like farmer field schools and provision of high yielding seeds, (v) capacity development of the PAD; and (vi) construction of PAD site buildings. CAD in the project area also has to consider the dune stabilization, but given discussions between the PAD and FWF Department, designated dune stabilization costs will not be included in the project cost, as FWF Department's regular activities can cover necessary dune stabilization support in the project area.

22. **Field channel (water course) construction and lining of already constructed unlined watercourses.** This includes the construction of watercourses, i.e. small field channels, that convey water from irrigation canals to individual farmlands. The project aims to complete the construction of all of required watercourses in the Main Canal, Mankera and Choubara branch areas. In the Main Canal and Mankera Branch areas, only about 25% to 30% planned watercourses have been in operation. In these areas, 749 watercourses were originally planned. However, only 444 watercourses have been constructed. 11 of these have been lined as planned (50% lining). Of the remaining, 94 have been lined from 15-30% (22% on average), 339 are

unlined (and most now silted up) and 305 are not yet constructed, and unlined or partially lined ones lined. The remaining watercourses are to be constructed under the proposed project. In the Choubara branch area, 609 planned watercourses are to be constructed. The PAD's default of 50% lining will be applied to 80% of watercourses, but the complete lining (100%) will be applied to the remaining 20% of watercourses as piloting. Lining is expected to bring easier maintenance of watercourses for farmers in sandy terrain. The proposed lining technique is precast concrete parabolic segment (PCPS) lining which has been promoted by PAD since 2004. While 50% lining is considered economically most optimal based on various research studies, for the sandy soils of the GTC area, a higher percentage lining may prove more economically beneficial. Thus in 20% of the watercourses, lining will be undertaken on 100% of the length, and cost/benefit analysis will be undertaken to assess an optimum lining policy depending on site-specific conditions. The watercourses that benefit the most number of farmers will be given priority for the complete (100%) lining.

23. On a limited number of watercourses (30), concrete piped watercourses will be used on a pilot basis. This will be trialed in the Main and Mankera Branch areas and if found to be more economically advantageous than PCPS, it can be scaled up in the Choubara branch area as a replacement to PCPS.

24. Piloting of buried pipe watercourses is also planned. Different materials may be tested, such as un-plasticized polyvinyl chloride (uPVC) or high-density polyethylene (HDPE) pipes. This buried plastic pipe irrigation distribution system is expected to (i) distribute water to individual fields, (ii) achieve the highest water distribution efficiency of not less than 98%, (iii) apply water on demand basis, and (iv) facilitate accurate water metering. Water received (through hydrants) at the fields could be used for flood, border, furrow, drip, or sprinkler irrigation. This system is beneficial to water saving and water productivity, and to undulated terrain in the project area.

Table A2: Community water course development and improvement targets

Type of Activity*	**No. of watercourses****
Main and Mankera BC	
Construction of new WCs to 50% lining with PCPS	220
Construction of new WCs to 100% lining with PCPS	55
Upgrading of existing unlined WCs to 50 % lining with PCPS	339
Upgrading of existing WCs from 22% lining to 50 % lining with PCPS	94
Construction of new WCs to 50% lining with concrete pipes	30
Sub-total	**738**
Choubara Branch Canal	
Construction of new WCs to 50% lining with PCPS	487
Construction of new WCs to 100% lining with PCPS	122
Sub-total	**609**
Total	**1,347**

* The categories indicated are variable and based on field conditions, demand of the farmers and economic viability.

** Tentative numbers estimated in the feasibility study.

25. The works are small-scale and labor-intensive, and will be conducted based on community participation. The PAD will enter an agreement with community institutional structure, i.e., water users associations (WUAs), for design, execution, cost sharing, supervision and O&M of works. Beneficiaries contribute land and will be involved as labor, while construction materials will be

provided by the PAD. This is estimated to be equivalent to 15% farmers' contributions. To enable the community participation, project activities will start with social mobilization and WUA formation. The PAD has experienced similar arrangements for other irrigation schemes including the ADB-financed Jalalpur Canal Irrigation Project. The community involvement will enhance ownership through cost-sharing mechanism and followed by sustainability of watercourses through increased ownership. For further details on the community contracting mechanisms see **Appendix 2** of this document.

26. For rough land leveling and clearing lands for water course construction, additional bulldozers will be purchased for the PAD Agricultural Engineering Department (Field Wing). Approximately 11 will be needed fin MC and MBC command areas. These can then move to the CBC command area, where an additional 4 will be required (i.e., 15 in total). The covenant will be included in the Loan Agreement to ensure that they will be used within the project area.

27. **Piloting for CAD and improved water productivity.** Subsidies will be provided to encourage the take-up of improved techniques, leading to improved water productivity. This will be done on a pilot basis, with the hope that this then eventually encourages scale-up once farmers see the benefits.

28. **Land levelling.** Only about 20-30% of the MC, MBC and CBC command area is patti area (flat lands), which can be irrigated immediately with minor land levelling (including laser levelling). The rest requires land development. Five bulldozers will be purchased to undertake land development work – in addition to the four unutilized during MC and MBC WC ROW clearing (see para 25), 915 ha can be cleared in the project lifetime. Additional area may be cleared with PAD's current stock of bulldozers. Land levelling will clear the backlog of farmers who have been waiting for land development activities. Farmers will contribute a cost as per current PAD regulations – with costs per hour depending on the size of the farm with larger landholders paying more. The requirements for levelling will be analyses utilizing Digital Elevation Models (DEM) that were purchased under the transaction technical assistance for the project preparation.

29. Where applicable (i.e., on sandy loam soils as opposed to sandy soils) subsidies will be provide for laser levelling to be undertaken (estimated at 4,000 ha), with equipment hired from private machinery and equipment service providers, with costs shared between government and farmers at a ratio of 80:20. Selection criteria for farmers will be determined during implementation, but they are likely to include:

a) farmer willingness
b) appropriate topography of land;
c) has an assured/reliable water source either in his own right or under contract arrangements from neighboring farmers. While assessing the water availability, multiple sources should be considered instead of assessing from only one source;
d) undertakes to provide support and assistance to the project staff, supply & services companies, and consultants during their activities pertaining to the site surveys etc.
e) is owner/tenant/lessee and self-cultivator of land (in case of absentee owner, there should be well-versed farm manager);
f) is not defaulter of any revenue/financial institution;
g) agrees to sign a tripartite agreement before issuance of works order; and
h) will be liable to pay full amount of financial assistance received for the purpose as arrears of land revenue in case of violating any of the conditions specified by the government.

30. Preferably the farmer should also be a lead farmer (as identified by fellow farmers in the watercourse) who will act as the farmer field school (see subsequent paras).

31. PAD will coordinate with the Forestry Department to be mutually benefitted from their sand dune stabilization (through planting vegetation) programs.

32. **Piloting of improved on-farm water management (OFWM) technologies**. To encourage the take-up of improved OFWM technologies to improve water use efficiency, and to foster crop diversification including high value crops (with high water-consuming crops discouraged), equipment will be provided on a subsidized basis (coupled with demonstrations which should also incentivize take-up – see further below). This will include HEIS (drip and sprinklers covering an estimated area of 4000 ha), the lining of 1000 tubewell watercourses (with PCPS or pipes), and 100 water retention ponds (800m3) constructed on a pilot basis to assess their efficacy, with an improved design building on lessons learned from previous practice. The government/farmer contribution will be 80:20 (50:50 for tubewell watercourse lining with a maximum subsidy of PKR 350,000 following current government regulations). Selection criteria for farmers to demonstrate this subsidized HEIS will be determined during the implementation, but are likely to include:

a) has an assured/reliable water source either in his own right or under contract arrangements from neighboring farmers. While assessing the water availability, multiple sources should be considered instead of assessing from only one source;
b) agrees to contribute remaining cost of system installation other than provided by government. It is assumed that cost of system would cover the complete installation of various items depending on site-specific situation where system is to be installed;
c) is willing to mobilize post installation operation and maintenance expenditure;
d) undertakes to provide support and assistance to the project staff, supply & services companies, and consultants during their activities pertaining to the site surveys, installation of equipment, and other civil works as well as during post installation services;
e) is owner/tenant/lessee and self-cultivator of land (in case of absentee owner, there should be well-versed farm manager);
f) is not defaulter of any revenue/financial institution;
g) will not remove or transfer the installed system and ensure its operation minimum for three years after installation;
h) undertakes to use the motor/ pump for operating HEIS only
i) agrees to get the operator of irrigation system trained in operation, trouble-shooting/repair & maintenance from SSC/government;
j) agrees to be solely responsible for HEIS equipment safety after its delivery and installation;
k) will arrange material prior to issuance of work order for inspection by the CAD Consultants in case, he/she wants to contribute “in kind material” towards farmers’ share.
l) agrees to sign a tripartite agreement before issuance of works order; and
m) will be liable to pay full amount of financial assistance received for the purpose as arrears of land revenue in case of violating any of the conditions specified by the government.
n) only pumps with an approved energy source used (the HEIS would be offered together with a pump with approved energy source).

33. Preferably the farmer should also be a lead farmer (as identified by fellow farmers in the watercourse) who will act as the farmer field school.

34. For the lining of tubewell watercourses, the selection criteria for should follow that of HEIS, with an additional criteria that only tubewells linked to a pumping system with an approved energy source, and high-value crop production will be piloted.

35. Construction of 100 water storage ponds (WSP) (typically 20m x 20m x 2m deep) will be undertaken on pilot basis. These may be linked to HEIS as discussed above and can be used to store excess canal water, as well as rainwater and groundwater. During 2008-18 only 15 WSPs were constructed by the OFWM Directorate, which were later abandoned because of the excessive leakage and evaporation losses of water. Therefore, for this project on a trial basis ponds with improved lining will be constructed. Further technical details will be developed during the project implementation, depending upon field conditions, such as topography, land availability and soil permeability. Selection criteria will be determined during the project implementation, but are likely to include:

a. owns agricultural land and technically feasible site based on surveys.
b. agrees to use stored water for irrigation purpose (preferably through drip and sprinkler irrigation) and would not use it for other purposes.
c. is willing to contribute his/her share as per approved cost sharing formula.
d. is not a defaulter of any government financial institution.
e. agrees to abide by the decisions of the authorized representative of the department and will not challenge the same in any court of law.
f. agrees that he/she will be fully responsible for aftercare/ successful operation of the intervention and there will be no responsibility on the department for any damage once the site is commissioned.
g. undertakes to rectify any damage, which might hinders the usefulness of the intervention regarding irrigation of crops.
h. is willing to pay back full cost of government share in case he/ she violates any of terms and conditions.

36. WUAs may also be eligible for a pond on a group basis. The WUAs are expected to be registered with an agreement signed to take on O&M costs and allow equitable access to the pond amongst members. Details will be further examined during the project implementation depending on the actual needs of beneficiaries.

37. **Training for farmers and PAD on improved on-farm water management and good agricultural practice.** Demonstration and training for farmers will be done by utilizing lead farmers with a farmer field school (FFS) approach (60 FFS, or approximately one for every 2-3 villages in the project area). Establishment of public owned and managed demonstration centres is recommended. In total it is expected that 21,600 farmers will be trained (10% women). In terms of training events there are expected to be held at least every month (or every two weeks depending on the season).

38. Demonstrations will cover both agronomic practices (e.g., optimal use of fertilizers and pesticides and conservation agriculture) and improved OFWM[34] (e.g., HEIS and the use of groundwater), although separate trainings on OFWM will also be undertaken with WUAs. The FFS will also be used to demonstrate the use of agricultural machinery, which will be purchased through the project.

[34] Utilizing the trainers and resources of the OFWM Department's Water Management Training and Research Institute.

39. An awareness raising campaign will also be initiated including the production of training materials and the organization of events. Farmers will be made aware of what crops are best suited to the area, building on the agro-ecological zoning carried out by FAO in 2019.[35] These include gram, wheat, millet, quinoa, garlic and radish in particular. Others include sunflowers, sorghum, peas, carrots, and turmeric. The south of the scheme area is particularly suited to sesame, sudan grass, cotton, maize, mott grass, turnip, tomato and okra.

40. While these crops may grow best, farmers will be made aware that to increase their net income, a move to more profitable crops suitable to the area is recommended, as well as less water-consuming crops. For example, according to FAO, for the GTC area, net returns on sunflower are Rs 9,000 / ha, cotton Rs 9,000-12,000 / ha, gram Rs 22,000-32,000 / ha, wheat approx. Rs 30,000 / ha, carrots and tomato Rs 140,000 / ha and garlic over Rs 600,000 / ha. To incentivize the take-up of high-yielding seeds, 687,600kg of high-quality seed varieties (maybe wheat, gram and cotton) will be provided to farmers on a 50:50 cost-sharing basis to plant approximately 5,000 ha.

41. Training will also be provided for staff of PAD, in particular the OFWM department. 83 training events will be organized on topics such as social mobilization, farm layout planning, the design of water storage ponds, the judicious use of groundwater, etc.

42. **Construction of PAD site/office/training buildings.** Six office buildings (including a training center) will be constructed for the OFWM department. Two buildings will be constructed for the agricultural extension department. One building (including a storage shed for agricultural machinery for demonstrations) will be constructed for the agricultural engineering department, most likely in Mankera.

43. Farmer consultations will be necessary throughout the life of the project's planned program for agricultural development and CAD, in order to obtain feedback on what works and what can be improved. This will be the role of PAD staff. Mid-term and final surveys will be undertaken by PAD on the number of farmers using improved on-farm water management technologies and practices (and the area covered).

C. Output 3 (PID): Institutional system for irrigation scheme and water resource management strengthened

44. This component aims at enhancing the PID's institutional capacity for water resources management and operation and maintenance of irrigation schemes to ensure sustainability. The following activities will be included.

(i) groundwater monitoring and modelling;
(ii) canal flow water monitoring;
(iii) capacity development activities for the PID staff including long-term and short-term training;
(iv) GIS-based asset management system development;
(v) GIS-based project monitoring and evaluation system (project performance monitoring system) development;
(vi) ground water recharge piloting; and

[35] FAO. *Agro-ecological zones of Punjab – Pakistan*. Rome. 2019

(vii) other institutional capacity strengthening, maybe including support for start-up of the implementation of the new Water Act that may become required depending on findings of the ongoing ADB's capacity development technical assistance (TA9255-PAK).[36]

45. **Ground water monitoring and modelling.** Depths to ground water tables and ground water quality will be measured and monitored. Groundwater data is required to help regulate farmers' use of tubewells in case of over-abstraction, to identify where additional tubewells can be installed, and to help identify areas where groundwater is increasing as a result of seepage from unlined canals, which could cause water logging. The equipment installation is designed to supplement existing monitoring systems of the Irrigation Research Institute (IRI) under the PID for other irrigation schemes in Punjab, with piloting for more advanced technologies. The IRI has installed groundwater monitoring equipment, i.e., piezometers, in command areas of existing irrigation schemes and has been acquiring data. The GTC area has been out of the IRI's existing monitoring network. The proposed project will install piezometers for the entire GTC scheme with 6 km x 6 km density in the Main Canal, Mankera, and Choubara branch areas, and with lower density in the Nurpur and other remaining branch areas. Automated monitoring equipment will be installed at 5 locations as piloting.

46. The piezometers will be installed in the first year of the project implementation period, for the earliest start of data acquisition that will be used for future canal lining discussions (para. 11). The monitoring system will cover the entire GTC area, including Nurbur and other remaining branch areas, to acquire data for a future comprehensive ground water assessment. Project activities will also include support to the IRI for groundwater modelling and analyses.

47. **Piloting for groundwater recharge.** Details will be determined during the ADB capacity development technical assistance (TA9255-PAK) (footnote 54). The pilot will likely be to see whether during the wet (kharif) season excess water supply can be used to recharge the aquifer in areas where the groundwater is low, so it can then be abstracted by tubewells in the dry (rabi) season.

48. **Irrigation canal flows monitoring.** To improve the PID's ability to manage water flows within the irrigation system in an equitable and efficient manner measurement equipment will be installed for monitoring flow discharges in irrigation canals. The flow monitoring equipment installation is designed to supplement existing monitoring systems of the IRI under the PID for other irrigation schemes, with piloting for more advanced technologies. Two or three automated monitoring systems will be installed as piloting, in addition to conventional manual monitoring meters.

49. **GIS-based asset management system** will also be developed under the project for enhancing the O&M capacity of the PID. The asset management system will be further expanded by the PID as an O&M decision making system. Separate systems have been established by local consultants funded by the PID, but these are not linked to each other. An improved asset management system will be designed to convert existing excel inventory tables to georeferenced GIS-based database, to allow regular updates of information of asset conditions from field offices, and to become the basis for future asset management decision-making system development. Assets, their locations and conditions are to be recorded.

[36] ADB. 2016. *Technical Assistance to the Islamic Republic of Pakistan for Institutional Transformation of the Punjab Irrigation Department to a Water Resources Department*. Manila.

50. **GIS-based project monitoring and evaluation system (project performance monitoring system [PPMS)).** Performance monitoring will be undertaken by the PID to assess the impact of the scheme on land use (i.e., changes to crop production through a conversion to irrigated agriculture). Data will be stored in a PPMS which will have three components (to be further verified in the first year of the project):

- The GTC PPMS Database: an integrated information system which includes spatial data (irrigation assets, satellite remote sensing, digital elevation model (DEM) etc.), survey statistics and other statistical information. The data is stored locally on the computer system (or server) and partially stored in cloud.
- The land use change analysis for project progress assessment: an appraisal of changes in land use in the GTC project area in order to document the impact of investments in command area development. Outcomes of this analysis may include land use change maps and the creation of statistics by district or Branch/Distributary canals. The baseline is 2008 before the Main Canal (MC) and the Mankera Branch Canal (MBC) and the Choubara Branch Canal (CBC) were constructed. The analysis will be based on satellite data.
- Seasonal irrigation crop monitoring: This is likely to be yearly assessment of crop conditions using satellite data, maybe for the kharif (wet) seasons. The analysis will include computation of difference in (a) the same period in the previous year; (b) a wet and dry year, and (c) a long-term average.

51. The PPMS data can be used for agricultural assessments of the project's impacts, like cropping intensities and yields at the end of the project. This will supplement annual PAD agricultural survey data. The system is to be designed to use an open source software and freely available remote sensing data. The TRTA for the project preparation developed a system design proposal. The system design will be further examined during the project implementation.

52. **Training for PID staff.** This will include long-term (Masters courses) and short-term training and other capacity development activities.

53. **Piloting for groundwater recharge.** Details will be determined following start-up of the ADB capacity development technical assistance (CDTA) (TA9255-PAK, footnote 54). The pilot will likely be to use the monsoon (kharif)season surplus water in areas where the groundwater is low, so it can then be abstracted by tubewells in the dry (rabi) season.

54. **Other PID institutional capacity strengthening.** It may include institutional capacity development for asset management and other capacity to ensure the project's sustainability, and also for efficient water management. Requirements will be examined under the ongoing capacity development TA9255-PAK (footnote 36).

Table A1-a1: Implementation Status of GTCIP and Proposal for ADB Financing

Sl.	Canal or Branch	Irrigable area (ha)	Current Status		Activities under proposed ADB Financing
			Irrigation System	CAD	
Group 1					
1.	**Main Canal** with distributers: **35 km** (Distributary: 112 km, Minor: 11 km, Outlets: 200) (GTC-01 to 04)	39,964	Construction by WAPDA completed in 2009. In operation.	CAD are ongoing since 2008 and partially done with GOPB financing and World Bank's financing support.	Remaining CAD under ADB-financed first project.
2.	**Mankera Branch: 65 km** (Distributary: 206 km, Minor: 72 km, Outlets: 525) (GTC-05)	104,085	Construction by WAPDA completed in 2009. In operation.	Same as Main Canal.	Same as Main Canal
Subtotal: Group 1		**144,049**			
Group 2					
3.	**Choubara Branch: 72 km** (Distributary: 251 km, Minor: 124 km, Outlets: 609) (GTC-06)	119,069	Detailed design done and tender documents prepared by WAPDA in 2005. More than 85% of lands was believed to be acquired, but a price gap between the old and latest land rates is to be filled. PC-I for GOPB financing approved in 2015 and design review consultant team financed by the GOPB was engaged in Nov 2017 for updating the design, preparing amended PC-I and procurement documents and drafted these documents. Civil work procurement not yet initiated and works were decided to be shifted to ADB-financing.	No CAD was included in the PC-I approved in 2015. No CAD activities started.	Irrigation system physical works and CAD under ADB-financed first project.
Subtotal: Group 2		**119,069**			
Subtotal: Groups 1– 2		**263,118**			
Group 3					
4.	**Dhingana Branch: 91 km** (Distributary: 450 km, Minor: 101 km, Outlets: 1,014) (GTC-7 and 8)	200,931	Detailed design done and tender documents prepared by WAPDA in 2005 but documents are made available in July 2018. Revised PC-I not yet prepared. Safeguard and other documents and costs are to be updated.	Not yet planned.	Irrigation system physical works and CAD may be by a future ADB-financed project.
5.	**Mahmood Sub-branch: 54 km**	115,304	Same as Dhingana.	Not yet planned.	Same as Dhingana.

	(Distributary: 296 km, Minor: 17 km, Outlets: 527) (GTC-7 and 9)				
6.	**Nurpur Branch: 58 km** (Distributary: 224 km, Minor: 128 km, Outlets: 609) (GTC-10)	124,615	Same as Dhingana.	Not yet planned.	Same as Dhingana.
Sub-total: Group 3 (Branch: 203 km, distributary: 970 km, minor 246 km, outlets, 2,150)		**440,850**			
Subtotal: Groups 2-3		**559,919**			
Grand Total		**703,968**			

ADB = Asian Development Bank, CAD = command area development, GOPB = Government of Punjab, GTC = Greater Thal Canal, PAD = Punjab Agriculture Department, WAPDA = Water and Power Development Agency.

Figure A1-a1: Greater Thal Canal Irrigation Scheme

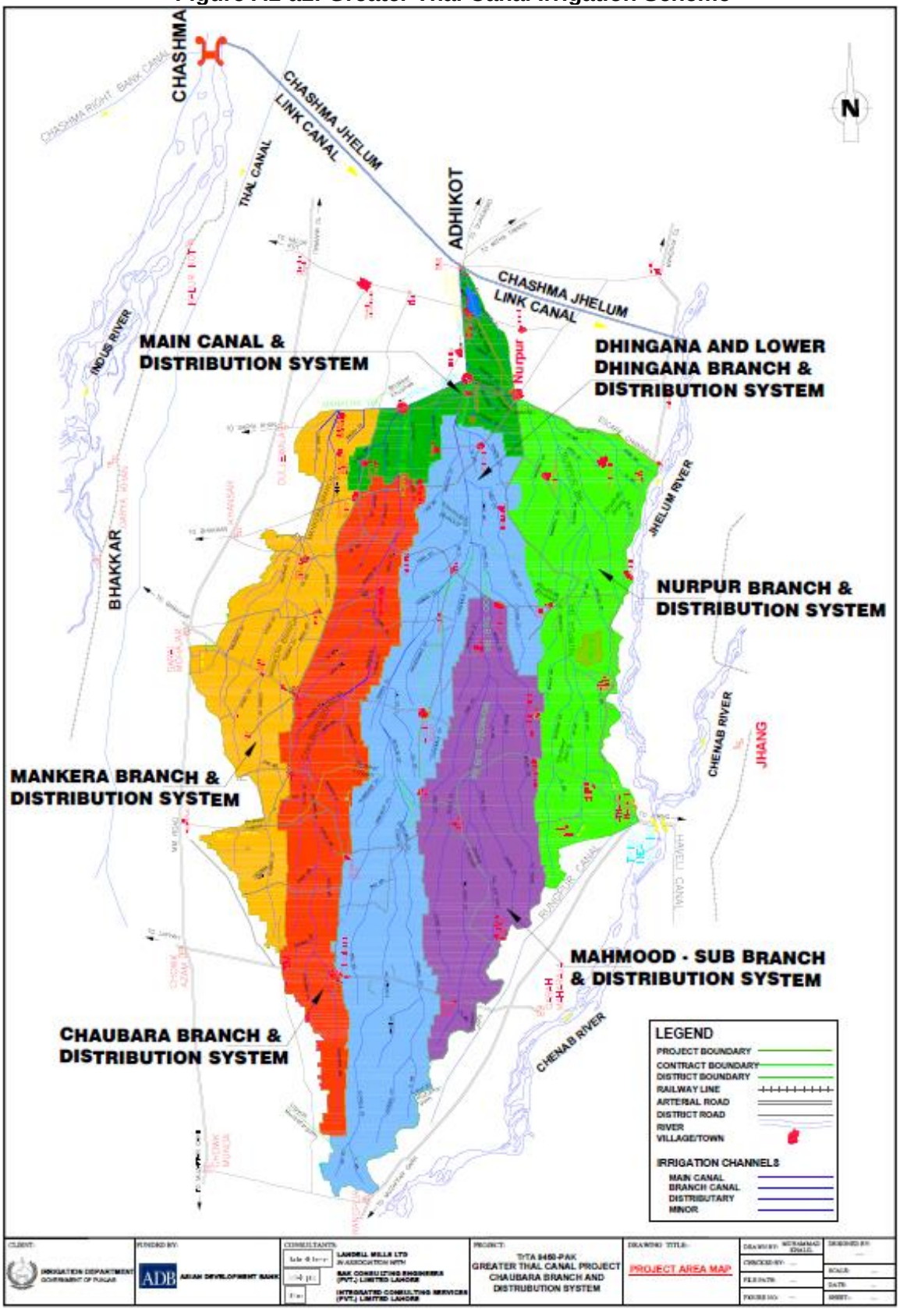

Table A1-a2: Summary History

Year	Event
1873	Project to irrigate the Thal Doab was conceived by the Government of United India.
1919–1929	Project alternatives to irrigate the Thal Doab were designed and prepared, but these were repeatedly turned down or deferred by the Government of India due to funding constraints and issues of water availability.
Late 1940s	The Thal Canal system was constructed to irrigate the western part of the Thal Doab along the Kundian-Khushab and Kundian-Shershah railway lines.
1970	The Chashma Barrage and Chashma-Jhelum (C-J) Link Canal construction was completed, including a head regulator of 15,000 cusecs capacity at Adhikot, at RD 180+222 of the C-J Link, to serve as the eventual offtake for irrigating the remaining area of the Thal Doab (i.e., the GTCIP).
1972 and 1980	Project proposals to undertake the GTCIP from the head regulator on the C-J Link were twice developed and submitted by the Punjab Irrigation and Power Department (I&PD), but were both turned down by the Government of Pakistan due to funding constraints and issues of water availability between the provinces.
1991	The Pakistan Water Apportionment Accord is agreed, including an allocation for the GTCIP and settling its longstanding issue of water availability between the provinces.
1992–1995	A detailed feasibility study for the GTCIP was conducted, and PC-1 was prepared by I&PD (NESPAK-NDC joint venture was a consultant), but no further progress is achieved due to funding constraints.
2000	The Pakistan Water and Power Development Authority (WAPDA) released its Water Vision 2025 Plan. The GTCIP was one of three identified priority irrigation projects for its first phase.
2001	Anticipatory PC-1 for the GTCIP was approved for Rs 50 million and the project was inaugurated.
2001–2002	The main PC-1 for the GTCIP was prepared and approved for Rs 30.467 billion.
2002–2008	The Project Planning Report including environmental impact assessment and resettlement action plan, detailed engineering designs, and tender documents/drawings were prepared by WAPDA (a NESPAK-led joint venture was a consultant).
2002–2010	Construction of the Phase I of the GTCIP, comprising the main canal, distributary off-takes from the main canal, and the Mankera Branch canal and its distributaries and minors – contract packages GTC-01, 02, 03, 03a, 04, and 05.
2008	Original PC-1 for the project expired and a revised PC-1 was prepared by WAPDA (NESPAK was a consultant), with a revised project cost of Rs 43.126 billion.
2009	The Federal Government defers the revised PC-1 and stops funding the GTCIP for its proposed second and third phase, due to funding constraints.
2010	Construction of Phase 1 is completed and handed over to the Punjab Irrigation Department (PID) for canal operation and maintenance, and to the Punjab Agriculture Department (PAD) for command area and on-farm development.
2016	PID prepared a new PC-1 for construction of the Choubara Branch canal and its distributaries and minors (contract package GTC-06), which is approved for Rs 6.262 billion of Government's own finance.
2017	PID engaged a consultant team for detailed design updating, bidding document preparation and construction supervision for the Choubara branch canal system.
2019	The Punjab Government decided to shift the Choubara branch system construction from its own financing to ADB-financing.

APPENDIX 2: COMMUNITY PARTICIPATION IN PROCUREMENT (CPP)
Greater Thal Canal Irrigation Project

1. **Introduction:** This component directly addresses the needs of the communities in developing tertiary level irrigation network.[37] Experience has shown that active and dedicated participation of the key stakeholders in the design and implementation of projects, especially those at the grass-roots level, contribute significantly to the sustainability of developmental activities, through increased ownership and more effective use of grassroots level inputs. The additional benefits are: (i) more appropriate intervention; (ii) better implementation and sustainability; (iii) better utilization and increased ownership; (iv) greater efficiency and better planning; (v) greater transparency and accountability; and, more importantly, (vi) increased equity and empowerment through greater involvement of the poor, women, and other disadvantaged groups.

2. **Selection criterion:** The following is considered for the selection of works for community participation:

(i) Water Users Associations (WUAs) will be established at each canal outlet and will be registered under the "On Farm Water Management & Water Users Association Ordinance [Act]-1981 (Amended 2001)";
(ii) the estimated cost of each subproject should be less than $200,000;
(iii) due consideration should be given to locating, designing, implementing, and operating the subproject in order to minimize any adverse impacts on the environment;
(iv) no resettlement should be necessary. However, if absolutely necessary, suitable safeguards in accordance with ADB's Safeguard Policy Statement (2009) should be applied;
(v) WUAs will enter a participation agreement with OFWM as attached (Attachment 1) and will agree that all sub-projects will be designed and supervised by PIO through Command Area Development Consultants (CADC) assistance and in consultation with WUA;
(vi) entire watercourse development will be carried out and watercourse will be lined as per approved permissible limit including critical reaches for efficient water conveyance to the farmer fields;
(vii) community will preferably engage local labor and should indicate willingness to participate with counterpart funds and in kind, such as labor and should provide undertaking for recurrent operation and maintenance (O&M) works.

3. **Implementation Arrangements:** The Punjab Agriculture Department is the implementing agency and will implement the command area development through the Project Implementation Office (PIO). The WUA will be the institution for watercourse development and each watercourse in the Greater Thal Canal command will serve about 400-500 acres (average) by over 50 farmers. The key responsibilities of the WUA are (i) provision of right-of-way (RoW) for earthen construction of watercourse; (ii) arrangement of counterpart funds and share of skilled and unskilled labor required for works; (iii) procurement of construction materials and labor for carrying out civil works; (iv) resolution of disputes amongst the water users typically in respect of channel alignment and fixation of water control structures; (v) carrying out civil works in accordance with standards and

[37] This includes primarily development of earthen channel, installation of water control structures, lining of critical reaches, construction of culverts, animal wallow, drop structures, earth filling and associated works.

specifications under the supervision of PIO and CADC; and (vi) agree to undertake routine O&M of improved watercourses.

4. The PIO will coordinate with the Punjab Irrigation Department which is the executing agency through the Project Management Office-Barrages (PMO-Barrages) in the development of engineering and revenue *chakbandi* as well as *Warabandis*.[38] This information will deliver the final map of each watercourse command, channel layout and delineation, farm turnouts, land ownership data and lists of water users. These activities will benefit from the development of CAD models utilizing topographic data including Digital Elevation Models (DEM) (purchased under the TRTA). These will help to demarcate the watercourse command area and ROW based on digital topographic data, including the delineation of areas which are suitable for high efficiency irrigation systems (HEIS) without the need for major land development. The PIO will (i) ensure social mobilization of the water users for their active participation at all stages of works including organization and registration of shareholders into 1,253 WUAs;[39] (ii) design and provide cost estimation for system; (iii) collect farmers' share as their contribution in sub-projects; (iv) allocate and release funds to WUA as per stage-wise completion; (v) provide regular progress reports; (vi) prepare statements of expenditures, maintain proper accounts, and conduct audits; and (vii) construction supervision and monitoring through CADC assistance.

5. **Procurement:** The WUAs will be responsible for procurement at the watercourse level. The WUAs will purchase the construction materials such as cement, pre-cast concrete parabolic segments (PCPS)/RCC pipes, bricks and sand through Request for Quotation (RFQ) procedures by inviting at least three quotations preferably from local suppliers. In case of PCPS lining, the PCPS will be procured through RFQ from PAD's already approved and prequalified firms only.[40] The PAD with the help of the CAD implementation consultant team will provide close guidance to WUAs to ensure required technical specifications will be clearly indicated in the RFQ form. The labor component of the subprojects can be extended by the members of the community, provided adequate expertise exists, who should be reimbursed adequately for the services rendered. It should be ensured that children will not be employed for the works. In case the WUA cannot identify adequate skilled labor within the community, the work can be let out by inviting quotations from three local contractors. Here also, to the extent possible, members of the local community should be employed by the contractors for labor. The contract should be in the local language and simple, adequately addressing the main issues such as scope of work, start date, completion period, payment terms, progress and quality review, defects-liability period, responsibilities of the WUA and contractor, including review, inspection, payment procedures and contract termination.

6. **Project Implementation:** The WUA will be responsible for the implementation of the works while the PIO will supervise the works and certify the quantity and conformity with design and specifications, duly verified by CADC. The following procedure will be followed.

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[38] The engineering *Chakbandi* of a canal system involves division of its command area into various segments and attachment of each segment to a particular outlet at the parent channel (distributary/minor) on the basis of topography for delivering irrigation water. The revenue *Chakbandi* of an outlet involves on-site verification of the proposed command area, physical demarcation of the boundaries, mapping of land ownership, and preparation of lists of shareholders/water users.

[39] Social mobilization may include intensive publicity campaign to reach out to the target communities through direct mail, press releases, signage, media advertising, workshops and meetings. The IA district and tehsil offices will extend their services especially in areas from which response is low and provide training and other assistance to such people to support capacity-building. The IA may engage social mobilizers in CADC to undertake, among other activities, mobilization of community groups, skills training and establishment of participatory planning processes at the village or community level.

[40] The Precast Concrete Parabolic Segment (PCPS) lining has been approved as alternate lining technique being hydraulically more efficient, durable and quick in installation than rectangular shaped brick lined channel.

a. The OFWM field staff will mobilize shareholders of the watercourses to organize them into Water Users Associations (WUA). The same will be registered under OFWM and WUAs Ordinance [Act] 1981 (Amended 2001)/ rules;
b. The WUA will open a joint account to be operated by its Chairman and Treasurer in a commercial bank. The WUA will provide a bank statement along with the specimen signatures of the Chairman and the Treasurer to the Assistant Director Agriculture On Farm Water Management (OFWM) who will forward the same to Deputy Director Agriculture OFWM;

c. The WUA will execute an output-based agreement with Deputy Director Agriculture OFWM wherein roles and obligations of both the parties will be defined. The agreement will be based on lump-sum contracts with payments linked with achievement of physical milestones as defined in the agreement;

d. The OFWM/PIO staff in the project tehsils will conduct engineering surveys of the watercourse command area and prepare design and cost estimates in consultation with WUA that will be checked and verified by the CADC;

e. The competent authority, i.e., Director Agriculture (OFWM)/ Deputy Director Agriculture (OFWM) will accord Technical Sanction of planned works;

f. The clearance of RoW of entire watercourse for pad formation for portion of watercourse to be constructed/ lined will be carried out by the Field wing and WUA will engage machinery from the Field wing of Agriculture Department for RoW clearance and formation of pad for earthen construction and lining of watercourse. In case the machinery is not available with Field wing during initial years, or engaged at other watercourse construction sites in the project area, the WUA may arrange labour/ machinery from market for completion of said activities as per rates notified by the government for the district concerned,

g. The WUA will carry out earthen construction of proposed length under the supervision of OFWM field staff. This will involve removal of shrubs, bushes, and vegetation as well as other natural or man-made obstructions from the right-of-way. It will be followed by filling of low spots in the right-of-way, constructing a well compacted pad, and excavation of channel as per engineering design;

h. After 50% completion of earthen development/ construction of the watercourse, the WUA will install water control structures and carry out lining of critical sections of the watercourse;

i. Farmers will contribute their requisite share for labor and mason costs for installation of water control structures, construction of culverts, animal wallow, drop structures, lining of critical sections and back earth filling of water control structure and lined sections, and the Government will bear the entire cost for earthen construction of the watercourse and all construction materials;

j. The requisite funds will be released into the joint accounts of the respective WUAs by Deputy Director Agriculture OFWM in three installments on recommendations of the CADCC as per the criteria below:

i. **First Installment:** Release of 50 percent cost of earthen development/ construction and 40 percent of the estimated material cost on receipt of the first intermediate completion report from the CADC certifying the: (a) approval of survey and design; (b) issuance of technical sanction by the competent authority; (c) 50 percent farmers' share on account of labor charges for lining, installation of water control structures and associated works deposited; (d) completion of RoW clearance and pad formation for at least 50 percent length to be constructed/ lined; and (c) earthen construction of at least 50 percent of designed watercourse completed;

ii. **Second Installment:** Release of remaining 50 percent cost of earthen development/ construction and 30 percent of the estimated material cost on receipt of second intermediate completion report from CADC certifying that (a) remaining 50 percent labor charges of farmers' share on account of lining, installation of water control structures and associated works deposited; (b) entire designed earthen sections developed; and (c) at least 30 percent planned lining and other works completed.

iii. **Third Installment:** Release of remaining 30 percent of the estimated material cost on receipt of final completion report from CADC consultants certifying; (a) completion of all planned works; and (b) rectification of any pending discrepancy.[41]

k. The requisite funds for watercourse construction and lining/improvement under the proposed project will be transferred from provincial Account-I to Cost Centers/DDO Codes of respective DDA OFWM with the authorization of the Finance Department;

l. The funds from Cost Centers/DDO Codes will be released by the Deputy Director Agriculture OFWM/competent authority into the joint accounts of respective WUAs in three installments on recommendations of CAD Consultants as per above said criteria;

m. Audit will be carried out through PIO internal audit and externally-appointed auditor. This audit report should form a part of the overall audit of the Project and should be submitted to ADB in accordance with loan covenants.

7. **Risk mitigation:** The community participation may encounter risks such as (i) being time and resource intensive; (ii) logistically difficult; (iii) conflicts among stakeholders; (iv) consultative groups not duly represented; (v) higher expectations; (vi) domination by powerful and more educated elite; and (vii) lack of adequate capacity. The PIO will address the risks through awareness creation, capacity building and engaging CADC early during the project implementation. Majority of farmers are absentees because there are no significant agricultural activities in the area at present. The watercourse development may face absence of owners, shortage of labor, and poor financial condition of the farming community. It is, therefore, planned that cost for earthen construction of watercourses will be borne by the project. This will provide initial contribution to the project and jumpstart the activities.

[41] On completion, the WUA, PIO and CADC will jointly visit the completed works for inspection. If the inspection team concludes that works have been implemented satisfactorily, a completion certificate will be issued by the PIO.

8. **Land donation:** The land is provided by the farmer beneficiaries and local communities for farm level field channels (watercourses) as counterpart support including other assets such as trees and labor, therefore, involuntary resettlement is not involved. As a safeguard measure, PAD and PIO shall undertake the following:

a. Early screening of the watercourse development will be undertaken to fully determine the impacts, including the land requirements. Consultations with local communities will be undertaken throughout the screening, planning and implementation phases of each project. Consultations will be recorded in detail and will include all discussions in relation to the donation of land, if applicable;
b. Where land donation is required, written agreements between the parties will be obtained;
c. Donated lands for the watercourse will be legally transferred to the WUA;
d. Only watercourse alignment where there is written confirmation of agreement among all concerned landowners/farmers will be included under the Project; and
e. A grievance redressal mechanism will be put in place under the PAD and PIO, with representation from the farmer beneficiaries, and local government. A grievance log will be established prior to project implementation and will be available for inspection and reporting by project monitors.

Command Area Development of Greater Thal Canal Irrigation Project
(ADB Funded)

PARTICIPATION AGREEMENT

This deed of agreement for the construction and improvement/lining of watercourse is made on _____ between the Deputy Director Agriculture On Farm Water Management (OFWM)/authorized representative of Provincial Government (hereinafter referred to as the **First Party**)

and

The Water Users Association (WUA) registered under OFWM and WUA Ordinance 1981 (amended 2001) of Watercourse No. _____ Village/Chak No._____, Union Council _____ Tehsil _____, District _____ (hereinafter referred to as **Second Party**).

WHEREAS the parties agree to the following terms and conditions:

1. ESTIMATED COST OF WORKS

1.1 The total cost of the watercourse construction and improvement/lining is in approved design and cost estimate for watercourse improvement and attach as Annexure-I. The cost of construction materials of the watercourse is termed as Material Cost and is Rs. _____. The cost of skilled and unskilled labor as well as earthen construction is termed as Labor Cost. Material cost as well as cost of earthen construction will be provided by the First Party as financial assistance to the Second Party whereas labor cost for lining, installation of water control structures, back earth filling, etc. shall be contribution of the Second Party for watercourse construction and improvement/lining.

1.2 The agreed/approved cost will be paid by the First Party to the Second Party in three installments as stipulated in clause 3.1.

2. OPENING OF BANK ACCOUNT

2.1 After signing of the mutual agreement, the Second Party will open a contract specific joint bank account in any commercial bank which will be jointly operated by the Chairman and the Treasurer of the WUA. Report of the account opening will be made to First Party.

2.2 The Second Party will provide a copy of specimen signatures of account operators (Chairman and Treasurer WUA) to the First Party. Any change shall be communicated to the First Party immediately. The signatories shall not be changed without prior consent of the First Party.

3. DISBURSEMENT OF FUNDS

3.1 Payment to the Second Party for watercourse construction and improvement/lining shall be released by the First Party in three installments in the following manner:

1. First Installment

Release of 50 percent cost of earthen development/ construction and 40 percent of the estimated material cost on receipt of First Intermediate Completion Report (ICR-I) from the Command Area

Development (CAD) consultants certifying :

(a) Approval of survey and design;
(b) Issuance of technical sanction by the competent authority;
(c) 50 percent farmers' share on account of labor charges for lining and installation of water control structures deposited;
(d) Completion of RoW clearance and pad formation for at least 50 percent length to be constructed/ lined and;
(e) Earthen construction of at least 50 percent of designed watercourse completed

i. .

2. Second Installment

Release of remaining 50 percent cost of earthen construction and 30 percent of the estimated material cost on receipt of Second Intermediate Completion Report (ICR-II) from CAD consultants verifying the following (Annexure-III):

i. Remaining 50 percent labor charges of farmers' share on account of lining/installation of water control structures, etc. deposited;
ii. Entire designed earthen sections developed; and
iii. At least 30 percent planned lining and other works completed.

3. Third Installment

Release of remaining 30 percent of the estimated material cost on receipt of Final Completion Report (FCR) from CAD consultants certifying the following (Annexure-IV):

i. All planned works completed; and
ii. Any pending discrepancy rectified.

3.2 Payment at each stage will be made by the First Party on submission of a bill for completed portion of works at the stages agreed under clause 3.1 to the Second Party on its certification by the CAD consultants. A contingent bill will be prepared and submitted by the Deputy Director Agriculture OFWM to the District Accounts Officer for processing of payment to the Second Party.

3.3 The Second Party will release all payments through crossed cheques with authentication by the concerned Assistant Director Agriculture OFWM. The Second Party will maintain a record of all transactions and purchases made for construction and improvement/lining of watercourse in a specified register.

4. Adjustments of Construction Material Prices

3.4 Upon submitting the request for second installment, the Second Party shall provide details of actual expenditures to the First Party. The prices shall be adjusted as per actual expenditures provided that the unit rates were within the price band approved by the District Rate Committee (DRC) (Annexure-V).

3.5 In the course of watercourse construction/improvement/lining, if the Purchase Committee of WUA discovers that the market rates are outside the DRC approved price bands, the Purchase Committee shall approach the DRC for a revision.

3.6 There will be no financial implication on the part of the First Party if the actual rates adopted by Purchase Committee for procurement of construction materials exceed those approved by DRC.

4. PROCUREMENT, FINANCIAL MANAGEMENT AND MAINTENANCE OF ACCOUNTS/RECORDS

4.1 The DRC will fix the price band for various construction materials to be procured by the WUAs. The Purchase Committee (PC) for the watercourse comprising of representatives of the Second Party (Annexure-VI) will be responsible for the procurement of construction materials following the Request for Quotation (Shopping) Procedure for WUAs (Annexure-VII). The WUA Purchase Committee shall survey the local market/area and collect the rates of construction materials, i.e. cement, bricks, sand, pipes, precast concrete parabolic segments (PCPS), *nakkas,* etc., from at least three different firms/suppliers. For purchase of PCPS, quotations will be collected only from suppliers prequalified by the Agriculture Department for the purpose. The quotations so offered will be in the name of the Purchase Committee and other relevant record thereof will be maintained in a proper manner by the Second Party. The Second Party shall procure materials from the local market at the lowest competitive rates and execute the works in accordance with clause 3 above.

4.2 In the event of any misuse of funds by the Second Party, the First Party shall have the right to freeze the bank account of the Second Party and initiate inquiry as deemed necessary.

4.3 In case of non-utilization of funds due to any reason, the Second Party will be liable to refund the unspent balance immediately to the First Party.

5. COMPLETION TIME AND CONTRACT TERMINATION

5.1 The works shall be completed by the Second Party within 365 days and shall be responsible for timely completion of works. In exceptional circumstances, the time period may be extended in writing by mutual consent of both parties and approval of the Director General Agriculture WM/Director Agriculture OFWM.

5.2 If the Second Party commits a major breach on any of the terms and conditions under this Agreement and does not take appropriate remedial actions as advised by the First Party within one month of such advice, then the First Party may terminate this Agreement. In case of such termination, the Second Party shall refund the unutilized funds provided by the First Party deducting the value of completed works undertaken by the Second Party in accordance with the approved procedure and verified/certified by the CAD consultants. In this case, the watercourse will be considered completed as such, even if the construction/improvement/lining works have not been completed as planned.

6. DUTIES AND RESPONSIBILITIES OF FIRST PARTY

The First Party shall:

- Issue directions to the Second Party (WUA) for the development/construction and improvement/lining of watercourse;
- Facilitate WUA to collect approved *Chakbandi* Plan and *Warabandi* from the Irrigation Department;
- Conduct surveys and prepare the design of watercourse according to engineering principles;
- Prepare the cost estimates of the watercourse;
- Get the design and cost estimates approved by the CAD consultants;

- Provide help in the construction/improvement/lining of watercourse and arrange government funds to be provided in installments to the WUA;
- Provide technical guidance in construction works according to the standards and specifications of the department to complete the task in time;
- Facilitate certification of completed works by CAD consultants and release funds to WUA on completion of requisite milestones as per recommendations of CAD consultants;
- Resolve the disputes amongst the members of WUA;
- Not be responsible for any damage, if occurred during or after completion of work, due to mismanagement or negligence of the WUA or due to natural calamities like rain, floods, etc;
- Not be responsible for over-topping of watercourse due to increase in flow over and above designed/sanctioned discharge of the watercourse caused by change in full supply level of the canal/minor or any sort of hindrance/obstacle created by human or animals in the flow of water.

7. DUTIES AND RESPONSIBILITIES OF SECOND PARTY

The Second Party shall:

- Perform duties as per provisions of the OFWM and WUA Act 1981 (amended 2001) as well as relevant project documents/guidelines;
- Provide the approved *Chak* Plan and *Warabandi* from the Irrigation Department;
- Provide the list of shareholders of the watercourse attested by the *Numberdar* or WUA Chairman;
- Resolve the disputes among shareholders amicably;
- Arrange/provide land for watercourse right-of-way, get it cleared by the shareholders and remove obstacle, if any;
- Collect the farmers' share from the shareholders well in time;
- Complete the earthen construction, installation of water control structures and lining/improvement works within the specific period agreed with the First Party;
- Arrange requisite machinery, materials and suitable skilled and unskilled labor to carry out the works;
- Purchase the construction materials from the local market on competitive rates within limits approved by DRC in accordance with the "Request for Quotation (Shopping) Procedure for WUA".
- Utilize the allocated/sanctioned funds (Government & Farmers' Share) properly, and use/consume the construction materials according to the departmental standards and specifications. The WUA will maintain the record of all receipts and consumptions in the specified register;
- Follow the guidelines and instructions of the CAD consultants and OFWM field staff;
- Provide access to the First Party or its representatives during construction and improvement/lining of watercourse;
- Provide procurement record/vouched accounts to the First Party or its representative on demand;
- Make alternative route/passage arrangement during watercourse improvement/lining process;

8. CONTRACT TERMINATION

This Agreement may be terminated on the occurrence of any of the following:

a) By mutual agreement between both parties
b) By the First Party in the following cases:
   i. if the Second party breaches any of the provision of the Agreement;
   ii. if the Second Party is found to have engaged in fraud or corrupt practices that have impacted the execution of Agreement badly for completion of planned works;
   iii. upon completion of works as per satisfaction of the First Party on evidence by the WUA;
   iv. any other reason as considered justified by the First Party in the best interest of the Contract.

9. SETTLEMENT OF DISPUTE

During execution of the scheme, if any dispute arises relating to any aspect of this Agreement, the parties shall first attempt to settle the issue through mutual and amicable consultation. If the same is not resolved through such consultation, the matter will be referred for adjudication to the Director General Agriculture WM/Project Director/Director Agriculture OFWM whose decision will be final and binding on both parties.

On behalf of Second Party

Signature _____ Place _____ Dated _____

Name of Chairman _____ Office Stamp _____

Watercourse No. _____ Village /Chak No. _____

On behalf of First Party

Signature _____ Place _____ Dated _____

DDA (OFWM) _____ Office Stamp _____

1. **W I T N E S S E S**

1. Signature _____ Place _____ Dated _____

   Name _____ Village _____ Tehsil _____

2. Signature _____ Place _____ Dated _____

   Name _____ Village _____ Tehsil _____

Annexure-I

Command Area Development of Greater Thal Canal Irrigation Project
Watercourse Construction and Improvement/Lining

Financial Year: _____

COST ESTIMATES

Watercourse No._____ Village/Chak No._____ Minor/Disty._____
Field Team_____ Tehsil _____ District_____
Total Length _____m, Planned Earthen Construction_____,
Planned Lining _____m (____%)
Lining Technology: Precast Concrete Parabolic Segments (PCPS) Lining

Segment No. _____ Top Width (T)_____ m, Depth (D)_____ m

Material Estimates

S. No	Description of Work	Qty	Brick Work (cu. m)	Concrete Work (cu. m)	Bricks (No)	Cement (Bags)	Sand (cu. m)	Gravel (cu. m)	Steel (Kg)	PCPS (No)
1.	PCPS Lining (m)									
2.	Nuccas (Nos) i. ---------dia ii. ---------dia									
3.	Culverts (Nos) i. Box Culvert ii. Slab Culvert									
4.	B. Wallows (No)									
5.	Drop Structure (No)									
6.	Joints (Nos)									
7.	Others _____ _____									
	Total									

A: Total Estimated Cost of Civil Works

Cost of bricks (rate / 1000 x total bricks) = Rs. _____
Cost of cement (rate / bag x total bags) = Rs. _____
Cost of sand (rate / cu. m x total sand) = Rs. _____
Cost of gravel (rate / cu. m x total gravel) = Rs. _____
Cost of reinforcement (rate / kg x total steel) = Rs. _____
Cost of _____ No. PCPS @ Rs._____/ PCPS = Rs. _____
Cost of _____ No. Nakkas of _____ dia @ Rs. _____/Nakka = Rs. _____

Others (if any) Item _____, Quantity _____ Rate _____ = Rs. _____

Total : A = Rs. _____

B: Total Estimated Cost of Labor

a) Cost of masons/semi-skilled labor including back earth filling charges = Rs. _____
b) Cost of unskilled labor for earthen construction and excavation of section to be lined = Rs. _____

Total (a+b) : B = Rs. _____

Total Estimated Cost of Watercourse Construction and Improvement/Lining

Total Cost (A+B) = Rs. _____

Government Share {A+B(b)} = Rs. _____

Farmers' Contribution {B(a)} = Rs. _____

Water Management Officer/Supervisor	Assistant Director Agriculture (OFWM)/AAE
_____	_____
Signature and Stamp	Signature and Stamp
Deputy Director Agriculture (OFWM)	CAD Consultants Field Engineer
_____	_____
Signature and Stamp	Signature and Stamp

Annexure-II

First Intermediate Completion Report (ICR-I)
Command Area Development of Greater Thal Canal Irrigation Project

WATERCOURSE CONSTRUCTION AND LINING

Financial Year: _____

Release of 1st Installment – 50% of Total Earthen Construction Cost and 40% of Total Material Cost

Watercourse No._____ Village/Chak No._____ Minor/Disty._____
Field Team_____ Tehsil _____ District_____
Total Length _____m, Planned Lining _____m (_____ %), Planned Earthen Construction _____m, (_____ %)

Earthen Construction (Min. 80%) and Deposit of Farmers' Share (Min. 50%) by WUA

Particulars	Earthen Construction			Deposit of Farmer's Share		
	Planned (m)	Executed (m)	%	Total Masonry Labor Cost for Civil Works (Rs.)	Deposited (Rs.)	%
Main						
Branch – A Branch – B Branch – C ……..						
Total						

Signature_____

Name of Chairman (WUA)_____

Signature_____

Name of WMO/WM Sup._____

Date_____

Signature_____

Name of DDA (OFWM)_____

Signature_____

Name of ADA (OFWM)_____

Certificate by CAD Consultants;

"Certified that ____% of planned earthen construction executed by WUA have been checked and found satisfactory. WUA has also deposited Rs. _____ as its due share (_____%) towards masonry labor cost. Release of First Installment, i.e., 50% of earthen construction cost and 40% of total material cost amounting to Rs. _____ to WUA, therefore, is recommended."

Signature: _____
Name of CAD Consultants FE: _____
Official Stamp: _____
Date: _____

Annexure-III

Second Intermediate Completion Report (ICR-II)
Command Area Development of Greater Thal Canal Irrigation Project

WATERCOURSE CONSTRUCTION AND LINING

Financial Year: _____

Release of 2nd Installment – 50% of total Earthen Construction Cost and 30% of Total Material Cost

Watercourse No._____ Village/Chak No._____ Minor/Disty._____
Field Team_____ Tehsil _____ District_____
Total Length _____m, Planned Lining _____m (_____ %), Planned Earthen Construction _____m, (_____ %)

Earthen Construction (100%) and Deposit of Remaining Farmers' Share (50%) by WUA

Particulars	Earthen Improvements			Deposit of Farmer's Share		
	Planned (m)	Executed (m)	%	Total Masonry Labor Cost for Civil Works (Rs.)	Deposited (Rs.)	%
Main						
Branch – A Branch – B Branch – C ……..						
Total						

Civil Works (Minimum 30%)

Particulars	Planned	Executed	%
PCPS Lining Section I Section II	_____m _____m	_____m _____m	
Nakkas (……dia) (……dia)	_____No _____No	_____No _____No	
Culverts	_____No	_____No	
B. Wallows	_____No	_____No	
Other structure, drop, syphon etc.			

Signature_____ Signature_____

Name of Chairman (WUA)_____ Name of WMO/WM Sup._____

Signature_____ Signature_____

Name of DDA (OFWM)_____ Name of ADA (OFWM)_____

Certificate by CAD Consultants;

"Certified that _____% of planned earthen construction and _____% of planned civil works executed by WUA have been checked and found satisfactory. WUA has also deposited Rs._____ as its due share (remaining _____ %) towards masonry labor cost. Release of Second Installment amounting to Rs._____ to WUA, therefore, is recommended."

Signature: _____
Name of CAD Consultants FE: _____
Official Stamp: _____
Date: _____

Annexure-IV (FCR -1/2)

Final Completion Report (FCR)
Command Area Development of Greater Thal Canal Irrigation Project

WATERCOURSE CONSTRUCTION AND LINING

Financial Year:_____

Release of Final Installment – 30% of Total Material Cost

Watercourse No._____ Village/Chak No._____ Minor/Disty._____ Field Team_____ Tehsil _____ District _____Total Length _____m, Planned Lining _____m (_____ %), _____ Planned Earthen Construction _____m, (_____ %)

Detail of Civil Works	Type of lining	Length	Width	Depth	Side Slope	Wall Thickness	Floor Width	Floor Thickness	Unit Volume/ Length	Total Brick Work	Total Concrete Work	Construction Materials as Per Maximum Permissible Limits					
												Bricks	Cement	Sand	PCPS	Gravel	MS Bars
		(m)	(m)	(m)	(z)	(m)	(m)	(m)	(cu. m/ m)	(cu. m)	(cu. m)	(No)	(bags)	(cu. m)	(No)	(cu. m)	(Kg)
Lined Section I	PCPS																
Lined Section II	PCPS																
Lined Section III	PCPS																
Total :																	

Naccas/ Outlets	……. No. of ……..……. cm dia. Size									
	……. No. of ……..……. cm dia. Size									
	Total ……..……. Naccas/ Outlets (Nos.)									
Arch Culverts	……. No. of ……. m length each									
Slab Culverts	……. No. of ……. m length each									
Drop Structures	…….. Size…….. Nos									
Buffalow Wallow	…….. Size…….. Nos									
Any Other	…….. Size…….. Nos									
Total Civil Works Executed and Construction Materials as Per Maximum Permissible Limits										
Total Materials Actually Consumed										

Annexure-IV (FCR -2/2)

Details of Actual Expenditure Incurred on Physically Consumed Construction Materials

Watercourse No. _____	Village/Chak No. _____	Minor/Disty. _____	Field Team/Unit _____	Tehsil _____	District _____

Sr. No.	Description	Unit	Quantity	Unit Rate	Total Cost (Rs.)
Cost of Civil Works / Construction Material (Government Share)					
1	PCPS	(No)	i) ii)		
	Total:				
2	Cement	(bags)	i) ii)		
	Total:				
3	Sand	(cu. m)	i) ii)		
	Total:				
4	Bricks	(No.)	i) ii)		
	Total:				
5	Pannel Naccas	(No)	i) ii)		
	Total:				
6	Gravel	(cu. m)			
7	MS Bars	(Kgs)			
8	Any other				
Total Cost of Civil Works / Construction Material					
Amount already paid through First Installment					
Amount already paid through Second Installment					
Total Amount paid through First and Second Installments					
Amount to be paid as Third/Final Installment/Recovered					

Remarks

It is certified that:

1. 'A' class bricks, portland good quality fresh cement, good quality sand, gravel of required strength, MS bars of desired size have been used in the civil works.
2. PCPS and pannel nakkas have been purchased from the prequalified firms and installed by following project standards and specifications.
3. All above construction material have been purchased at lowest competitive rates.
4. The mortar in 1:4 cement sand ratio has been used in brick masonry and plaster works.
5. The executed works meet the prescribed project standards and specifications.
6. Cost analysis has been made on the basis of approved rates by the purchase committee, actually consumed materials and as per financial record maintained by the WUA.

Signature: _____ Signature: _____

Name of Chairman WUA: _____ Name of WMO/Sup: _____

Official Stamp: _____ Tehsil: _____

Official Stamp: _____

Signature: _____ Signature: _____

Name of ADA (OFWM): _____ Name of DDA (OFWM): _____

Tehsil/Field Team/Unit: _____ District/Region: _____

Official Stamp:_____ Official Stamp: _____

Certificate by CAD Consultants

"Certified that total cicvil works and entire earthen construction executed by WUA have been checked and found satisfactory. Release of Third/Final Installment, i.e., remaining amount (≤30% of total materials cost) of Rs. _____ to WUA is, therefore, recommended."

Signature: _____

CAD Consultants FE Name: _____

District: _____

Official Stamp: _____

Date: _____

Annexure-V

Command Area Development of Greater Thal Canal Irrigation Project
Composition and Terms of Reference of District Rate Committee

1.	Director Agriculture (OFWM) of Respective Division	Chairman
2.	XEN Building Department	Member
3.	Field Engineer (CAD Consultant)	Member
4.	Deputy Director Agriculture (OFWM) concerned	Member/Secretary

The terms and reference of the DRC include, inter-alia the following:

(i) Periodically review rates of various construction materials (sand, cement, bricks, pre-cast concrete parabolic segments (PCPS), and other items used in watercourse development/ improvement, etc.)

(ii) Fix price band for different materials for clusters on geographical basis as per prevailing market rates

(iii) Fix price/ rates for excavation, geomembrane laying/jointing and earthen covering (clay) for construction of water storage ponds at high efficiency irrigation system, power systems, and other project interventions

(iv) Review and make decisions regarding watercourse improvement development and construction items

Annexure-VI

DIRECTORATE GENERAL AGRICULTURE (WATER MANAGEMENT), PUNJAB, LAHORE

O R D E R

In order to effect purchase of construction materials (PCPS, cement, sand, bricks, nakkas, gravel, pipes, other accessories, etc.) for construction and improvement/lining of watercourses under the Command Area Development of the Greater Thal Canal Irrigation Project, the Purchase Committee would comprise of the following:

Sr. No.	Name	Designation
1	Chairman, WUA	Chairman
2	Secretary, WUA	Member
3	Treasurer, WUA	Member
4	Member, WUA	Member
5	Member, WUA	Member

The committee would affect purchase of construction materials observing specified terms and conditions as mentioned in the Participation Agreement for construction and improvement/lining of watercourses under the Project.

Sd/-
Director General Agriculture
(Water Management)
Punjab, Lahore

No. _____/DO/OFWM/ Dated

A copy is forwarded for information and immediate necessary action to:

1. Director Agriculture (OFWM) concerned
2. Deputy Director Agriculture (OFWM) concerned

Director General Agriculture
(Water Management)
Punjab, Lahore

Annexure-VII

Command Area Development of Greater Thal Canal Irrigation Project
Procurement Procedure for Water Users Association

The Deputy Director Agriculture OFWM/First Party will ensure that the requisite goods/materials for construction and improvement/lining of watercourses are procured by the Water Users Association (Second Party) in accordance with the simplified procurement procedure as given below:

(i) Water Users Association (Second Party) will plan to procure construction materials and hire labor (skilled and unskilled) at least for every seven (7) days;

(ii) The Second Party will ask for at least three (3) quotations (in writing) for all planned materials to be procured for execution of works;

(iii) The Second Party will hire labor only or as services from precast concrete parabolic segments (PCPS) firms along with materials for planned works;

(iv) The quotations shall be placed on the Second Party office notice board for 3-5 days;

(v) At least three members of Second Party shall prepare a comparative statement for the received quotations and recommend award to the lowest evaluated quoting firm/supplier for procurement of goods/material in consultation with the OFWM field staff;

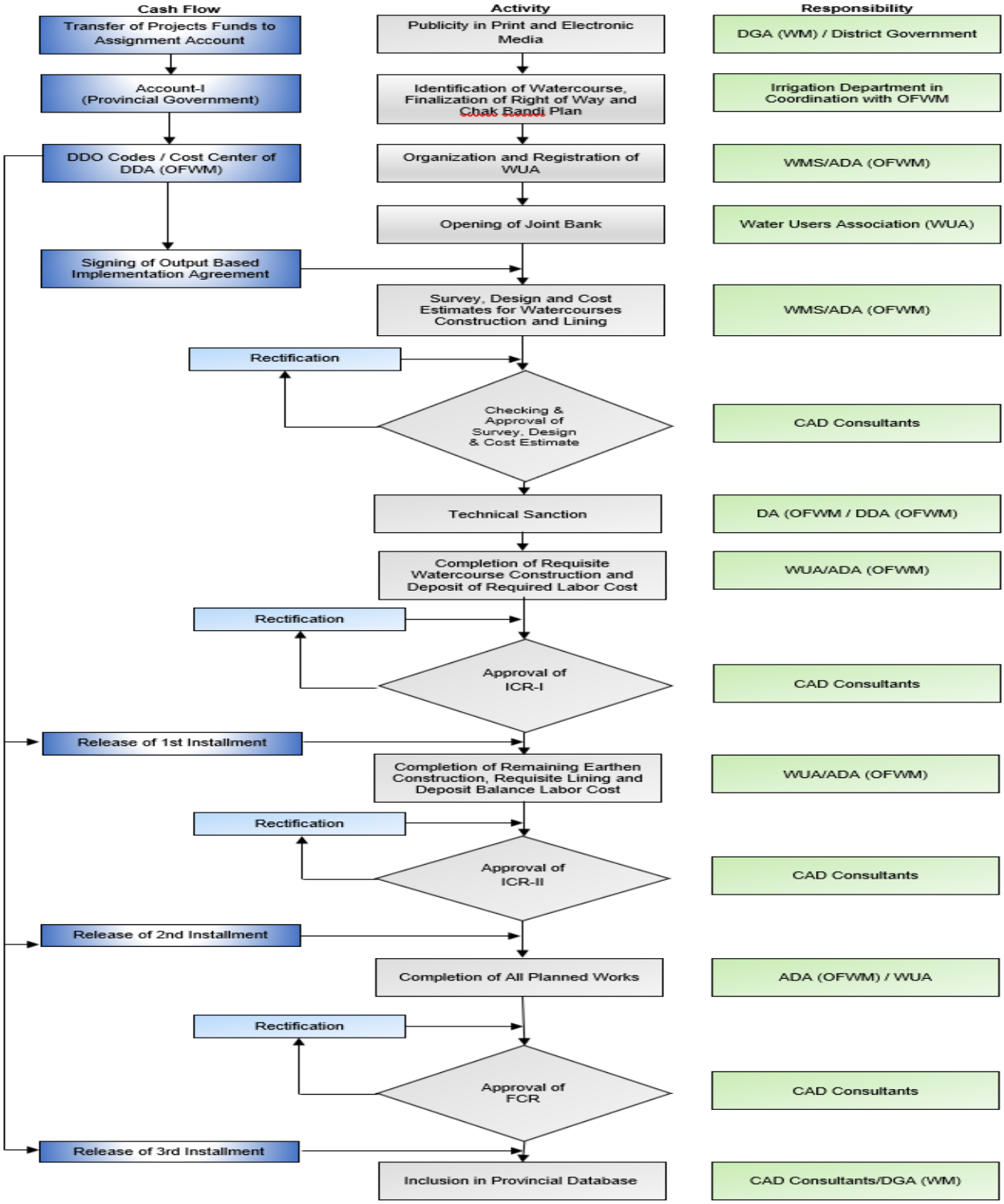
(vi) The work order/award shall be in writing and shall indicate the cost, quantity of material and required date of delivery;

(vii) The receipt of material/goods, and payment shall be kept in records;

(viii) The Second Party shall maintain a register of the received goods/materials and hired labor vis-à-vis their consumption as well as receipts shall be kept/placed on record properly;

(ix) If the Second Party hires the labor for execution of works, the attendance sheet shall be maintained;

Command Area Development of Greater Thal Canal Irrigation Project
Process Map for Watercourse Construction and Lining



ADA (OFWM) = Assistant Director Agriculture (On Farm Water Management); CAD = Command Area Development; DA (OFWM) = Director Agriculture (OFWM); DDA (OFWM) = Deputy Director Agriculture (On Farm Water Management); DGA (WM) = Director General Agriculture (Water Management); DDO = Drawing and Disbursing Officer; FCR = Final Completion Report; ICR = Intermediate Completion Report; WMR = Water Management Supervisor

APPENDIX 3: DRAFT TERMS OF REFERENCES FOR PID IMPLEMENTATION SUPPORT AND CONSTRUCTION SUPERVISION CONSULTANTS

A. BACKGROUND

1. The Greater Thal Canal Project area lies in the eastern part of Thal Doab bounded by the River Indus on the west and rivers Jhelum and Chenab on the east. On the west, the proposed project area abuts with the existing Thal Canal command boundary and falls within the boundaries of Bhakkar, Layyah, Khushab and Jhang districts. The eastern part of the Doab, which was left out from the original Thal Canal project, constitutes the Greater Thal Canal area. This area, a vast desert spread over about 1.976 million acres, has been lying barren for centuries except for some rainfed agriculture, mostly during Rabi. It has now to be considered for development through irrigated agriculture.

2. Under the inter-Provincial Water Accord, Kharif allocation of 1.873 MAF has been approved for Greater Thal Canal Project in addition to which additional flood supplies may also be available during monsoon period. The studies have been carried out for non-perennial irrigation with water accord allocation and additional flood supplies. However, if in some year(s), additional flood supplies are not available, then shortages will be managed through rotational program system and reliance will be placed on stress irrigation techniques.

3. The irrigation network of Greater Thal Canal Project consists of four command systems of Branch canals namely, Mankera, Choubara, Dhingana and Nurpur and one command system of Mehmood sub branch of Dhingana branch with total 65 distributaries and 29 minors. Phase - I of the project, involving construction of Main Canal and Mankera Branch, was implemented by WAPDA. Now the Government of Punjab is entrusted the job to implement remaining parts of the Project:

Phase-I (Completed in 2008 by WAPDA)

- Construction of Main Canal, its 8 Nos. Direct Distributaries with Minors.
- Construction of Mankera Branch and Distribution System.

Phase-II (under taken now)

- Construction of Choubara Branch Canal and Distribution System.

Phase-III (Future)

- Construction of Dhingana Branch Canal and Distribution System.
- Construction of Mehmood Sub Branch of Dhingana Branch Canal and Distribution System.
- Construction of Noorpur Branch Canal and Distribution System.

4. Phase-I was completed in 2008 at a cost of Rs. 10.17 Billion by WAPDA, through five contract packages. Remaining contracts were not implemented by WAPDA. Phase-II is now to be implemented by the Punjab government with the financial assistance from Asian Development Bank (ADB).

5. In 2015, Government of the Punjab decided to construct Phase II comprising Choubara Branch Canal System under Annual Development Programme (ADP) 2015-2016. For this purpose, PC-I was prepared and approved on March 02, 2016 amounting Rs. 6,261.701 Million. GTC Consultants (JV of ACE and EGC in association with Berkeley Associates) were hired who

have already completed the updated detailed design and Bidding Documents of the Choubara Branch Canal System. In May 2019, Government of the Punjab decided to seek financial assistance from Asian Development Bank (ADB) for implementation of Choubara Branch Canal Construction Project. Accordingly, a new team of consultants will be engaged for structural design adjustments during implementation, contract management, social and environmental safeguard during implementation and monitoring, project implementation management support and other services to meet the requirements for an ADB - financed project.

B. OBJECTIVES OF THE ASSIGNMENT

6. The following are the objectives for hiring the consultancy services for Construction Supervision Consultant (CSC) of Choubara Branch Canal Construction Project- Greater Thal Canal (Phase-II):

i. to ensure construction of a reliable and sustainable irrigation system of specified quality, in accordance with the civil works contracts. In this regard, the hired Construction Supervision Consultant (CSC) are expected to perform effective construction supervision, feedback and management of all associated activities ensuring quality work of specified standards and practices and completion of project on time and within the budget;
ii. to delegate necessary powers to the CSC to supervise construction of the irrigation system as per scope of works, on specified quality standards, within prescribed time;
iii. to continue design review and incorporate changes in the design and construction drawings, if needed, and provide technical and design support (running design) throughout the currency of construction activities;
iv. to make the CSC's role proactive and not limited to watch and see and monitor and report, by anticipating all activities for execution of physical works, forewarning the contractor and informing the Client regarding all expected challenges;
v. to hold the CSC wholly responsible for required production rate of the physical works, control of work cost and quality of construction;
vi. to deliver the services with professional standards and commitment, by applying knowledge of management of integration, cost, scope, time, quality, procurement, communication, human resource, stakeholders and risk in using the current day practices of project administration for execution, monitoring and control and project closing.

7. The Consultant will have overall responsibility for all pertinent functions involved in the assignment of construction supervision, to produce a work result of quality, acting in accordance with standard international practices of the engineering profession. In relation to mentioned service delivery, the Consultant will perform various functions, like project management; construction surveillance & supervision; contract administration; value engineering; design during implementation; social and environmental safeguard etc. The consultant will deliver the Services, in accordance with relevant guidelines and standard procedures of ADB and according to instructions by the Client. One of the major responsibilities of CSC will be to perform the role of ''the Engineer'' while supervising the works and administering the work contract executed between the Employer and the Contractor. The work contract will be based on ADB Procurement Regulations (2017) and procedures. The works will be awarded through Single-stage: Two-envelop system. The consultant will also provide advice and assistance on all matters relating to project implementation, construction issues and audit paras/ issues pointed out by the audit authorities.

8. The major objectives of undertaking the Choubara Branch Canal Construction Project are as under:

i) Choubara Branch System aims at development of 294,110 acres CCA new irrigated agriculture in the eastern part of Thal Doab which falls within the boundaries of Khusab, Bhakkar and Layyah districts.

ii) Under the Water Accord, allocations have been approved for the Project for Kharif season in addition to which surplus flood flows may also be available during monsoon. If the project is commissioned for Kharif supplies augmented by surplus flood flows, crop production will increase from 12,032 ton/ annum to 378,270 ton/ annum at full development.

iii) The project will not only result in an increase in farm income but also the opportunities for labour will increase which will bring prosperity to the people in the project area and, thus, reduce drift of people to other areas for work.

iv) The project will have many positive impacts including increase in agricultural production resulting in a boost to the economy, improvements in physical environment including atmosphere, climate, land and water, improvement in quality of life due to betterment in socio-cultural and socio-economic conditions and enhancement of infra-structural and public health facilities.

9. The civil works under the project are expected to include, but not limited to the following:

a) Earth work for making canal prism
b) Canal lining by canal lining machine
c) Construction of Hydraulic Structures (Head Regulators / Cross Regulators / Distributors / Falls etc.)
d) Construction of Outlets
e) Construction of Bridges
f) Installation of Mechanical Equipment
g) Re-sectioning of GTC Main Canal & Mankera Branch Canal System
h) Field Offices and Colonies

10. The consultants will be responsible for:

a) undertaking running design during implementation based on detailed design prepared by WAPDA engaged consultants, updated by GTC Consultants and existing site conditions;
b) construction supervision and contract management of the works of the project including all allied structures assuming the role of ‘’the Engineer’’ as defined in FIDIC document;
c) provision of all necessary working drawings ensuring quality construction and strict compliance with the Land Acquisition and Resettlement Plan (LARP), Corrective Action Plan (CAP), site-specific environmental management plan (SSEMP) and specifications, and measurement / certification of completed works facilitating contractor’s progress payments;
d) Implementation of the Biodiversity Action Plan (BAP);
e) Carrying out tasks as delegated in the project’s safeguard documents including the gender action plan, LARP and Environmental Management and Monitoring; and
f) Other project implementation support to the PMO.

C. SCOPE OF SERVICES, TASKS AND EXPECTED DELIVERABLES

11. The Scope of services for consulting services will include, but not limited to the following:

a) **General Functions**

i) assume the responsibility to check surveys and benchmarks established by the Contractor at each site of work and ensure accuracy of surveys and benchmarks connecting all components under the works.

ii) attend all meetings convened by the Client or Government of Pakistan or Government of Punjab or ADB and make necessary presentations and minutes of meetings. Keep record of such meetings;

iii) prepare all documents for approval of the Government of ADB or any other agency;

iv) check and approve all proposals and designs submitted by the contractor for temporary works (river diversions, boat-bridge etc.), bar bending schedules and electrical and mechanical works;

v) monitor the instrumentation installation;

vi) scrutinize and approve the Contractor's staff and labor proposals including replacements and work program;

vii) conduct periodic check on record of Contractor's personnel and equipment;

viii) assist the Client in taking over the contract works and prepare list of items of works to be completed by the Contractor during defects notification period (DNP); also prepare inventory of works/ structures completed and tools/ plant/ equipment etc.;

ix) prepare taking-over certificates and documents as required for acceptance of works/ goods by the Client;

x) using the output from the quality control program and the quantity surveying and measurement program, prepare monthly and quarterly progress reports using the latest software acceptable to the Client; for sending to donors and government offices;

xi) monitor, track and follow up project plan preferably using latest version of Primavera or equivalent for all project activities/tasks. To measure project progress on performance baselines for time, cost and other project constrains;

xii) generate progress reports using 'earned value' analysis;

xiii) make systematic record storage, cataloging of all project documentation, files, correspondence and devise a quick retrieval system

xiv) prepare monthly and quarterly progress reports on approved format and include all feature of the project like schedule, quality, procurement, risk, communications, cost and others, as required by the Employer;

xv) assist the Employer in maintaining detailed financial accounts and other project records, and prepare other documentation as may be required by the Employer or ADB;

xvi) provide technical support to Employer as required specially in submitting withdrawal applications to ADB for direct payment to the contractor; and

xvii) fully administer the Construction Contract till its completion.

b) **Other Obligations**

i) review and up-date the Contractor's program for implementation of various phases of the project and revise critical path analysis, if necessary.

ii) review and update EMP & EIA Reports in line with ADB's Safeguard Policy Statement (2009) and as provided in the bidding documents;

iii) review and approve the Site-Specific Environmental Management Plan (SSEMP) prepared by the contractor based on the EMP in the bidding documents, review and supervise implementation of the environmental mitigation measures and monitoring plan in line with ADB's Safeguard Policy Statement (2009);

iv) review and update draft Land Acquisition and Resettlement Plan (LARP) and prepare final Land Acquisition and Resettlement Plan (LARP) in line with ADB's Safeguard Policy Statement (2009);

v) prepare/ update Environment and Health Safety Plan, Gender Action Plan (GAP) and Land Acquisition and Resettlement Plans (LARPs) for all locations where project civil works involve land acquisition and/ or livelihood disruption on rights of way;

vi) support PMO in monitoring and carrying out activities related to implementation of Environmental Management Plan (EMP), Land Acquisition and Resettlement Plans (LARP), Corrective Action Plan (CAP) in line with ADB relevant policies and guidelines and preparing quarterly progress reports thereof;

vii) ensure that all project components reviewed and supervised by the Consultants are implemented in an environmentally friendly manner and taking adequate mitigation measures wherever necessary;

viii) keep the Client informed of technical and environmental/ social issues and progress of all contractual works both by direct contacts and through discussions or correspondence;

ix) review and approve the Health Safety and Environment (HSE) Plan and prepare Change Management Statement, if necessary and oversee their implementation;

x) implementation of the Land Acquisition and Resettlement Plan (LARP) and Corrective Action Plan (CAP) is the responsibility of Environment and Social Unit (ESU) of PMO. However, the Consultants will assist PMO/ EA in reviewing, updating and implementation of LARP and CAP and preparing internal semi-annual social safeguard monitoring reports. The Consultants will also assist PMO/ EA and External Monitoring Agent in preparing external monitoring report by providing required data and information.

xi) prepare response to audit observations and paras in respect of payments certified by them and assist the Client in getting them resolved during and after completion of the project; and

xii) assist the Employer in implementation of LARP;

c) **Design during Implementation Phase**

i) perform updating of design, by adding new works with the approval of Employer, if necessary

ii) review and approve design calculations and shop drawings submitted by the Contractor(s);

iii) continue design review of the detailed design prepared by WAPDA engaged consultants and updated by GTC Consultants, incorporate changes in the design and construction drawings as and when required, and provide technical and design support throughout the currency of construction activities;

iv) natural calamities such as earthquakes, floods or wind storms in the area may cause change in the ground conditions or geotechnical parameters. The Consultant will review the changes, if any, and will accordingly revise/ update the alignment, layout, dimensions, levels or any other design parameter for those parts of the Works;

v) during construction, identify need for additional surveys and geotechnical investigations, if any, and review hydraulic and structural parameters on the basis of new information, if significantly different than what were available at design stage, then redesign or improve the present design if needed; and

vi) revise/ amend PC-1 for approval as and when required.

d) **Construction Supervision and Contract Administration**

i) undertake full administration of construction contract(s) and supervise construction works (including civil, electrical and mechanical discipline), during Construction Period, assuming the role of “the Engineer” and undertake all tasks as per Multilateral Development Bank Harmonized Edition of FIDIC General Conditions of Contract for Construction. This shall include on-Site supervision of the contractors’ works for compliance with the specifications, review of Contractor’s submittals, verification of executed works, issuance of interim payment certification, checking and approving the quality assurance procedures and all other submittals prepared by the contractors;

ii) analyze and review the Contractor’s staff and labour proposals and work programme;

iii) review and suggest appropriate changes to the contractor’s construction schedule and programme, and inform the Employer on the impact on the project completion date and other mile stones.

iv) prepare Construction Drawings on the basis of fresh joint topo survey. Issuance of Construction Drawings will be in a manner to facilitate construction activities, to plan, start and execute works on time before construction schedule submitted by the Contractor.

v) put in place a comprehensive quality control program including detailed methodology for inspection, sampling and testing and confirm its adequacy in the field and ensure satisfactory employment at site;

vi) establish a comprehensive program for setting out, surveying and measurement and ensure its implementation throughout the contract period;

vii) assume the responsibility to check surveys and benchmarks established by the Contractor at each site of work and ensure accuracy of surveys and benchmarks connecting all components under the works contract;

viii) monitor the instrumentation installation;

ix) scrutinize and approve the Contractor’s staff and labor proposals including replacements and work program;

x) conduct periodic check on record of Contractor’s personnel and equipment;

xi) inspect and witness tests when necessary, during manufacture of electrical and mechanical materials and machinery for compliance with specifications.

xii) witness any acceptance test and advise the Employer whether the works or any part thereof have been completed as per specifications and certify outcome of acceptance test in support of provisional acceptance certificate of completion;

xiii) in the event of contractual dispute which may result in legal action, adjudication or arbitration between the Contractor and the Client, the consultants will, on the instructions from the Client, collate and prepare factual documentation describing the circumstances of the dispute. If required, the consultants will attend hearings and provide all legal and other support to the client;

xiv) carry out dispute resolution, as per provisions of the Conditions of Contract;

xv) review design calculations and shop drawings submitted by the Contractors on all M&E works and approve or amend the same in consultation with the client;

xvi) Carry out joint measurements and verification of executed works as basis for certification of interim payments;

xvii) prepare Appropriate Request after performing necessary check on all variation request and make recommendation to the Employer for issuance of Variation Order in accordance with Contract;

xviii) analyze and check contractor’s claims for time extension and payments as per conditions of Contract and advise the Employer accordingly;

xix) prepare all supporting documents and provide contract-related support to the Employer for contractual disputes, between the Employer and the Contractor, in Dispute Boards and Arbitration and during amicable settlement process;

xx) verify and certify contractors' statement of accounts for interim payments on the basis of quality control and quantity survey and measurement of data ensuring that quantitative progress reporting is adequate to support the contractor's requests for payments;

xxi) Perform determination, value engineering, Engineer's decision, dispute resolution as per provisions in the conditions of contract, when necessary, in the capacity of the Engineer;

xxii) as instructed by the Employer, supervise engineering or other studies associated with the project and its components undertaken by the contractor or any other agency as appointed by the Employer;

xxiii) testing of material at site, off-site testing and inspection of goods and materials in the factory or elsewhere, if needed;

xxiv) supervise installation of mechanical and electrical works in a satisfactory and safe manner in accordance with the specifications and contract requirements;

xxv) testing and commissioning of Electrical & Mechanical equipment in association with the Client;

xxvi) assist the Employer in taking over the contract works and prepare list of components of work to be completed by the Contractor during Defects Notification Period (DNP); also prepare inventory of all Client's assets.

xxvii) prepare taking-over certificates and documents as required for acceptance of works/ goods by the Employer;

xxviii) using the output from the quality control program and the quantity surveying and measurement program, prepare monthly and quarterly progress reports using the latest software acceptable to the Employer; for sending to donors and government offices; and

xxix) prepare a comprehensive Project Completion Report on completion of the contract, on the format acceptable to the Employer and inclusive of all information required by the Employer and based on review of ''as-built'' drawings based on the "as constructed" drawings, prepared by the Contractor(s) as appropriate; and

xxx) assist the Employer in commissioning of the project.

e) **Survey and Investigation**

i) perform joint survey in collaboration with the Contractor(s) and Employer.

ii) carry out/ check all surveys and setting out necessary for proper supervision of the works.

iii) check all TBMs installed by the Contractor(s).

iv) plan and supervise additional surveys, geotechnical investigations and other such activities where necessary to provide a basis for both design modifications and subsequent changes in the construction drawings. The consultants shall hire, with prior approval of the Employer, any additional services of such other agencies responsible for carrying out the aforesaid investigations and model studies etc.

f) **Biodiversity Action Plan (BAP) Sub-Consultants**

The Consultants shall prepare the TORs for the BAP sub-consultants considering the scope and activities regarding biodiversity action plan and hire the services of BAP sub-consultants through provisional sums for implementation of biodiversity action plan for the subject project.

D. TEAM COMPOSITION & QUALIFICATION REQUIREMENTS FOR THE KEY EXPERTS

12. Consultant will maintain two (2) offices and two (2) teams; i.e., one (1) Head Office at Lahore and one (1) Field office. The Design Team and the Team Leader / Deputy Team Leader will be based at Lahore Office and will spend certain time at field office as required. The time input of Team Leader/ Deputy Team Leader would be staggered in such an efficient manner so as to ensure strong hold on the head office management as well as effective and risk-free supervision of project construction activities in the field. The construction supervision team will be based at the Field Office.

Head Office:

13. The Consultants will establish the Head Office / Design Office at Lahore which will serve as the principal Project Office during the construction supervision phase. The cost of renting, furnishing, equipping and maintaining the Head Office will be included in the Consultants' financial proposal.

Field Office:

14. The supervisory team shall be adequately strengthened with the site supervision team, surveyors, inspectors, and administrative staff. The Consultants would be responsible for establishing, equipping and maintaining the Field Office. The cost of establishing, equipping and maintaining the Field Office and residences shall be included in the Consultants' financial proposal.

Security Arrangements:

15. Security situation at Lahore and project sites is satisfactorily under control and security risks at these places are low to medium. The Consultants should, however, review the security situation there and identify / adopt any specific security measures as deemed necessary.

Indicative Staffing Requirements for Construction Supervision

16. Following matrix represents the Client's reflection on the Consultant's team composition and minimum estimation of person-months for project management, design work, construction management and other field activities for performance of the assignment. However, the prospective consultants should propose their own breakdown of staffing and level of effort / staff work based on their own experience and evaluation of the proposed services. The consultants should propose a realistic deployment schedule for all positions depending on the work requirements as all positions listed below would have inputs for different timespans.

17. The Client estimates an indicative 984 person-months of national key experts and non-key experts to be provided by the Consultants for project management, design work and construction management of the Project. The detail of person-months is as follows: key experts, national: minimum 240 person-months; non-key experts, national: 744 person-months. The planned completion period for Choubara Branch Canal Construction Project is forty-eight (48) months including twelve (12) months of maintenance period during which the consultants shall maintain a minimum staff to perform the required tasks of finalizing the contract**.** The estimated duration of consulting services is fifty-two (52) months.

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
KEY-STAFF					
A. Project Office (PO) at HQ Lahore					
01	Construction Management Specialist / Team Leader	B.Sc. Civil Engineering and M.Sc. Construction Management, M.Sc. Civil Engineering, or other relevant degree.	22	10 years' professional experience in planning, designing and construction supervision/ management of major water sector/ hydel engineering projects including 05 years' specific experience in similar position in construction supervision of major canals / dams/ Barrages/ flood works projects using ICB procedures under FIDIC Conditions of Contract for Construction.	42
02	Contracts & Claims Specialist / Deputy Team Leader	B.Sc. Civil Engineering and Master's degree in Construction Management or equivalent.	22	10 years' professional experience in procurement of civil works, contract management and processing of contractors' claims including 05 years' specific experience related to contract administration and claim handling on large water sector projects under ADB / World Bank / Foreign Donors financing, using ICB procedures under FIDIC Conditions of Contract.	36
03	Lead Design Engineer	B.Sc. Civil Engineering and Masters in Civil Engineering, Hydraulics / Irrigation or other relevant engineering degree	22	10 Years' professional experience in design of civil works on major water sector projects including 05 years' specific experience in similar position on hydraulic design of canals / dams/ barrages and other major hydraulic structures on large canals in renowned Consultancy firms.	12
04	Resettlement Specialist	Master's degree in Sociology / Rural Sociology / Social work / Social Sciences or equivalent.	15	10 Years' professional experience in activities relating to land acquisition and planning and implementation of resettlement plans on large construction projects including 05 years' specific experience in similar position on large water sector projects in accordance with GoP and ADBs' / World Bank's Social Safeguards Policy Guidelines.	12

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
05	Environmental Specialist	Master's degree in Environmental Sciences / Environmental Engineering or equivalent.	15	10 years' professional experience in conducting environmental screening/ assessment of large construction projects including 05 years' specific experience in similar position on water sector projects as per GoP and ADBs' /World Bank's Environmental Guidelines.	12
				Sub - total Key positions in PO	**114**
B. Field Office (Key Staff Continued)					
01	Chief Resident Engineer	B.Sc. Civil Engineering and Masters degree, in Civil Engineering, Construction Management or equivalent.	22	10 years' professional experience in construction planning and supervision of large water sector/ hydel engineering projects on major rivers including 05 years' specific experience in similar position on canals / dams/ barrages and other major hydraulic structures on large canals in renowned Consultancy firm.	36
02	Resident Engineer - Bridges & Regulators	B.Sc. Civil Engineering and Masters degree, in Civil Engineering, Construction Management or other relevant engineering degree.	17	10 years professional experience in construction planning and supervision of large water sector/ Hydel engineering projects, including 05 years' specific experience in similar position on construction planning and supervision of large-scale irrigation projects, canal lining, bridges and major hydraulic structures.	24
03	Resident Engineer - Lining & Earth Work				42
04	Material Engineer / Quality Control Specialist	B.Sc. Civil Engineering and Master's degree in Geology, Civil Engineering, Geo-tech Engineering or other relevant degree	17	10 years' professional experience in quality control of large construction projects including 05 years' specific experience in similar position in material selection, lab tests in labs and at sites for canals/ dams / barrages and hydraulic structures on major canals/ rivers.	24
				Sub-total of Key positions in Field Office	**126**
				Total Key-Staff (PO & FO)	**240**
NON-KEY STAFF					
A. Project Office					
1	Office Engineer	B.Sc. Civil Engineering. Master Degree in Civil	10	07 years' professional experience in implementation of works of large-scale projects including 03	48

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
		Engineering would be preferred and would be rated higher.		years' specific experience on reporting, scheduling and documentation cataloguing on major water sector projects.	
2	Senior Structural Design Engineer	B.Sc. Civil Engineering. An additional Master's degree in Structural Engineering is preferable and would be rated higher.	10	07 Years' professional experience in design of bridges and other major structures including 03 years' specific experience in structural design of river control structures and other major hydraulic structures on large canals in similar position in a renowned consultancy firm.	24
3	Senior Hydraulic Design Engineer	B.Sc. Civil Engineering. An additional Master's degree in Hydraulics / Irrigation / Water Resources Engineering is preferable and would be rated higher.	10	07 Years' professional experience in hydraulic design of civil works on major water sector projects including 03 years' specific experience in hydraulic design of canals/ dams / head works and other major hydraulic structures on large canals in similar position in a renowned consultancy firm.	36
4	Senior Irrigation Design Engineer	B.Sc. Civil Engineering. An additional Master's degree in Irrigation / Hydraulics / Water Resources Engineering is preferable and would be rated higher.	10	07 Years' professional experience in design of civil works on major water sector projects including 03 years' specific experience in irrigation design of new or remodeled major canal systems in similar position in a renowned consultancy firm. .	12
5	Senior Geo-technical Engineer	Geologist with Master's degree in Geology or B.Sc. Civil Engineering. An additional Master's degree in Geo-technical Engineering is preferable and would be rated higher.	10	07 years' professional experience related to design of geo-technical works on major structures including 03 years' specific experience material selection, and quality control on construction of large construction projects in similar position on dams / barrages / head works and other major hydraulic structures on large canals.	06
6	Senior Electrical Engineer	B.Sc. Electrical Engineering. An additional Master's degree in Electronics / Electrical Engineering is preferable and	10	07 year's professional experience in designing and supervision of building electrical works	02

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
		would be rated higher.			
7	Senior Mechanical/ Gates & Gearing Engineer	B.Sc. Mechanical Engineering. An additional Master's degree in Mechanical/ Hydro-mechanical Engineering is preferable and would be rated higher.	10	07 years' professional experience in design, fabrication, erection and installation of gates/ gearings, hoisting system and mechanical equipment on large construction projects, including, 03 years' specific experience in similar position on spillways/ barrages/ headworks/ head regulators/ hydel engineering projects.	24
8	Senior Construction Planning & Scheduling Engineer	B.Sc. Civil Engineering. An additional Master's degree in Construction Management / hydraulics/ Irrigation / Water Resources Engineering is preferable and would be rated higher.	10	07 years' professional experience in planning and scheduling of large construction projects including 03 years' specific experience in reporting, planning, scheduling and document cataloging on major water sector projects on rivers and large canals.	36
9	Senior Contracts Management Engineer	B. Sc. Civil Engineering. An additional Master's degree in Construction Management is preferable and would be rated higher.	10	07 years' professional experience in contract management and processing of contractors' claims on major construction projects including 03 year's specific experience in similar position on large water sector projects under ADB/ World Bank financing, using ICB procedures under FIDIC Conditions of Contract for Construction.	42
10	Procurement and Contract Specialist	B.Sc. degree in Civil / Mech. Engineering	10	07 years' professional experience in procurement of civil works, consulting services and contract management including 03 years' specific experience in similar position in procurement of works and consulting services under externally funded projects ADB/ WB/ JBIC funded Projects using ICB / NCB procedures under FIDIC Conditions of Contract.	24
11	Construction Management Specialist	B.Sc. Civil Engineering	10	07 years' professional experience in planning, construction supervision, documentation and monitoring & control of large construction projects in a consultancy environment including, 03 years' specific	24

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
				experience in similar position in a consultancy environment on canals/ dams/ barrages/ hydel engineering under externally funded projects like ADB/ WB/ JBIC financed projects using ICB / NCB procedures under FIDIC Conditions of Contract.	
12	Environmental Expert	Master's degree in Environmental Sciences/ Environmental Engineering or equivalent.	10	07 years' professional experience in conducting environmental screening/ projects including 03 years' specific experience in similar position on water sector projects in accordance with Go-Pb and ADB/ World Bank's Procedures.	24
13	Monitoring & Evaluation Expert	Having Bachelor's degree in Civil/ Mechanical/ Social Sciences	10	07 years' professional experience in developing and implementing monitoring and evaluation strategies and plans for large scale irrigation projects.	24
14	Independent Valuator	A registered valuer with the Pakistan Bankers' Association	05	05 years' experience in doing valuation work for agricultural, residential and commercial land and buildings in both urban and rural areas, preferably within the Punjab Province.	05
15	GIS / Survey Expert	B.Sc. Civil Engineering. Or B.Sc. Agricultural Engineering. An additional Master's degree in GIS / Space Science is preferable and would be rated higher.	07	04 years' professional experience in Remote sensing / GIS including 02 years' specific experience in similar position on major water sector projects.	12
16	Junior Engineers (3-4 No.)	B.Sc. Civil / Mechanical / Electrical Engineering	03	02 years' professional experience in engineering construction projects.	80
				Sub-Total of Non-key positions in PO	**423**
B. Field Offices (FO) (Non-Key Staff Continued)					

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
01	Assistant Resident Engineer - Civil (02 positions)	B.Sc. Civil Engineering. An additional Master's degree in Construction Management is preferable and would be rated higher	10	07 years' professional experience in construction planning and supervision of large construction projects including 03 years' specific experience in similar position on major water sector/ hydel engineering projects.	84
02	Assistant Resident Engineer - Mechanical	B.Sc. Mechanical Engineering. An additional Master's degree in Mechanical/ Hydro-mechanical Engineering is preferable and would be rated higher.	10	05 years' professional experience in construction planning and supervision of design, fabrication and installation of gates/ gearings, hoisting systems and mechanical equipment on large hydraulic structures on major rivers and canals.	24
03	Assistant Resident Engineer - Buildings	B.Sc. Civil Engineering. An additional Master's degree in Construction Management is preferable and would be rated higher.	10	05 years' professional experience in construction planning and supervision of building work projects.	12
04	Materials Specialist	Master's degree in Geology / Physics or other relevant disciplines	10	05 years' professional experience in performing materials sampling, laboratory tests, quality control and quantity progress reporting on large construction projects including 03 years' specific experience in similar position on major water sector/ hydel engineering projects on rivers and large canals.	36
05	Junior Environmentalist	Master's degree in Environmental Sciences/ Environmental Engineering or equivalent.	08	05 years' professional experience in conducting environmental screening/ projects including 02 years' specific experience in similar position on water sector projects in accordance with Go-Pb and ADB/ World Bank's Procedures.	36
06	Junior Sociologist	Master's degree in Sociology / Rural Sociology / Social work / Social Sciences or	08	05 year's professional experience in activities relating to land acquisition and planning & implementation of resettlement plans on large construction	36

Sr. No.	Position	Qualification	Total Experience (Years)	Overall General and Job Specific Experience (Years)	Input in Months of Experts
		equivalent.		projects including 02 years' specific experience in similar position on large water sector projects in accordance with GoP and ADBs' / World Bank's Social Safeguards Policy Guidelines.	
07	Social Development and Gender Expert (preferably female)	Master's degree in Sociology/ Gender & Women Studies/ or equivalent	08	05 years' professional experience in working with development organizations, communities (rural areas) and government line departments and implementation of social development programs and gender action plan (GAP) on various projects including 02 years' specific experience in similar position on various projects with multiple donors.	03
08	Junior Engineers (3-4 No.)	B.Sc. Civil / Mechanical / Electrical Engineering	03	02 years' professional experience in relevant field on engineering construction projects.	90
				Sub-Total of Non-key in FO	**321**
				Total of Non-Key (PO + FO)	**744**
				GRAND TOTAL (Key-Staff + Non-Key-Staff)	**984**

Notes:

(i) The abovementioned person-months include Consultant's professional input only. The above positions do not include miscellaneous contract / support staff (non-technical, semi-technical and technical input) like office manager, accounts manager, accountant, surveyors, quantity surveyors, inspectors, social enumerators (male and female), auto-CAD operators, draftsmen, guards, drivers and office boys etc. They should be included in consultant's estimated reimbursable expenses items and not in the remuneration cost and person-months of experts.

(ii) All support staff in the Project/Design/Field offices will be provided by the Consultant.

E. JOB DESCRIPTION AND QUALIFICATIONS OF CONSULTANTS' STAFF

18. Indicative tasks of each expert are indicated below. Detailed tasks of each expert will be developed by the consultants to meet with the requirements given under scope of work and will be described in their technical proposals.

KEY STAFF

19. **Construction Management Specialist / Team Leader (National: 42 person-months - indicative):** Responsibilities of the Construction Management Specialist / Team Leader will include but not limited to the following:

i. Overall responsibility for delivery of services and performance of Consultancy Contract. Build, lead Upfront and motivate team members and prepare and train

for a daunting task, and continue to do so throughout the project.

ii. assist the PMO in Project implementation;

iii. assume full responsibility for the consultants' team and performance of services under the consultancy contract;

iv. ensure that the consultants' team undertakes comprehensive review of detailed designs and specifications which were prepared by the design consultants during 2009;

v. ensure that the consultants' team undertakes comprehensive construction supervision and contract administration of civil, mechanical and electrical works for Project where the Consultants will act as "the Engineer" and undertake all tasks as per Multilateral Development Bank Harmonized Edition of FIDIC Conditions of Contract for Construction;

vi. oversee the consultants' team activities and supervise construction of works ensuring compliance to details provided in the construction drawings and strict adherence to construction specifications;

vii. ensure preparation of detailed and quantitative progress reports to support the contractor's requests for progress payments;

viii. keep the Client informed of technical issues and progress of all works both by informal and formal meetings and correspondence and assist in any project issue which the Client may require;

ix. take overall responsibility for preparation of Operational Manual for the Project. Also, jointly review the draft in detail with PMO barrages and PID prior to finalization and printing;

x. participate in the Dispute Board meetings to explain and discuss issues raised by the Contractor/ Client or DB;

xi. assist the Clint in preparing responses to audit objections and quarries of the donors or other Government Authorities;

xii. coordinate with all Client's concerned organizations on project issues; and

xiii. at the end of the construction activities, guide and ensure that the team prepares a comprehensive Construction Completion Report inclusive of 'as-built drawings" as appropriate.

20. **Contracts and Claims Specialist / Deputy Team Leader (National: 36 person-months - indicative):** Responsibilities of the Contracts & Claim Specialist / Deputy Team Leader will include but not limited to the following:

i. act as the Team Leader during the absence of Team Leader;

ii. assist the Team leader in ensuring that the consultants' team undertakes comprehensive review of designs and specifications and carries out construction supervision and contract administration of the civil works for the Project assuming the role of "the Engineer" and undertakes all tasks as per Multilateral Development Bank Harmonized Edition of FIDIC Conditions of Contract for Construction;

iii. assist the team leader in overseeing the consultants' team activities ensuring compliance to details provided in the construction drawings and strict adherence to construction specifications;

iv. assist the Team Leader in overseeing quality control methodology put in place, confirming its adequacy and ensuring that its employment is satisfactorily carried out;

v. render necessary advice and assist the Team Leader in contract administration and procurement issues / assignments/ contractual claims;

vi. assist the Team Leader in resolving any contractual issue which the Team Leader may refer;

vii. determine extension of time for completion and other claims in accordance with the conditions of contract in consultation with the Team Leader and Resident Engineer;
viii. provide assistance to the Client in dispute resolution as per provisions in the conditions of contract;
ix. assist the Team Leader in keeping the Client informed of contractual and claims issues by direct contacts and through discussions or correspondence;
x. assist the Team Leader/ Resident Engineer in holding meetings with the Contractor on contract and claims issues; and
xi. assist the team leader in preparing a comprehensive Project Completion Report (PCR), Operational Manual and any other duty/ assignment the Team Leader may entrust.

21. **Lead Design Engineer (National: 12 person-months - indicative):** Responsibilities of the Lead Design Engineer will include but not limited to the following:

i. Lead design review team, coordinate all specialties and ensure design review to be performed on schedule.
ii. Review all relevant documents and exam design parameters and design criteria against the Employers' requirement.
iii. Decide the size of construction drawing with other specialties and check whether it is in line with Employers' requirements.
iv. Request, promptly and as per schedule, Project Manager if any input is required from the field.
v. Timely generate construction drawings to facilitate construction supervision team and contractor to perform works on schedule.
vi. Request, supervise and witness a test to check the stability of the slope in the hill cut section of canal alignment.
vii. Provide requirements, plan and schedule for topographic surveys and any other investigations required to provide necessary input for design amendments during construction, if required;
viii. Draft relevant portions of the Operational Manual for the Project according to requirement of the Employer.
ix. Generate monthly progress report, describing the input and utilization of all specialties and output / works results.

22. **Resettlement Specialist (National: 12 person-months - indicative):** Responsibilities of the Resettlement Specialist will include but not limited to the following:

i. review all documents relevant to the Project;
ii. assist the Team Leader in planning and carrying out social safeguards related action plans (such as LARP and CAP) in the project area;
iii. support PMO in developing, monitoring and carrying out activities related to implementation of LAPR and CAP in line with relevant ADB Policies and Guidelines;
iv. assist PMO in complying with ADB's Policies and Guidelines on Involuntary Resettlement in accordance with ADB's Safeguards Policy Statement (SPS; 2009);
v. training of selected PMO staff with a view to strengthening the PID's capacity to adequately oversee resettlement activities; and
vi. prepare internal monitoring reports on implementation of social safeguards as per SPS (2009).
vii. assist PMO and External Monitoring Agent to prepare External Monitoring Report

by providing required data.

23. **Environmental Specialist (National: 12 person-months - indicative):** Responsibilities of the Environmental Specialist will include but not limited to the following:

i. review all relevant documents, particularly the Environmental Impact Assessment study;
ii. prepare/ update a cost-effective environmental management and monitoring plan which is in line with EISA / EMP recommendations so as to ensure minimal environmental effects both during and following the construction period;
iii. review the Site-Specific Environmental Management Plan (SSEMP) for Project site and ensure its effective implementation;
iv. prepare and execute required appropriate actions to mitigate any negative environmental impacts associated with construction activities in collaboration with PMO Barrages and all concerned stakeholders;
v. prepare a detailed Reforestation Plan for the Project and supervise its implementation during construction process as required in the EISA / EMP;
vi. develop training materials for PID and PMO barrages staff to support environmental protection measures and monitor and mitigate potential environmental impacts.
vii. ensure that any Environmental Impact Assessments, if required, fully comply with ADB Guidelines Safeguards Policy Statement (SPS, 2009) and ensure that all required mitigation measures are identified and acceptable. Ensure that the environmental management and monitoring plans reflecting full details regarding the estimated mitigation costs are in place through the SSEMP; and
viii. assist in finalizing the bi-annual environmental monitoring report, also assist the PMO in finalization of quarterly progress reports, annual progress reports and any specific report asked by the PMO.
ix. Effective coordination with the BAP Consultant to ensure implementation of the BAP

24. **Chief Resident Engineer (National: 36 person-months - indicative):** Responsibilities of the Chief Resident Engineer will include but not limited to the following:

i. Building, upfront leading and motivating construction supervision team and prepare and train for a daunting task, and continue to do so throughout the project.
ii. Assist the Team Leader & Deputy Team Leader in carrying out all aspects of his TOR;
iii. Assist the Team Leader & Deputy Team Leader in ensuring that the team undertakes and carries out construction supervision and contract administration of the civil works for the Project assuming the role of “the Engineer” and undertake all tasks as defined under FIDIC General Conditions of Contract for Construction;
iv. Assist the Team Leader & Deputy Team Leader in overseeing the consultants’ team activities ensuring compliance to detail provided in the construction drawings and strict adherence to construction specifications;
v. Assist the Team Leader & Deputy Team Leader in overseeing quality control methodology put in place, confirming its adequacy and ensuring that its implementation is satisfactorily being carried out;
vi. Assume the responsibility for effective supervision and contract administration of all civil, mechanical and electrical works during the period of construction supervision;
vii. Oversee activities of the teams under his/ her control related to supervision of construction works ensuring compliance to detail provided in the construction

drawings and strict adherence to construction specifications;
viii. Ensure preparation of detailed and quantitative progress reports to support the contractor's requests for progress payments;
ix. Prepare a comprehensive Construction Completion Report including as-built drawings as appropriate;
x. Ensure that the contractor follows the implementation schedule;
xi. Review the plan for execution of critical activities and arrange timely completion of these activities; and
xii. Ensure effective implementation of EMP.

25. **Resident Engineers (National: 02-Positions): (1st Position: Resident Engineer – Bridges & Regulators: 24 person-months – indicative); 2nd Position: Resident Engineer – Lining and Earthwork: 42 person-months - indicative):** Responsibilities of the Resident Engineers will include but not limited to the following:

i. Resident Engineer will be responsible for setting out, leveling, inspection, witnessing, testing, verification and interim verification of works for an individual Contract, under his control;
ii. Assist the Chief Resident Engineer in carrying out all aspects of his TOR relating to civil, electrical and mechanical works component;
iii. Carry out effective supervision and contract administration of the civil works during the period of construction supervision;
iv. Ensure that the consulting team under his/ her control undertakes comprehensive construction supervision and contract administration of the works required to be carried out by the Consultant, as defined under ADB Harmonized Condition of Contract;
v. Participate in preparation of Quality Manual.
vi. Identify and formulate all control points in construction process. Categorize control points into report, witness and certification points, as described in Quality Manual.
vii. Ensure effective control over production and quality of concrete, coordinate with material engineer in this regard. Devise a protocol and design a Check Lists to ensure the compliance of the witness and certification points.
viii. Oversee the activities of the teams under his/ her control related to supervising construction works ensuring compliance to detail provided in the construction drawings and strict adherence to construction specifications;
ix. Ensure that the quality control methodology is strictly followed and prepare response in the form of rework or rectify the nonconformities pointed out by the Quality Audit Team.
x. Ensure preparation of detailed and quantitative progress reports to support the contractor's requests for progress payments;
xi. Prepare a comprehensive Construction Completion Report including as-built drawings as appropriate;
xii. Ensure that the contractor follows the implementation schedule;
xiii. Review the plan for execution of critical activities and arrange timely completion of these activities; and
xiv. Ensure effective implementation of EMP.

26. **Material Engineer / Quality Control Specialist (National: 24 person-months - indicative):** Responsibilities of Material Engineer / Quality Control Specialist will include but not limited to the following:

i. Build, lead and motivate quality audit team and prepare and train for a daunting task, and continue to do so throughout the project.

ii. Advise on suitability and consistent availability of various construction materials proposed to be used in construction;
iii. Assist Project Manager and CRE in approval of source and origin of construction materials
iv. Ensure that the Quality Control Manual is strictly followed by the Project team and bring out all deficiencies to the notice of the Project Manager / Deputy Project Manager / Chief Resident Engineer / Resident Engineer promptly;
v. Perform good control of batching plant operations. In this regard formulate SOPs with the approval of CRE, to be followed by the Contractors.
vi. Identify witness and certification point in material supply, staking, storage and operation of batching plants.
vii. Confirm sufficient availability of all materials before commencement of a concrete operation, in coloration with respective Resident Engineer.
viii. Evaluate contractor's proposal for establishment of field laboratory(s) and approve other laboratories for testing;
ix. Ensure that the routine detailed and quantitative progress reporting is adequate to support the contractor's requests for progress;
x. Establish and oversee appropriate standards and quality control procedures; and
xi. Ascertain that construction inspectors are fully cognizant of all required density testing requirement during construction and the methodology there of.

NON-KEY STAFF

27. **Office Engineer (National: 48 person-months - indicative):** Responsibilities of the Office Engineer will include but not limited to the following:

i. report to the Team Leader;
ii. maintain record of design/ drawings along with other documents in the office;
iii. keep complete record of hard and soft copies of all versions of designs and drawings and ensure that latest versions are being issued for implementation;
iv. allocate specific identification number to different versions of drawings;
v. maintain record of all project related documentation;
vi. assist the Team Leader in compilation of O&M Manual;
vii. maintain full record of construction drawings, shop drawings and as-built drawings;
viii. supervise and manage office documentation on behalf of the Team Leader;
ix. assist in the preparation of weekly and monthly progress reports and ensure timely submission of deliverables;
x. assist in the preparation of revised PC-1 and Engineer's Estimate of the Project:
xi. head logistics team for running, operation and maintenance of all vehicles and equipment. Maintain log of all vehicles and equipment.
xii. provide support during mobilization stage to establish offices of the Consultants;
xiii. perform cataloguing and file designation for all correspondence, for convenient storage and retrieval; and
xiv. prepare filling list and document cataloguing and establish a library of all necessary document and files for the project.

28. **Senior Structural Design Engineer (National: 24 person-months - indicative):** Responsibilities of the Senior Structural Design Engineer will include but not limited to the following:

i. review all relevant technical documents;
ii. review design parameters and design criteria viz-a-viz Client's requirements;
iii. review design calculations, check for accuracy and see that appropriate standards

were adopted. In case of disagreement, refresh and update the design;

iv. organize, supervise and carry-out any additional investigations deemed necessary for structural aspects of any feature to be included in the Project;
v. analyze structural design options where changes are required;
vi. coordinate with the team for detailed design of all structural aspects of works including preparation of relevant additional construction drawings and specifications which may be required; and
vii. assist in drafting relevant portions of O&M Manual for the Project with emphasis on procedures/ practices to ensure long term structural stability of structures.

29. **Senior Hydraulic Design Engineer (National: 36 person-months - indicative):** Responsibilities of the Senior Hydraulic Design Engineer will include but not limited to the following:

i. review all relevant documents;
ii. examine design parameters and design criteria viz-a-viz Client's requirements;
iii. organize and supervise topographic surveys and any other investigations required to provide necessary input for design;
iv. supervise and ensure follow-up action of physical model tests, if any, and take the lead in recommending modifications to and refinement of the model to ensure reliable output;
v. coordinate and supervise detailed design of all hydraulic aspects of works including preparation of relevant additional construction drawings and specifications which may be required;
vi. draft relevant portions of O&M Manual for the Project with emphasis on operating rules based upon water level observations coupled with available flood prediction information; and
vii. coordinate and generate comprehensive detailed design review report, by compiling input from all specialities.

30. **Senior Irrigation Design Engineer (National: 12 person-months - indicative):** Responsibilities of the Senior Hydraulic Design Engineer will include but not limited to the following:

i. In consultation with the hydraulic and structural Engineer, review both functional and structural requirements of distribution system structures;
ii. Recommend any supply arrangements from the distributary and minor canals to watercourses to improve either efficiency or equity of distribution;
iii. Develop/review operation and maintenance strategies for the irrigation infrastructure by PID.
iv. Develop monitoring and evaluation parameters for the project and identify related research needs to ensure achievement of project objectives.

31. **Senior Geotechnical Engineer (National: 06 person-months - indicative):** Responsibilities of the Senior Geotechnical Engineer will include but not limited to the following:

i. responsible for all geotechnical investigation at site and provide data with recommendations to designs;
ii. review the capacity of soils for designing of structures foundations and identify any remedial foundation stabilization work to be included in the packages of works for new construction, rehabilitation, and upgrading;
iii. design pile load testing, review the field feedback and make necessary changes in the design, if necessary;
iv. review of design considerations relating to soils and materials engineering;

v. locate appropriate sites for materials to be used;
vi. formulate plans for and carry out detailed foundation investigations for the project facilities;
vii. supervise the work of the sub-contracted drilling, sampling and testing services to ensure compliance with best geotechnical practice; and
viii. prepare geotechnical and material reports.

32. **Senior Electrical Design Engineer (National: 02 person-months - indicative):** Responsibilities of the Senior Electrical Design Engineer will include but not limited to the following:

i. review and update complete electrical design and automation plans prepared by detailed design consultants and the Contractor and advise the Team Leader / Lead Design Engineer for necessary amendments where needed;
ii. cognizance of field performance of the design, especially of piling and canal lining. Make necessary changes if required.
iii. provide technical assistance to construction supervision team for installation and commissioning of the instruments;
iv. Provide technical assistance to construction supervision team for installation and commissioning of the Electrical equipment's;
v. conduct a detailed check of As-built Drawings of motorization / electrical / instrumentation works carried out by the Contractor;

33. **Senior Mechanical/ Gates & Gearing Engineer (National: 24 person-months - indicative):** Responsibilities of the Senior Mechanical / Gates & Gearing Engineer will include but not limited to the following:

i. review gate system design carried out by the detailed design consultants and suggest any improvements/ changes required for proper functioning of gates;
ii. review design calculations and shop drawings prepared and submitted by the contractor;
iii. pay periodical visits to the site for overseeing installation and testing process and brief the Resident Engineer;
iv. review testing standards, testing process and results thereof and brief the Resident Engineer accordingly;
v. advise and render any relevant assistance required by the Team Leader; and
vi. contribute in preparation of the O&M Manual for gates and hoisting arrangements.

34. **Senior Construction Planning & Scheduling Engineer (National: 36 person-months):** Responsibilities of the Planning and Scheduling Engineer will include but not limited to the following:

i. Take the overall responsibilities for project planning, scheduling, reporting;
ii. Analysis and approval of Tender Schedule, Baseline Schedule, Revised Baseline Schedule, Time line Schedule, Detailed Construction Schedule, As-Built Schedule and Recovery Schedule submitted by the contractor on computerized Primavera latest version;
iii. Assist the Project Manager, Deputy Project Manager, CRE and Contract and Claim Specialist in determining the extension of time for completion from the Contractor's Work Schedule;
iv. Furnished progress schedules and Earned Value Reports to the Project Manager;
v. Instrumental in monitoring of contractor schedule performance and intimate the Project Manager regarding status of all activities and forewarn on critical activities and update Project Manager in this regard.
vi. Monitor that the Contractor adheres to the contractual requirements of

Construction Schedule mentioned in the Special Provisions; and

vii. Monitoring of various activities shown on the Baseline schedule.

35. **Senior Contracts Engineer (National: 42 person-months - indicative):** Responsibilities of the Senior Contracts Engineer will include but not limited to the following:

i. Member of procurement, contract and claims response team
ii. Render necessary advice and assist the Contracts / claims Specialist in contract administration and procurement issues / assignments/ contractual claims;
iii. Determine extension of time for completion and other claims in accordance with the conditions of contract in consultation with the Contracts / claims Specialist;
iv. Provide assistance to the Employer in dispute resolution as per provisions in the conditions of contract;
v. Assist the Contracts / claims Specialist in keeping the Employer informed of contractual and claims issues;
vi. Assist the Contracts / claims Specialist in holding meetings with the Contractor on contract and claims issues; and
vii. Assist the Contracts / claims Specialist in preparing a comprehensive Project Completion Report (PCR), Operational Manual and any other duty/ assignment the Project Manager may entrust.
viii. Advise Employer on all contractual matters;
ix. Render necessary advice and assist the Project management team in contract administration and procurement issues / assignments;
x. Assist the Contracts / claims Specialist in resolving any contractual issue which the Project Manager may refer;
xi. Provide assistance to the Employer in dispute resolution as per provisions in the conditions of contract.

36. **GIS / Survey Expert (National: 12 person-months - indicative):** Responsibilities of GIS / Survey Expert will include but not limited to the following:

i. Review the existing data collection, communication and processing system from hydro-meteorological station installed;
ii. support the team in tasks related to irrigation assets management system.
iii. Analyzing spatial data through the use of mapping software.
iv. Discovering patterns and trends through spatial mapping of data.
v. Producing maps showing the spatial distribution of various kinds of data, including crime statistics and hospital locations.
vi. Converting physical maps into a digital form for computer usage.

37. **Independent Valuator (National: 05 person-months):** Responsibilities of the Independent Valuator will include but not limited to the following:

i. Conduct an independent valuation when disputes on compensation rates between the PID and affected people occur
ii. select sample land plots ensuring that the sample includes all categories of land (i.e. agricultural, residential, etc.) and location (off-road/adjacent to the road), etc. from the list of affected land parcels.
iii. describe the valuation approach methodology to be used to appraise replacement cost in accordance with the ADB SPS 2009;
iv. meet relevant stakeholders including DPs, LAC staff, project-land staff, DC staff, revenue officials, prospective buyers and the local people.
v. obtain copies of previous land awards, valuation tables, LA-7 forms and mutations information in the affected villages (mouzas). While collecting data, take into

consideration of the factors responsible for supply and demand.

vi. get information on recent land transactions, land use, cropping patters, crop production (per acre, per term, per year for different crops), irrigation patterns, availability of land in the project area and region, and factors prospective buyers consider while buying land in the region.

vii. undertake a physical survey to make a general assessment of the location of the land parcel (on/off road), value of similar properties in the vicinity, accessibility, sources of cultivation (canals, tube well etc.), nearby amenities (like schools, hospital, etc.), any improvements (structures, trees, crops, irrigation canals and other land development measures) made to the land parcel, general supply and demand environment in the locality, and prospective buyers in the locality.

viii. review the awarded rates by the DPAC and that of prevailing rates of sales records (mutations) in the sampled villages (mouzas) taking into account the accessibility to the land, location of the land; fertility/productivity; availability of amenities; and any other pertinent factor that may affect land values; verify the average farm yield/productivity rates from different sources i.e. LAC office, local farmers, and the Department of Agriculture;

ix. appraise the fair market value of the sampled properties (based on the actual prices at which a lost asset can be sold and acquired in today's markets as opposed to registered prices in land records), as well as relevant transaction costs and other elements of RC in accordance with the ADB SPS 2009;

x. prepare a valuation report for each sampled land parcel.

38. **Procurement and Contracts Specialist (National: 24 person-months):** Responsibilities of the Procurement and Contracts Specialist will include but not limited to the following:

i. working in PMO Barrages to provide capacity support to the Employer in all procurement activities regarding goods, works and services;

ii. assist the Employer in preparing/ up-dating procurement plans;

iii. oversee the working of Consultants and Contractors engaged by Employer in contract management/ administration;

iv. assist the Employer in reviewing and determining contractor's claims; and

v. assist and render advice to the Employer in any contractual issue that may arise.

39. **Construction Management Specialist (National: 24 person-months):** Responsibilities of the Construction Management Specialist will include but not limited to the following:

i. working in PMO Barrages to assist the Employer in reviewing and finalizing monitoring and evaluation strategy and plan, including input, progress, output and impact indicators;

ii. assist the Employer in reviewing and finalizing the computerized monitoring and evaluation system;

iii. monitor that all project components reviewed and supervised by the consultants are implemented in an environmentally friendly manner and where necessary adequate mitigation measures are taken

iv. review and assist the Employer in finalizing PPMS Baseline (Baseline / Benchmark) Report for the Project.

v. assist the Employer in overseeing the consultants' team activities ensuring compliance to detail provided in the construction drawings and strict adherence to construction specifications;

vi. assist the Employer in overseeing quality control methodology put in place, confirming its adequacy and ensuring that its implementation is satisfactorily being

carried out;

40. **Environmental Expert (National: 24 person-months):** Responsibilities of the Environmental Expert will include but not limited to the following:

i. working for PMO Barrages to assist in monitoring and carrying out activities related to Environment Component of the Project;
ii. ensure implementation of Environmental Management Plan at Site;
iii. assist the Director ESU in preparation/ updating a cost effective environmental management and monitoring plan, also in line with IEE recommendations so as to ensure minimal environmental effects both during and after the construction period

41. **Monitoring and Evaluation Expert (National: 24 person-months):** Responsibilities of the Monitoring and Evaluation Expert will include but not limited to the following:

i. review all documents relevant to the project;
ii. assist the PMO Barrages in development and establishment of an appropriate monitoring and evaluation strategy and plan, including input, progress, output and impact indicators;
iii. assist the PMO Barrages in computerizing monitoring and evaluation system so that it is compatible with and forms a part of the Management Information System;
iv. supervise baseline, intermediate and end of project socio-economic surveys;
v. develop appropriate analytical methodology for the socio-economic impact assessment;
vi. assist the PMO Barrages in supervising work of those ones conducting field surveys and analysing assessment results; review and assist the PMO in updating / finalizing RAP prepared during project preparation on the basis of detailed design;
vii. monitor that all project components reviewed and supervised by the consultants are implemented in an environmentally friendly manner and where necessary adequate mitigation measures are taken; and
viii. review and assist the PMO Barrages in finalizing PPMS Baseline (Baseline / Benchmark) Report for the Project.

42. **Assistant Resident Engineer** - **Civil/ Mechanical/ Buildings (2+1+1) - (National: 84+24+12=120 person-months - indicative):** Responsibilities of the Assistant Resident Engineer within his/ her own discipline will include but not limited to the following:

i. Report to the Resident Engineer;
ii. assist the Resident Engineer in carrying out all aspects of his/ her TOR;
iii. assume the responsibility for effective supervision and contract administration of civil/ mechanical/ electrical works, as the case may be, during the period of construction supervision;
iv. undertake comprehensive construction supervision and contract administration of the Works required to be carried out by the Consultant in the role of “the Engineer” as defined under FIDIC agreements;
v. supervise the construction works ensuring compliance to details provided in the construction drawings and strict adherence to construction specifications;
vi. ensure that the quality control methodology is strictly followed;
vii. ensure preparation of detailed and quantitative progress reports to support the contractor’s requests for progress payments; and
viii. assist in the preparation of Construction Completion Report including “as-built” drawings as appropriate.

43. **Materials Specialist (National: 36 person-months - indicative):** Responsibilities of the Materials Specialist will include but not limited to the following:

i. prepare an appropriate Quality Assurance Plan (QA/QC Manual) for construction supervision of the Project. The Manual will describe the testing requirements during construction;
ii. advise on suitability of various construction materials proposed to be used in construction;
iii. ensure that the Quality Assurance Plan (QA/QC Manual) is strictly followed by the Project team and bring out all deficiencies to the notice of Team Leader/ Deputy Team Leader/ Resident Engineer promptly;
iv. evaluate contractor's proposal for establishing the field laboratory and approve other laboratories for testing;
v. ensure that the routine detailed quantitative progress reporting is adequate to support the contractor's requests for progress;
vi. establish and oversee appropriate standards and quality control procedures; and
vii. ascertain that construction inspectors are fully cognizant of all required density testing during construction and the methodology to be employed there-on.

44. **Junior Environmentalist (National: 36 person-months - indicative):** Responsibilities of the Junior Environmentalist will include but not limited to the following:

i. report to the Resident Engineer / Environmental Specialist;
ii. review all relevant documents particularly the Environmental Impact Assessment Study;
iii. ensure implementation of Environmental Management Plan at Site under the guidance of Environmental Specialist;
iv. assist the Environmental Specialist in preparation/ updating a cost effective environmental management and monitoring plan, also in line with IEE recommendations so as to ensure minimal environmental effects both during and after the construction period; and
v. ensure implementation of Site Specific Environmental Management Plan (SSEMP) for the project under the guidance of the Environmental Specialist.

45. **Junior Sociologist (National: 36 person-months):** Responsibilities of the Junior Sociologist will include but not limited to the following:

i. report to the Resettlement Specialist;
ii. review all relevant documents particularly the Land Acquisition and Resettlement Plan (LARP) and the Corrective Action Plan (CAP);
iii. ensure assist the Resettlement Specialist in planning and carrying out social safeguards related action plans (such as LARP and CAP) in the project area;
iv. support PMO in developing, monitoring and carrying out activities related to implementation of LAPR and CAP in line with relevant ADB Policies and Guidelines;
v. assist PMO in complying with ADB's Policies and Guidelines on Involuntary Resettlement in accordance with ADB's Safeguards Policy Statement (SPS; 2009);
vi. assist the Resettlement Specialist for training of selected PMO staff with a view to strengthening the PID's capacity to adequately oversee resettlement activities;
vii. prepare internal monitoring reports on implementation of social safeguards as per SPS (2009); and
viii. assist PMO and External Monitoring Agent to prepare External Monitoring Report by providing required data.

46. **Social Development and Gender Expert (preferably female) (National: 03 person-months indicative):** Responsibilities of the Social Development and Gender Expert will include but not limited to the following:

i. develop the Gender Action Plan through close working with the project team;
ii. develop community mobilization and training plan aligned with the GAP targets and lead community consultations for the identification of trainees for livelihood raising programs as detailed in GAP;
iii. prepare data collection tools for collecting baseline information required for upgradation of schools, health facilities and vocational trainings etc in selected project areas;
iv. conduct qualitative studies at suitable sites of how women see the impact on their lives of provision of improved health care, skills training, education, and recreational provision; and
v. conduct field visits and any other function and responsibility, as assigned by the Employer.

47. **Junior Engineer (Civil/ Mechanical/ Electrical) (National: 80+90=170 person-months - indicative):** Responsibilities of the Junior Engineer will include but not limited to the following:

i. Assist the Deputy Team Leader/ Resident Engineer / Assistant Resident Engineers in carrying out his TOR; and
ii. Assist the Resident Engineer / Assistant Resident Engineer in supervision of works, prepare relevant records, work measurements, collecting and keeping the records for use by the Contract Specialist in resolving claims and disputes, preparation of progress reports, financial statements, etc.;

48. **Inspectors and Lab Technician:** Inspectors will have a diploma in the relevant branch of engineering from a recognized institute with at least five (05) years supervision experience in engineering construction projects. These are support staff positions and are chargeable to the head “reimbursable expenses”.

F. REPORTING REQUIREMENTS AND TIME SCHEDULE FOR DELIVERABLES

Reporting Requirements:

49. The consultants will have a dual reporting function to the Executing Agency (EA) and ADB. The consultants will prepare the following reports in English with Arial font (12 for headings and 11 for body text). The tables should use 10 Arial. The consultant will submit Table of Contents (TOC) and format for each report for prior approval of the Employer and/or the ADB. The consultant will provide these reports as per agreed program given below:

i. **Inception Report:** Within one month of commencement, the Consultants will submit Draft version of Inception Report, the Final version will be generated within one week after review of Draft Inception Report, till then services will be carried out according to the Draft version.

ii. **Monthly Progress Reports:** Monthly Progress Reports shall be prepared on regular basis. The report shall indicate progress of execution of services required under the consultancy assignment. The progress reports shall also detail progress under each civil works contract. The issues that may hinder the planned implementation shall be flagged in these reports along with the suggested

solutions.

iii. **Quality Assurance Plan (QA/QC Manual):** QA/QC Manual shall be presented by the consultants before start of construction works. The plan shall include comprehensive quality control program including detailed methodology for inspection, sampling and testing besides confirming its adequacy in the field. All inputs are related to the consultant's activities.

iv. **Updating of Resettlement Plans:** Draft Land Acquisition and Resettlement Plan (LARP) has been prepared by the ADB installed TRTA Consultants. Consultants are to prepare and provide updated LARP based on the final designs and alignments of the respective locations.

50. The ADB and Government of Punjab have agreed to the following principles with regard to resettlement under the project (i) the approach to resettlement under the project should not be to remove all persons who have encroached on the right of way(s), but to move only those persons who will be directly affected; (ii) design will be drafted with the objective of minimizing resettlement activities; and (iii) contract packages and execution of civil works will be directed in such a way to minimize resettlement activities. Based on above classification, the ADB installed TRTA Consultants have developed a Resettlement Framework and Land Acquisition and Resettlement Plan (LARP) for the project that was likely to encounter the resettlement impacts. The Consultants would assist the PMO Barrages in updating the Land Acquisition and Resettlement Plan (LARP) and Resettlement Action Plan (RAP) prepared by the TRTA Consultants that would be provided to CSC for implementation. The Plan may also be intended to revise or update with an aim to minimize the adverse effects to population. In this regard, the CSC are required to update the Plan when necessary and provide update in the progress reports about the planned goals versus achievements.

i. **Bi-annual Social Safeguards Monitoring Report:** Consultants shall prepare bi-annual social safeguards monitoring report and report the progress of social safeguards activities.

ii. **Quality Assurance / Quality Control (QA/QC) Report:** QA/QC Report shall consist of periodic inspections, results of testing and sampling etc. which were done in order to ensure quality assurance of works. The Report should have a section written by the Chief Quality Auditor, wherein he should give extra efforts to audit the performance of field staff and the resultant improvement thus achieved. The Report should also contain what instruction was passed on to the Field staff in the previous reporting period and status of any noncompliance. One section of report should depict the construction activities which are repeatedly showing rework and noncompliance.

iii. **Quarterly Financial Reviews:** Quarterly Financial Review shall be prepared and submitted on regular basis. The Reviews shall indicate revised cost estimates for each component of the project compared with the original budgetary provisions and recommendations for actions needed to control expenditure or seek additional funding, if so required.

iv. **PPMS Baseline (Baseline / Benchmark) Report:** The Baseline Information Report should be based on DMF requirements of inputs, outputs, outcome and impacts and provide clear baseline indicators/ software modules for future comparison.

v. **Mid-Term Evaluation Report:** It shall consist of (i) impact assessment of project activities; and (ii) organized monitoring database.

vi. **Operation and Maintenance Manual:** Both draft and final versions of the O&M Manual shall be prepared. The O&M Manual shall give the nature of periodic inspections to be made, physical interventions to be enforced by way of preventive and curative maintenance to be carried out every year, data to be collected and records maintained. The O&M procedures should be described in detail and should be "do-able" to maintain integrity of structures for their designed life. Resultantly, yard sticks for the Maintenance Intervention Works need to be prepared, both in physical and financial terms, to facilitate planning of annual O&M activities.

vii. **Project Completion Report:** Both draft and final versions of the Project Completion Report (PCR) shall describe civil works and operational procedures highlighting any specific requirements, listing up major problems encountered and actions taken besides including review of training needs for operational staff and making appropriate recommendations. It shall also summarize final quantities and financial statement and also give a resume of project implementation experience (ii) suggestions for improvement, sustainability and exit strategy; and (iii) impact assessment of project activities. The PCR shall include as-built drawings based on the "as constructed" drawings prepared by the Contractor

viii. **Minimizing Environmental impact and implementation of Environmental Management Plan:** An Environmental Impact Assessment (EIA) has been conducted for the project. The Consultants recruited under these TOR shall ensure that construction of all project components for which they are responsible for supervision shall fully comply with the EMP and SSEMP provisions, also following the EIA recommendations. The consultant shall update the Employer on the progress of EMP related activities regularly in the progress reports. The Consultant shall also prepare the bi-annual environmental monitoring reports for accuracy based on the contractor's monthly reports.

Deliverable:

51. The schedule for various reports and documents that are likely to be generated has been prepared. Additional reports and presentations shall be prepared as required. The consultants will supply the deliverables as per schedule given below along with the respective soft copy thereof:

Report	**No. of Copies**	**Submission deadline**
Draft Inception Report	5	Thirty (30) days after the commencement of services
Final Inception Report	10	One (01) week after the review of Draft Inception Report by the Client
Monthly Progress Report	10	10th of the following month
Quarterly Progress Report	10	10th of the following quarter
Quality Assurance Plan (QA/QC Manual)	10	One (01) month after the consultants' mobilization and before start of construction

Report	No. of Copies	Submission deadline
Updated ESIA Report	10	Two months after the commencement of services
Updated Resettlement Plan	10	Two months after the commencement of services
PPMS Baseline (Baseline/ Benchmark) Report	10	Six (06) months after the commencement of services
Monthly Internal Monitoring Report of EMP and Resettlement Plan	5	10th of the following month
Quarterly Progress Report of EMP, RP and GAP	2	10th of the following quarter
Semi Annual Environmental Monitoring Report	2	10th Of the following bi-annual period
Quarterly Monitoring Report on Implementation of BAP	2	10th of the following quarter
Bi-Annual Social safeguards monitoring report	2	10th of the following bi-annual period
Draft O&M Manual	15	One (01) year after the construction starts
Final Modified O&M Manual	15	One (01) month after the review of Draft O&M Manual by the Client, but before substantial completion of works
Quarterly Financial Reviews	25	10th of the following quarter
Measurement Register/ Record in support of IPC's as per agreed methodology	2	With each Contractor's verified monthly statement
Quality Control and Assurance Report	10	One (01) month after start of the following construction year
Mid-Term Evaluation Report	25	Mid-way of the project
Revised Planning Commission Proforma–I (PC-I)	50	As and when required
Revised Engineer's Estimate	05	As and when required
Draft Project Completion Report	25	Two (02) months before the anticipated completion date of the project
Final Project Completion Report	25	One (01) month after the review of Draft Project Completion Report by the Client
Planning Commission Proforma–IV (PC-IV)	50	At completion of works
Complete Inventory of works/ structures completed and tools / plants / equipment	10	At completion of the project

Program:

52. **The supervision consultants will assume the role of "the Engineer" during implementation of Choubara Branch Canal Construction Project- Greater Thal Canal (Phase-II).**

53. The estimated duration of consulting services is fifty-two (52) months. The Choubara Branch ICB contract will be implemented over a period of forty-eight (48) months including twelve (12) months of Defects Notification Period (DNP). In order to complete the start-up project review activities well in time, the consultants will be installed about one (01) month ahead of mobilization of the work contractor and will continue for about three (03) months after the DNP for smooth project close-up and issuance of the Performance Certificate and Final Payment Certificate. The Consultants should note that work contract for the Project is likely to be awarded shortly after mobilization of the Construction Supervision Consultants. Therefore, the Consultants are required to mobilize and complete start up Contract activities, drawings and specifications in such a manner that the scheduled start of construction is not jeopardized. Any changes required as a result of this review will be brought to the notice of the Client and will be incorporated in the designs as necessary.

54. The proposed project implementation schedule is shown in the following chart:

Project Implementation Schedule

Sr. No.	Indicative Activities	2021				2022				2023				2024				2025				2026			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Chaubara Branch Canal Construction Project- Greater Thal Canal (Phase-II)																								
A	PC-I Preparation and Approval																								
B	Recruitment of Construction Supervision Consultants																								
C	Bidding and Award of Contract and Mobilization																								
D	Preparatory Period for Consultants																								
E	Active Construction Period																								
F	Defect Notification Period																								
G	Implementation of LARP																								
H	Implementation of EMP																								
I	Project Closeup Period																								
J	**Project Completion**																								

G. EMPLOYERS' INPUT AND COUNTERPART PERSONNEL

55. The Employer shall make available to the Consultants at no charge the following:

i. Access to all reports, studies, data, photographs, maps, and institutions relating to the works, access to all sites for surveys and investigations.

ii. Assistance to procure all necessary administrative documents including but not limited to visas, exchange control documentation, import licences, exemption certificates, work permits, driving licences, resident visas.

iii. Free field office and residential accommodation[42] for the supervisory team at the project site after one (01) year of commencement of works. The Consultants will provide all necessary computer equipment, printers, photocopiers, stationary supplies, telephone/ fax machines and office utilities etc. The cost of all agreed expenditure will be reimbursed under the consulting services contract.

iv. Free use of vehicles[43] procured by the Consultants for official purposes and approved personal use, during the entire period of consultancy services.

v. Permission to use facilities such as Guest Houses, payable at the official rates, will be granted where possible, to members of the Consultants' staff in connection with their official duties.

H. INFORMATION TO FACILITATE PROPOSAL PREPARATION

56. The information on engineering design of the project is open/ available to all shortlisted firms for fair competition and can be obtained from the Project Management Office at the address indicated in Clause 2.1 of Data Sheet, RFP.

[42] *The free office accommodation will be provided on its availability with the client under the civil works contracts. The consultants will, however, arrange these facilities at their own during first twelve (12) months of the assignment.*

[43] *The vehicles will be purchased for the Consultants through works Contract, however, the Consultants are required to arrange vehicles at home and site offices through their own resources before the purchase of these vehicles.*

APPENDIX 4: DRAFT TERMS OF REFERENCES FOR PAD COMMAND AREA DEVELOPMENT CONSULTANTS (CADCS)

1. BACKGROUND

1. The Greater Thal Canal (GTC) offtakes at RD 180+222 from the Chashma-Jhelum (CJ) link canal near Adhi Kot in district Khushab. In total, the GTC project consists of a Main Canal (MC) and five (5) branch canals (Mankera, Choubara, Dhingana, Nurpur and Mehmood sub-Branch). The GTC system comprises of irrigation network extending over 35 km main canal (lined), 342 kms branch canals (lined), over 1,835 kms distributaries and minors alongwith allied structures (regulators, falls, bridges etc.). The GTC has a gross command area (GCA) of 1.918 million acres and canal command area (CCA) of 1.738 million acres in Thal Doab (the area between the Indus and the Jhelum rivers) encompassing Bhakkar (39%), Layyah (30%), Khushab (17%) and Jhang (14%) districts. The canal is a non-perennial channel and designed to deliver a total 2.497 MAF of water annually with 8,500 cusecs discharge with water allowance of 3.88 cusec/1000 acres.

2. The Main Canal (MC) of the GTC network has been designed to supply water through cross regulators and head regulators to the Mankera Branch Canal (MBC) with a design flow rate of about 34,384 litres per second (lps) (34.38 m^3/sec). The MBC further supplies irrigation water through 8 distributaries and 9 minors to about 544 outlets/ watercourses. The commanded area of MBC is estimated as 257,132 acres (104,060 ha) with a current flow rate of 28,222 lps (28.22 m^3/sec). The average commanded area of the MBC is 485 acres (197.8 ha) per outlet/ watercourse. The construction of MC and MBC alongwith its distributaries and minors were completed by the WAPDA in 2008, and later handed over to the Punjab Irrigation Department for its Operation & Maintenance (O&M) while the remaining network of branch canals, distributaries and minors are planned to be constructed. The combined water allowance of the MC and MBC has been estimated as 270 lps (0.27 m^3/sec) / 1000 ha. The Choubara Branch Canal (CBC) with a design flow rate of 41,035 lps (41.04 m^3/sec) is planned to be constructed under the proposed project alongwith its command area development.

3. The Asian Development Bank (ADB) has agreed to finance the construction of remaining systems of the GTC and their Command Area Development (CAD). The proposed project will support the CAD activities in already constructed MC and MBC as well as newly planned CBC covering about 649,000 acres (263,000 ha) traversing Khushab District (Nurpur Tehsil), Bhakkar District (Mankera Tehsil), and Layyah District (Choubara Tehsil).

2. PROJECT OBJECTIVES

4. The Project Development Objective (PDO) of the CAD-GTC is to *develop irrigated agriculture and enhance agricultural productivity* in the project area. The PDO will be achieved through the development of climate smart on-farm irrigation and agricultural development infrastructure in the commands of MC, MBC and CBC for enhancing water conveyance, application and use efficiencies through an integrated approach. The CAD-GTC (Phase-II) will have following key objectives.

a) Develop irrigated agriculture on **600,000 acres** of culturable waste/ barani/ rainfed land by efficient water conveyance, application and its effective farm level use
b) Promote on-farm climate resilient agriculture practices on **20,000 acres** through reformatory irrigation, crop production, renewable energy, and on farm irrigated agriculture technologies

c) Support high value agriculture (HVA) on **10,000 acres** for cultivation of profitable crops for enhancing farmers' productivity vis profitability
d) Develop capacity of **25,000 farmers/stakeholders** for adopting climate smart and high value agriculture practices for enhancing productivity and profitability
e) Engage and strengthen capacity of over **50 private sector service providers** for climate resilient irrigated agriculture service delivery
f) Generate on-farm employment opportunities (on & off farm) for about **1,000 rural youth** for most vulnerable population in project areas to improve livelihoods and alleviate poverty

3. PROJECT COMPONENTS

5. The major activities to be carried out under the project would include, inter alia, the followings.

A. Development of On-Farm Water Conveyance Network
- A.1. Organize **1,347** Water Users Associations (WUAs)/ farming communities
- A.2. Develop/ construct and carry out lining on **1,347** watercourses
- A.3. Develop **1,000** irrigation schemes/ lining of tubewell watercourses

B. Promotion of Climate Resilient and High Value Agriculture
- B.1. Carry out LASER land levelling on **10,000** acres
- B.2. Install high efficiency irrigation systems (HEISs) on **10,000** acres
- B.3. Install power systems for operating HEISs on **10,000** acres
- B.4. Construct **100** on-farm water storage ponds

C. Agriculture Extension Support Services
- C.1. Provide certified seed to the farmers on **23,400** acres
- C.2. Establish **60** Farmer Field Schools (FFS)

D. Field Wing Support and Services
- D.1. Clear right of way (RoW) of **1,272** watercourses/ farm channels
- D.2. Develop about **2,290** acres of undulated land through rough land levelling

E. Awareness Creation, Trainings, Capacity Development of Farmers & Staff and R&D
- E.1. Awareness creation, publicity, and demonstration of project interventions
- E.2. Train and develop capacity of over **25,000** farmers/ water users/ stakeholders
- E.3. Support research & development activities, strategic studies, digitizing operations, crop processing support, piloting modern technologies & practices, etc.

F. Project Management
- F.1. Project administration and supervision
- F.2. Implementation supervision, monitoring & evaluation and third-party validation through Command Area Development (CAD) Consultants

4. COMMAND AREA DEVELOPMENT CONSULTANTS

6. It is planned to recruit Command Area Development Consultants (CADC) for implementation supervision support and third-party validation of project activities. The objective of the assignment is to engage a team of consultants to provide support for review & approval of design, construction/ installation supervision, quantity certification, quality assurance, technical assistance, and overall coordination of project activities. The consultancy services for project

implementation supervision are required to ensure that CAD activities are executed in an orderly manner with a high standard of workmanship and specified quality of materials within the envisaged implementation period as well as in conformity to best possible and latest technical, social and environmental standards.

7. The **Consultants Selection Committee (CSC)** will recruit the consultants in accordance with ADB guidelines for selection of consultants using the **Quality and Cost Based Selection (QCBS) method at 90:10 quality-cost ratio**.

5. MAJOR SCOPE OF SERVICES OF CADCS

i) Provide project implementation supervision and monitoring & evaluation support services to the PD (CAD-GTC)/ DGA(WM)
ii) Examine and prepare standards and specifications for watercourse construction works, HEIS equipment, LASER land leveling, water storage ponds, renewable energy and/or other power source systems for HEISs etc. as well as other project activities
iii) Provide support in procurement processes including pre-qualification of private sector supply and services companies (SSCs), advertisements, bid evaluation, award of contracts, etc.
iv) Draft technical documents, agreements, formats, specifications for design, materials and installation of equipment, itemized list of typical items, cost estimates etc.
v) Facilitate in finalization of rates for various items and services provided under the project
vi) Assist in mobilization and screening of farmers/ beneficiaries for various project activities
vii) Inspect and advise on standards, specifications, and criteria for construction and installation materials/equipment etc.
viii) Review and approve plans, designs, cost estimates for watercourse improvement, HEISs, LASER land levelling, water storage ponds, renewable or other energy-efficient power systems for HEISs etc., extension and field works etc.
ix) Provide resident supervision on precast concrete parabolic segments (PCPS) yards through deployment of Engineers/ Sub-engineers
x) Facilitate timely completion of works and recommend onsite design modifications
xi) Spot-check for quality of works during construction of a minimum of one third by their number
xii) Certify quantities and quality of completed works and delivered/installed equipment for watercourse improvement, HEISs and LASER land levelling, water storage ponds, power systems for HEISs, seeds/ plants, rough land leveling, bulldozer work etc.
xiii) Verify financial resource transfer applications as third-party validation
xiv) Notify the PD (CAD-GTC)/ DGA(WM) of compliance / non-compliance of works with agreed criteria and standards & specifications
xv) Submit monthly, quarterly, and annual reports of project activities besides other periodic reports as per requirements of project management
xvi) Provide technical support for training of stakeholders in all project interventions, particularly relating to high efficiency irrigation systems as well as new water management techniques and technologies

xvii) Provide implementation supervision support for successful implementation of CAD activities to be carried out by the Field and Agri. Ext. Wings under the proposed project
xviii) Develop and manage online database for all project interventions for smart project management
xix) Submit reconciled physical and financial reports for its onward submission to the donor/ ADB and government
xx) Liaise with provincial, divisional, and district project management for smooth execution of field activities
xxi) Extend technical support to maintain a website containing information on facilities and services, applications, procedures etc.
xxii) Support in project management based on modern concepts, implementation of works, including social and environmental management program, implementation of the communication strategy/plan, expenditure planning, budgeting and financing forecast and work plans, as required by the government and financing agency(s) of the project as well as assistance in developing the procurement plans, contract management, and financial management
xxiii) Any other duties assigned by the PD (CAD-GTC)/ DGA(WM)/ project management

5.1. SPECIFIC SCOPE OF KEY SERVICES

5.1.1. Watercourse Development/ Construction and Lining

i) Review the already developed standards and specifications for watercourse improvement/ lining works and improve the same as per latest project requirements to assure compliance with agreed criteria
ii) Prepare a watercourse development/ improvement/ lining manual envisaging step by step guide for carrying out field activities in accordance with the approved project documents
iii) Assist in mobilization of water users associations (WUAs) and selection of watercourses as per approved criteria
iv) Facilitate in finalization of rates by District Rate Committee (DRC) for construction materials
v) Verify rate assessment of construction materials to be procured by the procurement committee for civil work
vi) Check/ review surveys and cost estimates carried out by the OFWM staff
vii) Review and approve plans, designs, cost estimates for watercourse improvement
viii) Check for quality of works during construction according to the agreed quality assurance plan, facilitate timely completion of civil works and recommend onsite design modifications.
ix) Recommend financial transactions/ funds transfer to WUAs/ SSCs as per approved criteria
x) Certify quality and quantity of completed watercourse improvement/ civil works
xi) Take responsibility for completion of works as per standards & specifications and ensure third party validation

5.1.2. LASER/ rough land levelling

i) Assist in prequalification/ shortlisting of service providers for LASER land levelling services

ii) Assist in evaluation of bids/ tenders and award of contracts during prequalification/ bidding process of service providers to ensure selection of competent firms and quality services
iii) Assist in shortlisting of applicants for LASER land levelling
iv) Certify quantities and quality of LASER/ rough land levelling conformity with specified standards and quantities for payments to service provider
v) Provide technical support for training of farmers/service providers for LASER land levelling
vi) Prepare operation, maintenance and management manuals for farm layout planning and LASER land levelling
vii) Develop and maintain a GIS-based database of LASER land levelling acceptable to the Client

5.1.3. High Efficiency Irrigation Systems (HEISs)

i) Provide technical assistance in preparation of design & specifications, cost estimation of HEIS schemes, prepare guidelines, standardized criteria etc.
ii) Prepare technical documents/agreement for SSCs including contract conditions, specifications for design, materials and installation of equipment, itemized list of typical items etc.
iii) Assist in evaluation of the technical and financial proposals of SSCs
iv) Assist in mobilization and screening of farmers
v) Facilitate in finalization of rates for various items and services required for system installation
vi) Review and approve plans, designs, cost estimates for HEIS
vii) Check quality of material delivered at the site by SSCs conformity with specified standards and quantities based on an agreed quality assurance plan
viii) Check and certify quantities and quality of all completed works based on agreed quality assurance plan for payments of system cost to SSCs
ix) Prepare completion certificates, measurements of on-going/ completed works, and disbursement applications
x) Provide technical support for training of OFWM staff in high efficiency irrigation systems
xi) Review and advise on standards, specifications and criteria for high efficiency irrigation system best suited to local conditions
xii) Facilitate timely completion of intended works and recommend onsite design modifications
xiii) Verify financial resource transfer applications at various stages of works execution
xiv) Prepare operation, maintenance and management manuals for high efficiency irrigation systems
xv) Develop and maintain a GIS-based database of HEIS sites

5.1.4. Power Systems for Operating HEIS

i) Review designs and cost estimates of the power stems for operating HEIS.
ii) Provide technical assistance in preparation of designs & specification, cost estimation of power systems, prepare guidelines, standardized criteria etc.
iii) Prepare technical documents/agreement for SSCs including contract conditions, specifications for design, materials and installation of equipment, itemized list of typical items etc.
iv) Assist in evaluation of the technical and financial proposals of power system SSCs
v) Assist in mobilization and screening of farmers

vi) Facilitate in finalization of rates for various items and services required for power system installation
vii) Review and approve plans, designs, cost estimates prepared by the SSCs
viii) Check quality of material delivered at site by SSCs, conformity with specified standards and quantities based on an agreed quality assurance plan
ix) Certify quantities and quality of all completed works for payments of systems cost to SSCs
x) Prepare completion certificates, measurements of on-going/ completed works and disbursement applications
xi) Provide technical support for training of OFWM staff in high efficiency irrigation systems
xii) Review and advise on standards, specifications and criteria for high efficiency irrigation system best suited to local conditions
xiii) Facilitate timely completion of intended works and recommend onsite design modifications/ improvements
xiv) Check for quality of works during installation based on agreed quality assurance plan
xv) Verify financial resource transfer applications at various stages of works execution
xvi) Prepare operation, maintenance and management manuals for HEIS and its power system.
xvii) Develop and maintain a GIS-based database of HEIS sites

5.1.5. Construction of Water Storage Pond

i) Review the designs of the water storage pond for storing/ capturing water
ii) Provide technical assistance in preparation of the design and cost estimation of the water storage pond, prepare guidelines, standardized criteria etc.
iii) Prepare technical documents including contract conditions, standards for design, and itemized list of typical items etc.
iv) Assist in mobilization and screening of farmers
v) Facilitate in finalization of rates for various construction materials and services required for construction of water storage pond
vi) Review and approve plans, designs, cost estimates prepared by the staff
vii) Check quality of material delivered at the site, conformity with specified standards and quantities based on quality assurance/ standards
viii) Certify quantities and quality of all completed works for payments of WSP cost to the beneficiary farmers
ix) Provide technical support for training of OFWM staff in water storage pond construction and operation
x) Facilitate timely completion of intended works and recommend onsite design modifications/ improvements
xi) Spot-checking for quality of works during construction
xii) Verify financial resource transfer applications at various stages of works execution
xiii) Prepare operation, maintenance and management manuals for water storage ponds

5.1.6. Extension & Field Services, Awareness Creation, Training, Capacity Building, and Construction of Building Activities

i) Review and certify Agri. Extension and Field wing activities as per approved procedures
ii) Provide support for construction of office buildings/ training center as and when required

iii) Develop the overall framework of social mobilization, awareness creation, training and capacity building, which is gender-responsive
iv) Assist in social mobilization of farmers, community and WUAs, including women farmers.
v) Carry out training and capacity Building of farmers, community and WUAs, with separate training for women farmers
vi) Prepare Training Needs Assessment (TNA) reports as and when required
vii) Assist the WMTI and WMRF in implementation of Component-E of the project
viii) Coordination with PID, PAD, PIC, farmers, community and WUAs for successful completion of CAD activities envisaged under the proposed project

5.1.7. Monitoring and Evaluation

i) Develop the overall framework of monitoring and evaluation plan including collecting, analysing, and reporting project data for continual effective tracking of project development objectives
ii) Work on formulated set of key performance indicators and means of assessment against these indicators for project activities to be implemented
iii) Monitor and evaluate the implementation of project activities and their outcomes and impacts on socio-economic welfare of farming community in project areas
iv) Propose recommendations about project modalities to ensure achievement of envisaged development objectives
v) Contribute to development of annual work plan, ensuring alignment with project strategy, agreement on annual targets and inclusion of M&E activities in the work plan
vi) Oversee and execute M&E activities of water management practices and techniques and extension support and services with particular focus on results and impacts as well as in lesson learning
vii) Any other duty assigned by the project management

8. The Consultants will perform the role of "**The Engineer**" and undertake agreements in respect of civil works, goods, equipment, etc. to be procured under the project, and will be responsible for inspection and third party validation of these works in order to ensure that works undertaken and goods & equipment supplied are in accordance with the deigns, specifications and terms & conditions of the relevant contracts and standards. The Consultants shall ensure that procurement of goods, services, improvement works contracts are in accordance with the approved polices and guidelines as well as contracts are signed, and managed properly including any changes or variation orders during implementation.

9. The Consultants will provide support to DGA(WM)/ PD (CAD-GTC) in overall project management activities such as preparation of project implementation plans, expenditure planning, budgeting and financing forecast and plans, monthly, quarterly and annual progress reports or work programs as required by the Government of Punjab and ADB/ financiers of the project. They will also help in developing the procurement plans, contract management, and financial management. The plans will be updated on a regular basis as required by the Client.

6. TEAM COMPOSITION AND QUALIFICATION REQUIREMENTS FOR THE KEY EXPERTS

10. The Consultants will be encouraged to use the expertise available in Pakistan to the extent possible. However, international experience and experience with the ADB financed projects are necessary to carry out the assignment. The consultants are free to propose a

staffing plan and skill mix in order to ensure that necessary requisite objectives and scope of services are achieved. If all the required skills are not available within the consulting firms, they are encouraged to make joint ventures with other firms. The detail of consulting service inputs is given in Table below.

Sr. No.	Name of Expert	Qualification and Experience	Input/ man-months
A	**Key Experts (National)**		
1	Team Leader/ Project Manager K-1	• **Qualification:** Post-graduate degree in Agricultural Engineering / Water Resources Engineering / Irrigation Engineering/ Water Engineering & Management/ Civil Engineering with specialization in water resources or equivalent after B.Sc. Agri. Engineering. • **Experience:** 15 years in implementation of multi-sectoral projects with 10 years of implementing foreign funded on farm water management projects.	72 (1 position)
2	Design Engineer K-2	• **Qualification:** Post-graduate degree in Agricultural Engineering/ Irrigation Engineering/ Water Resources Engineering/ Water Engineering & Management or equivalent after B.Sc. Agri. Engineering. • **Experience:** Seven (7) years in designing of water management technologies/ methods/ techniques including three (3) years' specific experiences of designing on farm water management interventions.	72 (1 position)
3	Financial Management Specialist K-3	• **Qualification:** Degree of Chartered Accountant or ACMA/ ACCA/ MBA • **Experience:** Five (5) years in financial management in public/ private sector organizations preferably under a donor assisted project.	36 (1 position)
4	Agricultural Economist K-4	• **Qualification:** Post-graduate degree in Economics/ Agricultural Economics/ Development Economics • **Experience:** 10 years in economics including five (5) years in carrying out economic and financial analysis in agricultural/ water management sectors under foreign funded projects	36 (1 position)
5	M&E Specialist K-5	• **Qualification:** Post-graduate degree in Agricultural Engineering / Water Resources/ Irrigation Engineering/ M&E/ Project Management or equivalent after B.Sc. Agri. Engineering • **Experience:** Seven (7) years in M&E of water resources including five (5) years' specific experiences in M&E of on farm water management interventions	72 (1 position)
6	Field Engineer In-charge/ Field Coordinators K-6 & 7	• **Qualification:** Post-graduate degree in Agricultural Engineering/ Water Engineering & Management/ Civil Engineering or related field after B.Sc. Agri. Engineering • **Experience:** 10 years including five (5) years' experience in on farm water management/ irrigated agriculture development projects	144 (2 position)
7	Field Engineer K-8 to K-21	• **Qualification:** Bachelor's degree in Agricultural Engineering. Post-graduate degree in relevant field will be given preference. • **Experience:** Three (3) years in water resources management including one (1) year in on farm water management projects	1008 (14 position)

B.	Non-key Experts		
1	Irrigation Agronomist	• **Qualification:** Post-graduate degree in Agriculture/ Agricultural Engineering or equivalent with specialization in Irrigation Agronomy or related field. Ph.D. qualification will be given preference • **Experience:** 10 years in irrigation agronomy or related field including three (3) year work experience in irrigation agronomy under on farm water management projects	36 (1 position)
2	Social & Gender Expert	• **Qualification:** Post-graduate degree in sociology, development studies, anthropology or a closely related social sciences field. Ph.D. qualification will be given preference • **Experience:** Seven (7) years in social safeguards, impact assessment, resettlement monitoring, participatory planning, development of community organizations, preparation and implementation of gender action plans including three (3) years in water resources/ agricultural development projects • **Age:** 45 years (maximum)	36 (1 position)
3	GIS and RS Expert	• **Qualification:** Post-graduate degree in Remote Sensing & GIS or Bachelor/ Post-graduate degree in Agri. Engineering/ Water Resources or equivalent with specialization in GIS/RS • **Experience:** Five (5) years of work experience in GIS & RS applications in public/ private sector organizations preferably in water resources/ agricultural development projects	36 (1 position)
4	Groundwater Management Specialist	• **Qualification:** Post-graduate degree in Water Resources Management/ Groundwater Management/ Groundwater Hydrology/ Water Engineering & Management/ Agriculture Engineering or similar degree with specialization in Groundwater Management after B.Sc. Agricultural Engineering. Ph.D. qualification will be given preference. • **Experience:** 10 years in groundwater management including three (3) years in groundwater management under on farm water management/ agricultural development projects	18 (1 position)
5	Agricultural Engineer/ Resident Engineer	• **Qualification:** Bachelor's degree in Agricultural Engineering	504 (7 positions)
	Total		**2,070**

11. **Team Leader/ Project Manager (National, 72 person-months, One position).** The Team Leader (TL)/ Project Manager (PM) will possess a post-graduate degree in Agricultural Engineering / Water Resources Engineering / Irrigation Engineering/ Water Engineering & Management/ Civil Engineering with specialization in water resources or equivalent after B.Sc. Agri. Engineering. He should possess 15 years' experience in implementation of multi-sectoral projects with 10 years of implementing foreign funded on farm water management projects and management of similar consultancy services with demonstrated ability to work with government officials, technical field staff, private sector, and farmers. In addition, the TL/PM would be required to have familiarity with the principles and practices of participatory community development, irrigated agriculture, water management related issues, and knowledge of project management information

systems besides having fluency in spoken and written English. The major responsibilities of the TL/PM will include, but not limited, to the following:

i) Report to the Client/ DGA (WM)/ PD (CAD-GTC) for project management
ii) Assume overall responsibility for management of CAD Consultants' team
iii) Work as the "the Engineer" as per Client's agreement with the Water Users Associations (WUAs)/ beneficiary farmers/ service providers to supervise construction/lining/ installation/equipment delivery etc. with the best professional and consulting standards to ensure that works/ schemes are completed satisfactorily
iv) Keep the Client informed of technical issues and progress of all works both by direct contacts and through discussions or digital correspondence
v) Attend, at the project level, all meetings as required and keep a record of all such meetings.
vi) Assist the Client in amicable solution of project implementation challenges/ issues
vii) Ensure preparation and submission of regular project reports/ project completion report (PCR)
viii) Assist the Client in preparing the response to audit observations
ix) Assist the Client in preparing response to financiers/ ADB or other queries, observations, requirements etc.
x) Provide technical input in smooth implementation of project activities
xi) Coordinate with all project stakeholders/ organizations for project implementation
xii) Any other task assigned by the project management/ Client

12. **Design Engineer (National, 72 person-months, One position).** The Design Engineer should possess a post-graduate degree in Agricultural Engineering/ Irrigation Engineering/ Water Resources Engineering/ Water Engineering & Management or equivalent after B.Sc. Agri. Engineering with seven (7) years' experience in designing of water management technologies/ methods/ techniques including three (3) years' specific experiences of designing on farm water management interventions. Work experience in related computer tools, good communication skills, fluency in English and proven satisfactory record of similar consultancies would be preferred. The major responsibilities of the Design Engineer will include but not limited to the following:

i) Supervise designs and cost estimations of project interventions/ technologies and provide technical assistance and backstopping to field engineers/ staff
ii) Monitor the designing process carried out by the supply & service companies (SSCs)/ service providers/ OFWM staff to ensure socially acceptable, economically feasible, and environmentally friendly designs in accordance with the prescribed standards and specifications
iii) Assist the Client/ department in the whole bidding process of award of contracts
iv) Develop computer-based designs of all project interventions and provide training to project/ SSCs staff
v) Carry out continuous monitoring of designing process and maintain liaison with implementation staff/ other stakeholders
vi) Assist in reviewing and modifying the designs of project interventions for cost effectiveness and technical suitability
vii) Coordinate for ensuring adoption of international/ national standards for designs
viii) Guide the field engineer/ staff in preparation, review and approval of designs
ix) Prepare/ update design manuals of all project interventions and submit to the Client within one year of mobilization
x) Perform other duties as assigned by the project management/ client

13. **Financial Management Specialist (National, 36 person-months, One position).** The Financial Management Specialist (FMS) should have degree of Chartered Accountant or ACMA/ACCA/ MBA with five (5) years of work experience in financial management in public/ private sector organizations preferably under a donor assisted project. The FMS will be responsible for provision of technical guidance and expertise in the financial management activities under the project within the framework of prescribed policies and guidelines of the government and the ADB. The FMS will provide comprehensive support to the DGA(WM)/ PD (CAD-GTC) regarding establishment and maintenance of finance and accounting systems, processes and procedures, and ensuring adherence to the donor/ ADB/ government requirements. The major responsibilities of FMS will include, inter-alia, the following:

i) Provide technical assistance to DGA (WM)/ PD(CAD-GTC) for financial management activities
ii) Assist in managing all accounts, budget and audit matters
iii) Supervise in preparing cash flows, their planning, and management
iv) Prepare financial management reports including monthly SOE (Statement of Expenditure) reports and other reports as per requirement of the donor/ client
v) Support in dealing with the ADB/ donor on financial management issues
vi) Monitor the financial resources and accounting to ensure accuracy and reliability of financial reports
vii) Establish an efficient, accurate and updated reporting mechanism, preferably a real time transaction recording and reporting system including asset register management, receipt book and cash book-keeping, invoice register management, contract register, contract ledger management etc.
viii) Consolidate the periodic financial progress reports and submit to the PD (CAD-GTC)/ DGA(WM) for review/approval and/or all stakeholders in accordance with the prescribed requirements
ix) Assist in preparation of various financial reports as and when required by the Client
x) Organize cash management processes, including liquidity management, recommendation about imprest level, risk assessment, bank relationship management, timely accounting and reconciliation of all transactions, security for cash assets on site etc.
xi) Carry out capacity building of the provincial, regional and district level finance & accounts teams
xii) Provide support in carrying out internal and external audits timely and regularly to improve financial process as well as suggest corrective actions on all recommendations/ observations
xiii) Help in securing approvals of competent authority regarding budget allocations/ disbursements and release of funds
xiv) Assist in tax-related matters as and when required by the Client
xv) Any other relevant duties assigned by the DGA (WM)/ PD (CAD-GTC)

14. **Agricultural Economist (National, 36 person-months, One position).** The Agricultural Economist will possess a post-graduate degree in Economics/ Agricultural Economics/ Development Economics with 10 years' experience in economics including five (5) years in carrying out economic and financial analysis in agricultural/ water management sectors under foreign funded project. The work experience in a developed country in related field with demonstrated ability to work with government officials, technical field staff, private sector, and farmers would be preferred. Work experience in related computer tools, ADB rules/procedures, good communication skills, fluency in English, and proven satisfactory record of similar consultancies would be preferred. The responsibilities of the Agricultural Economist will include but not limited to the following:

i) Supervise collection, compilation and analysis of data/ information/ pictorial evidence before and after project interventions
ii) Lead surveys/information collection activities for impact assessment of project activities
iii) Carry out economic and financial analysis of project activities as and when required
iv) Train the consultants team/staff in collection of periodic/seasonal data for impact assessment of project activities, etc.
v) Assist the M&E Expert in data collection plans and preparation of formats
vi) Prepare a framework for gathering feedback of beneficiaries/ communities/WUAs
vii) Assess the social, economic and environmental impacts of project interventions
viii) Impart guidance and training on economic analysis to project staff
ix) Submit quarterly and yearly reports highlighting project impacts acceptable to the Clients
x) Assist the OFWM staff in determining economic feasibility of project interventions
xi) Design and complete special impact assessment studies as per requirement of project management
xii) Any other relevant duties assigned by the project management

15. **M&E Specialist (National, 72 person-months, One position).** The M&E Specialist will possess a post-graduate degree in Agricultural Engineering / Water Resources/ Irrigation Engineering/ M&E/ Project Management or equivalent after B.Sc. Agri. Engineering with Seven (7) years in M&E of water resources including five (5) years' specific experiences in M&E of on farm water management interventions with demonstrated ability to work with government officials, technical field staff, private sector, and farmers will be preferred. The responsibilities of the M&E Specialist will be but not limited to the following:

i) Lead the consultant's M&E team for provision of technical assistance to PD (CAD-GTC)/ Client in monitoring and evaluation of project activities and impacts
ii) Supervise implementation of overall monitoring and evaluation plan including collecting, analyzing, and reporting project data for continual effective tracking of project objectives
iii) Monitor and report project impacts, outputs, and outcomes as envisaged in project logical framework
iv) Carry out impact evaluation of project activities alongwith the Agriculture Economist to assess project benefits
v) Monitor project activities to ensure implementation of project activities in accordance with the prescribed standards, specifications, and procedures
vi) Carry out continuous monitoring of project plans and maintain liaison with implementation staff/ other stakeholders
vii) Ensure adoption of international/ national standards for monitoring of project activities
viii) Submit quarterly / yearly M&E reports envisaging monitoring of indicators against the logical framework and other indicators acceptable to the clients
ix) Perform other duties as assigned by the Client

16. **Field Engineer In-charge/ Field Coordinator (National, 144 person-months, Two positions).** The Field Engineer In-charge/ Field Coordinators should possess a post-graduate degree in Agricultural Engineering/ Water Engineering & Management/ Civil Engineering or related field after B.Sc. Agri. Engineering with 10 years' work experience including five (5) years' experience in on farm water management/ irrigated agriculture development projects. Work experience in related computer tools, coordination, good communication skills, fluency in English and proven satisfactory record of similar consultancies would be preferred. The responsibilities of the Field Engineer In-charge/ Field Coordinator will include but not limited to the following:

i) Lead the Field Engineers/ field teams and coordinate project activities amongst various stakeholders
ii) Act as a bridge between higher management and field formations to ensure resolution of project implementation issues
iii) Assist the PM/TL in project implementation supervision activities
iv) Attend all meetings as required and keep a record of all such meetings
v) Supervise checking and approval of field survey, design and cost estimates
vi) Coordinate and monitor/ supervise all project activities undertaken in the field and ensure quality of project interventions as well as quantity certification
vii) Prepare online/ web-based reporting formats of all project interventions acceptable to the Client for online progress reporting
viii) Develop close liaison with project stakeholders including project management, private sector service providers, farmers etc.
ix) Undertake any other relevant duties assigned by the project management

17. **Field Engineer (National, 1008 person-months, 14 positions).** The Field Engineer should possess a Bachelor's degree in Agricultural Engineering and three (3) year work experience including one (1) year in on farm water management projects. Post-graduate degree will be given preference. Work experience in related computer tools, good communication skills, fluency in English and proven satisfactory record of similar consultancies would be preferred. The responsibilities of the Field Engineer will include but not limited to the following:

i) Assist the OFWM field staff in successful implementation of project activities
ii) Coordinate and supervise construction/installation activities in the field
iii) Ensure quality and quantity of works as per approved standards and specifications by spot-checking of envisaged interventions
iv) Certify financial transactions/ funds for ongoing as well as completed project works as per approved procedures
v) Assist in finalization of rates of construction material in DRC as and when required
vi) Bring any deficiency into the notice of the controlling officers of district and provincial governments
vii) Develop close liaison with project stakeholders including project management, SSCs and the farmers
viii) Any other relevant duties assigned by the project management

18. **Irrigation Agronomist (National, 36 person-months, One position).** The Irrigation Agronomist should possess a post-graduate degree in Agriculture/ Agricultural Engineering or equivalent with specialization in Irrigation Agronomy or related field. Ph.D. qualification will be given preference. He should possess 10 years' work experience in irrigation agronomy or related field including three (3) year work experience in irrigation agronomy under on farm water management projects. Work experience in related computer tools, good communication skills, fluency in English and proven satisfactory record of similar consultancies would be preferred. The responsibilities of the Irrigation Agronomist will include but not limited to the following:

i) Assist the project management in implementation of OFWM and agricultural extension activities
ii) Develop guidelines and technical manuals about agronomy of different crops sown in the project area for professionals and farmers for successful crop production
iii) Prepare and implement plans for devising crop production technology including land preparation, planting, irrigation scheduling, inter-culture, fertigation, harvesting, processing and marketing under modern irrigation technologies

iv) Estimate crop water requirements (CWR) by using climatic data (rainfall, sunshine, humidity, wind speed, temperature etc.) for soil moisture monitoring and proper irrigation scheduling in the project area
v) Supervise demonstration and evaluation of modern irrigation and crop production techniques
vi) Assist the Extension wing in carrying out their envisaged activities
vii) Assist in preparation of most feasible cropping patterns under project interventions and water availability
viii) Assist the farmers in successful crop cultivation with HEIS and other modern irrigation technologies
ix) Compile and analyze reports on agronomic aspects of crop and water management for proposing recommendations
x) Participate in field visits & provide necessary input for crop and irrigation management
xi) Prepare training curriculum and carryout capacity building programs for technical staff and farmers about irrigation agronomy
xii) Any other relevant duties assigned by the project management

19. **Social & Gender Expert (National, 36 person-months, One position).** The Social & Gender Expert will have a post-graduate degree in sociology, development studies, anthropology or a closely related social sciences field. Ph.D. qualification will be given preference. Professional experience of seven (7) years in social safeguards, impact assessment, resettlement monitoring, participatory planning, development of community organizations, preparation and implementation of gender action plans including three (3) years in water resources/ agricultural development projects is required. In-depth knowledge for similar water resources development project environment and experience of Punjab will be an advantage. His/her main tasks will be to:

i) Ensure the equitable participation of women, including women landless farmers in community consultations, and report on the outreach, participation, and communication activities that have been carried out especially for women and vulnerable stakeholders
ii) Organize women farmers into community-based groups; ensure their regular meetings; ensure that the groups' discussions are recorded in the minutes; and inform and feed these group discussions into WUA meetings, as relevant
iii) Monitor and evaluate social and gender related impact of project activities
iv) Prepare and implement GAP
v) Carry out gender related surveys and studies
vi) Work with the Agricultural Economist and M&E Specialist for assessment of project impacts
vii) Provide guidance and training for participation of women/ gender in project activities
viii) Provide gender updates in monthly/ quarterly/ yearly project reports
ix) Any other duty assigned by the management/ client

20. **GIS & RS Expert (National, 36 person-months, One positions).** GIS and RS Expert should possess a post-graduate degree in Remote Sensing & GIS or Bachelor/ Post-graduate degree in Agri. Engineering/ Water Resources or equivalent with specialization in GIS/RS with five (5) years of work experience in GIS & RS applications in public/ private sector organizations preferably in water resources/ agricultural development projects. He would be responsible for provision of technical guidance and expertise in the development and management of GIS database of all project activities. He will provide comprehensive support to the client regarding database maintenance, data verification, updation of information, upgradation of system for use of data for

planning and monitoring activities. The major responsibilities of the consultant will include, inter-alia, the following.

i) Provide technical assistance to DGA (WM)/ PD (CAD-GTC) in developing GIS & RS maps of planned interventions
ii) Develop GIS applications on different platforms (i.e. ESRI products/ ERDAS Imagine/ ER-Mapper / MapInfo etc.) for project activities
iii) Develop shape files of all project interventions
iv) Supervise image processing/ interpretation and analysis of project interventions
v) Carryout data digitization and geo-tagging of all project interventions
vi) Manage map production and printing
vii) Administer spatial data analysis and management
viii) Develop a GIS-based database of project interventions
ix) Organize collection of necessary field data for completion, updating and up-gradation of GIS database
x) Build capacity of OFWM staff/IT team in operation, application and management of GIS database, use of GPS and latest GIS software i.e. ArcView, ArcGIS etc.
xi) Demonstrate ways to use OFWM GIS database as a management tool in an optimal manner for project planning & monitoring
xii) Produce project maps as and when required by the Client

21. **Groundwater Management Specialist (National, 18 person-months, One position).** The Ground Management Specialist should possess a post-graduate degree in Water Resources Management/ Groundwater Management/ Groundwater Hydrology/ Water Engineering & Management/ Agriculture Engineering or similar degree with specialization in Groundwater Management after B.Sc. Agricultural Engineering. Ph.D. qualification will be given preference. He should possess 10 years' experience in groundwater management including three (3) years in groundwater management under on farm water management/ agricultural development projects. Work experience in related computer tools, good communication skills, fluency in English and proven satisfactory record of similar consultancies would be preferred. The major responsibilities of the consultant will include, inter-alia, the following:

i) Develop guidelines and technical manuals about groundwater management strategies for OFWM staff/ professionals and farmers for successful crop production
ii) Prepare and implement plans for devising sustainable groundwater management plans including planting, irrigation scheduling, treated/ conjunctive or cyclic use of groundwater, fertigation etc., under modern irrigation technologies
iii) Design/ develop/ recommend ICT-based tools and gadgets for on-farm groundwater monitoring and management
iv) Prepare most feasible groundwater management options in project areas based on water availability from canal, groundwater and rainfall
v) Demonstrate and evaluate various groundwater management techniques
vi) Develop a framework for monitoring groundwater before and after project interventions
vii) Use computer models to analyze groundwater situation in project areas
viii) Compile and analyze the reports on groundwater monitoring and management aspects and water management for proposing recommendations
ix) Participate in field visits & provide necessary input for groundwater management
x) Prepare training curriculum and carryout capacity building programs for technical staff and farmers about groundwater management
xi) Any other relevant duties assigned by the project management

22. **Resident Engineers/ Agricultural Engineers (504 person months, 7 positions).** Resident Engineers/ Agricultural Engineer will possess Bachelor's degree in Agricultural Engineering degree and would be responsible for provision of resident supervision in fabrication/ production of Pre-cast Concrete Parabolic Segments (PCPS) at yards for watercourse lining in the project areas. He will also assist the Field Engineers in performance of field duties and other project activities as and when required.

7. REPORTING REQUIREMENT AND TIME SCHEDULE FOR DELIVERABLES

23. The Consultant will prepare the following key reports in English and provide the copies as per deliverables and schedule along with respective soft copy.

a) Inception Report – In this report, the Consultant will present their strategy, methodology, timeline, responsibility matrix, risk analysis, risk response methods etc. for successful delivery of consultancy services.
b) Monthly Progress Reports
c) Mid-term Report on the format acceptable to the Client
d) Yearly Impact Assessment/ Evaluation Report
e) Design Manuals of project activities
f) GIS/ RS maps of command area on various project activities (before and after) on monthly basis
g) Quality Assurance Plan - (QA/QC Manual)
h) Revised Planning Commission Proforma-I (PC-I), if needed
i) Assignment Completion Report (including digital database of all project interventions)
j) Revised Planning Commission Proforma-IV (PC-IV)
k) Any special reports as may be necessary from time to time for specific item / issue related to the project.

24. The schedule for various reports and documents that are likely to be generated by the Consultant has been prepared. Additional reports and presentations shall be prepared as required. The Consultants will supply the deliverables along with the respective soft copy thereof to the DGA(WM))/ PD (CAD-GTC) as per schedule given below

Sr. No.	Document	Soft & Hard Copies	Due
1.	Draft Inception Report	3	3 weeks after the effectiveness of the services
2.	Final Inception Report	5	One week after the issuance of comments by the Client on draft Inception Report
3.	Monthly Progress Report (Physical & Financial)	3	10th of the following month
4.	Quality Assurance Plan (QA/ QC Manual)	5	Within 45 days after commencement of services
5.	Quarterly Progress Report (Physical & Financial)	3	10th of the first month of following quarter

6.	Annual Summary Progress Report (Physical & Financial)	3	10th of the first month of following year
7.	ICT-based online progress reporting/ monitoring system	1	6 months after the effectiveness of the services
8.	Annual Progress Report (Physical & Financial)	3	During first month of the following year
9.	Monthly SOE (Statement of Expenditure) reports	3	10th of the following quarter
10.	EIO, RFP, PQD, tripartite agreement, etc.	3	As and when required
11.	Impact Assessment Report	3	After each year
12.	Quality Control / Assurance Report	5	After each year
13.	GIS/ RS maps	3	After 6 months, and as and when required
14.	Social and environment report/ ESMP report	3	After each year
15.	Design manual of each activity	5	Within 6 months after commencement of services
16.	Revised Planning Commission Proforma-I (PC-I)	30	As and when required
17.	Draft Assignment Completion Report	5	At completion of physical works/ activities
18.	Final Assignment Completion Report	25	At completion of physical works and financial transactions
19.	Planning Commission Proforma IV (PC-IV)	50	At completion of the project
20.	Complete inventory of works/ activities in hard and digital form	10	At completion of the project
21.	Special Reports	10	As and when required

8. CLIENT'S INPUT AND COUNTERPART PERSONNEL

i) The Consultant shall work closely with the Director General Agriculture (Water Management) Punjab/ Project Director (CAD-GTC) to whom they will be reporting on day-to-day basis. The Consultant will establish their offices in Lahore and project areas at suitable places. Most of the consultants' staff will be located in the field/ project areas.

ii) Director General Agriculture (Water Management) Punjab/ Project Director (CAD-GTC) will be representative of the Client who will also resolve various administrative issues relating to Consultants arising during the course of

assignment. The Consultants' Team Leader/ Project Manager will be the principal contact and will be expected to be readily available during project implementation.

iii) The Consultants shall be responsible for all aspects of performance of services as set forth in these TORs.

iv) All records and sites will be made available to the Consultant to enable them to perform their functions. The Consultants will be required to ensure confidentiality of the record.

9. CLIENT WILL PROVIDE THE FOLLOWING INPUTS, PROJECT DATA AND REPORTS TO FACILITATE PREPARATION OF THE PROPOSALS

25. All relevant documents regarding on farm water management and command area development activities are freely accessible at OFWM website (http://ofwm.agripunjab.gov.pk), which may be useful for interested consultants/ consulting firms.