



Periodic Financing Request Report

Project Number: 37231-044

MFF Number: 0009-PAK

November 2015

Islamic Republic of Pakistan: Punjab Irrigated Agriculture Investment Program (Tranche 4)

This document will be disclosed to the public in accordance with ADB's Public Communications Policy 2011.

CURRENCY EQUIVALENTS

(As of 15 November 2015)

Currency Unit	=	Pakistan rupee (PRe/PRs)
PRs 1.00	=	\$0.0095648
\$1.00	=	PRs104.55

ABBREVIATIONS

ADB	-	Asian Development Bank
AWB	-	Area Water Board
CPS	-	country partnership strategy
EA	-	executing agency
EMP	-	environmental management plan
FO	-	farmers organizations
ICB	-	international competitive bidding
LBDC	-	Lower Bari Doab Canal
LBDCIP	-	Lower Bari Doab Canal Improvement Project
MFF	-	multitranche financing facility
O&M	-	operations and maintenance management
PAM	-	project administration manual
PFR	-	periodic financing request
PIAPPF	-	Punjab irrigated agriculture project preparation facility
PID	-	Punjab Irrigation Department
PIDA	-	Punjab Irrigation and Drainage Authority
PMU	-	project management unit

WEIGHTS AND MEASURES

m	-	meter
mm	-	millimeter
km	-	kilometer
ha	-	hectare
m ³ /s	-	cubic meter per second

GLOSSARY

abiana	-	irrigation service fee
conjunctive use	-	combine use of surface and ground water
rabi	-	crops grown during the period from about December to May
kharif	-	crops grown during the period from about June to November

NOTES

In this report, “\$” refers to US dollars.

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- A. Compliance Status with Framework Financing Agreement and Loan Covenants of the Project 1, Project 2 and Project 3

TRANCHE AT A GLANCE

1. Basic Data			Project Number: 37231-044
Project Name	Punjab Irrigated Agriculture Investment Program – Tranche 4	Department /Division	CWRD/PRM
Country Borrower	Pakistan Government of Pakistan	Executing Agency	Punjab Irrigation Department
2. Sector	Subsector(s)		ADB Financing (\$ million)
Agriculture, natural resources and rural development	Irrigation		26.57
		Total	26.57
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG) Environmentally sustainable growth (ESG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive Natural resources conservation	Climate Change impact on the Project	
4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD) Knowledge solutions (KNS)	Institutional systems and political economy Application and use of new knowledge solutions in key operational areas	No gender elements (NGE)	
5. Poverty Targeting	Location Impact		
Project directly targets poverty	No	Rural	High
6. Risk Categorization:	Low		
7. Safeguard Categorization	Environment: C Involuntary Resettlement: C Indigenous Peoples: C		
8. Financing			
Modality and Sources	Amount (\$ million)		
ADB	26.57		
Sovereign MFF-Tranche (Loan): Ordinary capital resources	26.57		
Cofinancing	0.00		
None	0.00		
Counterpart	3.40		
Government	3.40		
	Total		
	29.97		
9. Effective Development Cooperation			
Use of country procurement systems	No		
Use of country public financial management systems	Yes		

TRANCHE AT A GLANCE

Date of Receipt by ADB of PFR: 24 August 2015

Tranche Number: 4

10. Country Operations Business Plan

CPS

<http://www.adb.org/sites/default/files/institutional-document/171824/cps-pak-2015-2019.pdf>

COBP

<http://www.adb.org/documents/pakistan-country-operations-business-plan-2015-2017>

11. Tranche Summary

ADB approved a multitranche financing facility (MFF) for the Punjab Irrigated Agriculture Investment Program for \$900 million in December 2006 (reduced to \$700 million in 2011 following amendment in MFF). Three tranches of total \$538 million were approved. The proposed tranche is fourth and last tranche (T4), will meet \$26.6 million cost overruns in T1 and remains within the MFF balance of \$162 million. The T4 is classified category C for environment, involuntary resettlement, and indigenous peoples safeguards. The climate change classification is Medium as the region experienced recurring major flood events and may face future water stress. For knowledge solutions, groundwater management plan is developed in the project.

Impact and Outcome: The impact will be increased agricultural production and farm income in Lower Bari Doab Canal (LBDC) command area. The outcome will be LBDC command area receives a sustainably improved delivery of water services and management

Outputs: (i) Balloki Barrage rehabilitated on revised time schedule and within budget based on the detail design and model studies, (ii) a groundwater management plan and conjunctive use strategy for LBDC is operational, (iii) farmers use improved on-farm water management practices, (iv) The LBDC and distribution system rehabilitated on revised time schedule and within budget based on detail design, (v) due diligence of subsequent tranches, and (vi) Area Water Board (AWB) and Farmers Organizations (FOs) take responsibility for operations of canal systems.

Implementation Arrangements: Punjab Irrigation Department will be the executing agency.

Project Readiness: All contracts are awarded and implementation arrangements of ongoing project are in place.

12. Significant Developments in the MFF and Previous Tranches

Tranche 1 approved on 18 December 2006 and comprises two loans: (i) \$217.8 million from ADB's ordinary capital resources (OCR) to finance the Lower Bari Doab Canal Improvement Project; and (ii) \$10 million from ADB's special fund resources to finance Punjab Irrigated Agriculture Project Preparation Facility. The details are as follows:

(i) Loan 2299 (\$217.8 million OCR): As of 15 November 2015 (91% elapsed time), the cumulative contract award and disbursements are \$206.3 million and \$156.9 million, 100% and 76%, respectively, of the net loan of \$207.3 million. The project is On-track. All contracts are awarded. Five of the 10 civil works contracts were completed.

(ii) Loan 2300 (\$10 million ADF): The facility support project has helped in preparation of two tranches, and feasibility studies and detail designs of future projects. As of 15 November 2015 (91% elapsed time), the cumulative contract award and disbursements total \$9.2 million and \$8.3 million, 91% and 82%, respectively, of the net loan of \$10.1 million. The project is On-track.

Tranche 2 (Loan 2841 \$270 million ADF) was approved on 22 December 2011 and finances New Khanki Barrage Project. As of 15 November 2015 (78% elapsed time), the cumulative contract award and disbursements are \$191.8 million and \$111.3 million, 78% and 45%, respectively, of the net loan of \$245.9 million. All contracts were awarded in 2013. The project is On-track.

Tranche 3 (Loan 2971 \$73 million OCR) was approved on 13 December 2012 and finances Pakpattan Canal and Suleimanki Barrage Improvement Project. As of 15 November 2015 (68% elapsed time), the cumulative contract award and disbursements are \$57.1 million and \$21 million, 78% and 29%, respectively, of the net loan of \$73 million. The project is On-track. All major contracts were awarded in 2014.

Nonphysical investments: (i) decentralized farmers management structure established; (ii) groundwater study completed; (iii) on-farm demonstration plots established; and (iv) social and environmental safeguards plans disclosed, updated and monitored.

Compliance with covenants: All undertakings in the Framework Financing Agreement and the covenants in the Loan and Project Agreements have been complied or are being complied with, and no specific measures are needed.

13. Milestones

Estimated Approval

7 December 2015

Estimated Effectiveness

30 December 2015

Estimated Completion^a

31 March 2017

14. Linked Documents

	Required Document	Disclosure Date
(i) Environment Weblink:		
(ii) Involuntary resettlement Weblink:		
(iii) Indigenous peoples Weblink:		

I. BACKGROUND

1. In December 2006, the Asian Development Bank (ADB) approved a \$900 million multitranche financing facility (MFF) for the Punjab Irrigated Agriculture Investment Program to cofinance investments in the irrigation sector in Punjab Province.¹ Two loans for the first tranche totaling \$227.8 million were approved at the same time—\$217.8 million equivalent from ordinary capital resources (OCR) and \$10 million equivalent from ADB's Special Fund resources (ADF). Two additional loans for two tranches were approved in 2011 and 2012, amounting to \$343 million. The MFF finances investments to improve century-old irrigation infrastructure and associated facilities in Punjab. It also prompts institutional reforms premised on eventual farmer management of the irrigation system to raise the effectiveness and efficiency of delivering irrigation.

2. Irrigated agriculture accounts for 28% of Punjab's gross domestic product and employs over 40% of its labor force. Irrigated cultivable agriculture covers 8.4 million hectares (ha). Fourteen barrages divert water through 22 main and link canals.² The replacement cost for Punjab's irrigation infrastructure, including barrages and conveyance network, is estimated at \$16 billion, whereas the estimated cost for rehabilitation and deferred maintenance needs is \$1.7 billion.³ The Country Partnership Strategy (CPS), 2009-2013 prioritized improving the irrigation infrastructure, and this strategic thrust continued in the CPS, 2015-19.⁴ The Punjab Irrigation Department's (PID) asset management plan prioritized rehabilitation of seven barrages and five main canal systems.⁵ ADB's contribution to infrastructural improvements is complemented by World Bank and Japan International Cooperation Agency (JICA) support to on-farm agricultural enhancement, infrastructure upgrade and institutional reforms.

3. Tranche 1 finances Project 1, consisting of the Lower Bari Doab Canal Improvement Project (LBDCIP) and the Punjab Irrigated Agriculture Project Preparation Facility (PIAPPF). The LBDCIP is improving the Balloki Barrage on the Ravi River, the Lower Bari Doab Canal system, and distributary and minor canals that supply water to more than 700,000 ha, along with supporting institutional reforms, on-farm productivity and improved groundwater management. The PIAPPF included preparation of subsequent projects under the MFF. Tranche 2 of the MFF financed the New Khanki Barrage Project, which will provide reliable irrigation water, serving 1.2 million ha and benefit 568,000 farming families. Tranche 3 of the MFF financed the Pakpattan Canal and Suleimanki Barrage Improvement Project. It will improve the Suleimanki Barrage, ensure reliable water supply to 1.01 million ha through its three canals and benefit more than 360,000 farming families. Pakpattan Canal provides irrigation to 500,000 ha.

4. The periodic financing request (PFR) relates to Tranche 4 and provides additional financing to meet cost overruns in Project 1. ADB, through missions, due diligence and coordination with the Punjab Government, reached the conclusion that the proposed additional financing will contribute to achieving the outputs and the outcome under the MFF and Project 1.

¹ This amount comprised (i) up to \$890 million equivalent from ADB's ordinary capital resources; and (ii) up to \$10 million equivalent in Special Drawing Rights (SDR) from ADB's special funds resources (ADF). On 15 December 2011, ADB's Board of Directors approved an amendment to the MFF for the Punjab Irrigated Agriculture Investment Program that (i) reduced the facility amount to one not exceeding the equivalent of \$700 million; and (ii) increased the limit on the use of ADF resources for the MFF to an amount not exceeding the equivalent of \$280 million.

² Total canal length is 37,643 kilometers (6,429 km main canals and 31,214 km distributary and minor canals).

³ Punjab. 2014-15. *Punjab Annual Development Program*. Lahore

⁴ ADB. 2015. *Country Partnership Strategy: Pakistan, 2015-19*. Manila

⁵ Taunsa, Balloki, Jinnah, Khanki, Suleimanki, Trimmu, Panjnad and Islam barrage and Lower Chenab, Lower Bari Doab, Pakpattan, Thal and Sidhnai canals systems

II. ASSESSMENT OF IMPLEMENTATION

5. **Physical and Nonphysical Progress.** Tranche 1 was approved on 18 December 2006 and became effective on 24 August 2007. As of 15 November 2015 and 91% elapsed time, the cumulative contract award and disbursements amounted to \$215.5 million and \$165.2 million, 99% and 76%, respectively, of the loan of \$217.4 million. The implementation rating is “On track”. All the consultancy and civil works contracts have been awarded. Five of the 10 civil works contracts were completed. One civil works contract was awarded and financed by PID’s own resources due to insufficient allocation of the ADB loan.

6. Tranche 2 was approved on 22 December 2011 and became effective on 17 February 2012. As of 15 November 2015 and 78% elapsed time, the cumulative contract award and disbursements amounted to \$191.8 million and \$111.3 million, 78% and 45%, respectively, of the loan of \$245.9 million. The implementation is “On track”. All contracts were awarded in 2013.

7. Tranche 3 was approved on 13 December 2012 and became effective on 6 June 2013. As of 15 November 2015 and 68% elapsed time, the cumulative contract award and disbursements amounted to \$57.1 million and \$21 million, 78% and 29%, respectively, of the loan of \$73 million. The implementation is “On track”. All major contracts were awarded in 2014.

8. Progress on the nonphysical components includes, (i) establishment of 3,779 water user associations, 52 farmers organizations (FOs) and one Area Water Board (AWB), completing the decentralized farmers’ management structures for operation and maintenance (O&M) of the minor and distributary canals;⁶ (ii) completion of a groundwater modeling study and institutionalization of its recommendations within the PID; and (iii) establishment of on-farm demonstration plots with the FOs. The PID updated and disclosed the land acquisition and resettlement plans (LARPs). They are being implemented. The PID established grievance redress committees and submitted internal and external monitoring reports. The PID included environmental management plans (EMP) in the bidding documents of all civil works contracts and is observing the relevant mitigation and monitoring measures.

9. **Compliance.** All covenants in the framework financing agreement (FFA) and the legal agreements for all tranches have been complied with, except for four that relate to FFA and/or Tranche 1. They are (i) legislation on a source of independent legal authority and establishment of FOs independent of the Punjab Irrigation and Drainage Authority Act (PIDA) of 2 July 1997; (ii) developing a participatory irrigation management model; (iii) audit of accounts and related financial statements of each FO; and (iv) external monitoring and evaluation for the entire FO program. For (i), the Punjab Government’s view is that this should follow a uniform legislation for FOs for all canal circles under the PIDA. Creating a separate legal framework in the project command area will result in non-uniformity among the canal circles and will cause serious problems in the implementation of institutional reforms in the process. The Punjab Government believes that the sustainability of the irrigation system will be compromised. For (ii), PIDA revised rule 2010 allows existing PID field offices to assist FOs in operational management during a transitional period until the FOs achieve sufficient capacity. For (iii) and (iv), PID is in

⁶ Under a major multi-donor institutional reforms program, the Punjab Irrigation and Drainage Authority (PIDA) was created at the provincial level, AWB at the canal command level, FOs at the distributary level and water user associations at water course level. The elections of AWB farmer members were completed on 29 February 2012.

the process of hiring experts to conduct the audit, external monitoring and evaluation of the entire FO program.⁷ The PID will submit the report in the second half of 2016 and based on overall findings, request ADB to consider a waiver to the requirement that FOs be operationally independent of the PIDA. Meanwhile, the PIDA continues carrying out internal monitoring of the AWB and FOs. The status of covenant compliance is in Supplementary Appendix A.

10. MFF Status: Due to limited time and financing, except for the proposed PFR, no future tranche is planned. The MFF utilization period ends on 30 September 2017, and it is anticipated that the balance of \$137 million will remain unutilized. Under the investment program, Tranche 1 prepared a detailed design of the Trimmu and Punjab Barrages Improvement Project (\$150 million), the Pakpattan Distribution System (\$110 million), and Thal Canal Remodelling (\$330 million). ADB approved the Trimmu and Punjab Barrages Improvement as a standalone project on 22 September 2014. The government is continuing with the policy direction agreed in CPS, 2015-19 to improve agricultural productivity, irrigation, water resources infrastructure and management, service delivery and to support reforms.

Table 1: MFF Utilization
(\$ million)

Tranche	Approval	Loan Amount in 2015 ^a
Tranche 1	December 2006	217.4
Tranche 2	December 2011	245.9
Tranche 3	December 2012	73.0
Tranche 4 (Additional Financing for Project 1)	November 2015 ^b	26.6
MFF Balance Amount		137.1
Total		700.0

^a Net loan amount as of 15 November 2015.

^b Submission for Management consideration.

11. Major Challenges and the Lessons Learned. Tranche 1 faced multiple challenges, including significant delays in design and procurement, variance in estimated and final design of civil works, currency fluctuations, loan surplus and cost overruns. The backlog of slow progress led to two loan extensions for a cumulative period of three years.⁸ The PID improved procurement efficiency in subsequent tranches through better project readiness, advanced engineering design and packaging. The decentralized farmers' management structure is facing operational challenges, while its performance is not yet fully established, audited and evaluated. Good practices from better performing AWBs and FOs serve as a benchmark for improvement.

III. PERIODIC FINANCING REQUEST

12. The Tranche 1 total investment plan at approval in 2006 was \$281.4 million, made up of \$271.1 million for LBDCIP and \$10.3 million for PIAPPF. Of this, the ADB loan amount for LBDCIP was ¥25,637,827,000 (equivalent to \$217.8 million at the time). This increased to nearly \$315 million by 2011 due to appreciation in Yen. As a result and upon the government's request, ¥4,363,350,000 surplus loan proceeds were cancelled from LBDCIP, reducing the loan amount to an equivalent of \$258 million.⁹ Since 2013 and by September 2015, the loan amount in USD equivalent reduced further by about \$50 million, due to loan currency depreciation. The

⁷ First tenure of FOs in project command area was 2012-2015.

⁸ Loan was extended in 2011 for two years from 30 September 2013 to 30 September 2015 and then in 2015, for further one year to the current closing in 30 September 2016.

⁹ During the Midterm Review in 2011, it was observed that the original loan amount of \$217.8 million, increased by nearly \$100 million equivalent due to the US\$-¥ parity. Considering the increased amount, loan saving or surplus was identified in the review mission and subsequently upon government's request, cancelled on 13 June 2011.

current loan amount is insufficient to complete the project. On 20 July 2015, the government converted unwithdrawn loan currency from Yen to Dollar to manage currency fluctuations. The government has also requested additional financing to (i) meet cost overruns primarily in civil works as explained below, and (ii) offset the reduction of the loan amount. Through the PFR, ADB OCR lending will increase from \$208.4 million to \$235 million and overall ADB financing to \$245 million.¹⁰ The government's PFR is in Appendix 1. This is included in the COBP, 2015-17 for approval in 2015.

13. At approval, the planned project investment was based on feasibility level design. During implementation, the detailed engineering surveys, studies and designs finalized more than 2,450 km of the main canal and distribution system.¹¹ The design of Balloki Barrage and spillway was concluded after model studies.¹² The procurement of major civil works was completed during 2011-2013, more than five years after the project's approval. Bids exceeded the engineer's estimates by more than 25%. Underestimated initial cost, delayed procurement, price escalation and high bid prices increased the base cost.

14. Additional financing is a more suitable response than restructuring, scaling down, and/or canceling the project. The project meets the additional financing eligibility criteria described in ADB's Operations Manual Section (OM) H5/BP and H5/OP, and the requirements in OM Section D14 as follows:

- (i) the project remains technically feasible, economically viable, and financially sound;
- (ii) the project is a government priority, consistent with CPS, 2015-2019 and included in COBP, 2015-2017. Sufficient MFF surplus is available;
- (iii) the project outcome remains unchanged;
- (iv) the project is at an advanced stage of readiness;
- (v) the project is scheduled for completion by 31 December 2016, within three months of the current date of the original loan of 30 September 2016;
- (vi) risk mitigation measures are in place, especially to improve implementation performance;
- (vii) the benefits of the completed main canal will not be fully utilized in the absence of a rehabilitated distribution system; and
- (viii) if not implemented in full, the project would not fully meet development objectives;

A. Impact and Outcome

15. The additional finance will not change the impact and outcome of the project but will reflect a change in the target achievement period.¹³ The project impact will be increased agricultural production and farm income in the Lower Bari Doab Canal (LBDC) command area. The outcome will be sustainably improved delivery of water services and management in the command area.

¹⁰ The current amount for LBDCIP is taken as \$208.4 million (varied from \$209.4 million in April 2015 to \$207.4 million in September 2015).

¹¹ The LBDC system is served by a total length of 2,525 km, comprising a 201-km main canal, 54-km branch canals, 1,099-km distributary channels, 1,162 minors and sub-minors and 9-km escape channels.

¹² The flood capacity at Balloki Barrage was finalized at 10,700 m³/s, increased from the existing 6,400 m³/s.

¹³ Project funded by the original loans under Tranche 1 and additional financing.

B. Outputs

16. The additional finance will not change the result chain of outputs. The project outputs will be (i) an operationalized groundwater management plan and conjunctive use strategy for LBDC, (ii) established 1 AWBs and 52 FOs and more than 3,000 water-user associations, taking over the responsibility for operations of the canal system, (iii) rehabilitated 2,450-km LBDC and distribution canals in the LBDC command area, and increased Balloki Barrage's safe flood capacity from 6,400 m³/s to 10,700 m³/s, based on findings of the detailed design and model studies, (iv) improved use of on-farm water management practices by farmers through 40 demonstration plots, and (v) completed due diligence and approved subsequent tranches under MFF. The details are in the design and monitoring framework (Appendix 1).

C. Investment and Financing Plans

17. The tranche is estimated to cost \$30 million. This includes the base cost, contingencies, taxes and duties and, financing charges during implementation (Table 2). The detailed cost estimates by expenditure category and by financier are given in the project administration manual (PAM) at Appendix 5.

Table 2: Investment Plan
(\$ million)

Item	Original Amount ^a	Amount			Total ^f
		Net Amount in 2015 ^b	Additional Financing ^c	Total ^f	
A. Base Cost of the LBDCIP					
1. R&U of the Balloki Barrage Complex	21.9	26.0		26.0	
2. R&U of the LBDC Distribution Network	146.9	187.6	28.0	215.5	
3. Groundwater Management	2.6	1.6		1.6	
4. OFWM and Agriculture	6.5	1.9		1.9	
5. Institutional Strengthening and Operation Modernization	10.9	1.6		1.6	
6. Project Management	9.5	6.3	0.3	6.7	
Sub-Total (A)	198.3	225.0	28.3	253.3	
B. Base Cost of the PIAPPF					
Sub-Total (B)	9.4	9.4	-	9.4	
C. Contingencies for the LBDCIP and PIAPPF ^d					
D. Financing Charges During Implementation ^e	61.0	0.7	1.3	1.9	
Total (A+B+C+D)	281.4	248.8	30.0	278.8	

LBDC = Lower Bari Doab Canal, LBDCIP = Lower Bari Doab Canal Improvement Project, OFWM = On-Farm Water Management, PIAPPF= Punjab Irrigated Agriculture Project Preparation Facility, R&U = rehabilitation and upgrade.

^a The original amount refers to the amount approved in 2006. This includes \$15.5 million in taxes and duties.

^b The net amount refers to the amount after cancellation, exchange rate fluctuations, expenditures incurred, contingencies utilized and expected expenditures estimated in 2015 (mid-2015 prices).

^c Includes taxes and duties of \$2.63 million to be financed from government resources.

^d Physical contingencies for additional financing are estimated as 3% of the base cost and in case of price contingencies, 1.7% per annum for the sum of the base cost and physical contingencies.

^e Includes interest and commitment charges. Commitment charges for an ADB loan are 0.15% per year to be charged on the undisbursed loan amount.

^f This amount is required for completion of Project 1.

Sources: Government of Pakistan. 2015. *Punjab Irrigated Agriculture Investment Project 1*; ADB estimates.

18. The government has requested a loan of \$26.57 million from ADB's ordinary capital resources to provide additional financing for Project 1, in particular to meet a shortfall in allocated funds for civil works and consulting services in LBDCIP. The loan will have a 20-year term, including a grace period of 5 years, repayment by custom-tailored method, an annual

interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, the interest and other charges during construction to be capitalized in the loan, and other terms and conditions set forth in the draft legal agreements.¹⁴ Based on this, the average loan maturity is 13 years and there is no maturity premium. The financing plan is in Table 3.

**Table 3: Financing Plan
(\$ million)**

	Original ^a		Net Amount ^b		Additional Financing		Total	
	Amount	Share of Total (%)	Amount	Share of Total (%)	Amount	Share of Total (%)	Amount	Share of Total (%)
ADB's Ordinary Capital Resources	217.8	77.4	208.4	83.7	26.6	88.7	235.0	84.3
ADB's Special Funds Resources	10.0	3.6	10.0	4.0			10.0	3.6
Government	53.6	19.0	30.4	12.2	3.4	11.3	33.8	12.1
Total	281.4	100.0	248.8	100.0	30.0	100.0	278.8	100.0

^a The original amount refers to the amount approved in 2006.

^b The net amount refers to the amount after cancellation, exchange rate fluctuations, expenditures incurred, contingencies utilized and expected expenditures estimated in 2015.

Sources: Government of Pakistan. 2015. *Punjab Irrigated Agriculture Investment Project 1*; ADB estimates.

19. The FFA requires each tranche under the MFF to be an amount not less than \$50 million, however the additional financing in the amount of \$26.57 million, will be the last tranche under the MFF. The Government has confirmed that, after the additional financing, no further amounts will be requested under the MFF.

D. Implementation Arrangements

20. The implementation arrangements for the components financed through additional financing will remain the same as in the original project. They are summarized in Table 3 and described in detail in the PAM. The PID continues to remain the executing agency (EA), with the Project Management Unit (PMU) responsible for implementation. The PID and PMU project delivery performance has been satisfactory and staff have adequate technical skills and understanding of ADB's procedures to manage the project. Consultants handling construction supervision and project-management support will continue until project completion. The eligible expenses for project management are described in Section V, Part B of the PAM. The updated procurement plan is in Section VI, Part C of the PAM. All project procurements are complete. The scope under additional financing is expected to be completed by 31 December 2016 and the loan account will be closed by 30 June 2017 (6 months after completion). Retroactive financing of up to \$0.75 million is requested for consulting services associated with the contract for Khanewal District (ICB-06A).¹⁵ This will finance the consulting services for construction supervision during implementation of ICB-06A until the additional financing is effective.

¹⁴ The legal agreements include (i) the loan agreement for the proposed tranche (Appendix 2), and (ii) the project agreement for tranche 1, as amended by the amendment letter (Appendix 3).

¹⁵ The PID awarded the civil works contract ICB-06A and is financing it through own resources until the effectiveness of additional financing. Until then, PID will bear the cost of consultancy services associated with the supervision of ICB-06A, which will be retroactively financed through additional financing.

Table 4: Implementation Arrangements

Aspects	Arrangements
Implementation period	December 2015-December 2016
Estimated completion date	31 December 2016 (loan closing date: 30 June 2017)
Management	
(i) Oversight body	The Project Steering Committee comprises Chairman Planning and Development Board, Punjab (chair) and secretaries of Finance, Irrigation, Agriculture and Environment Departments and, Member Engineering Planning and Development Department
(ii) Executing agency	Punjab Irrigation Department
(iii) Key implementing agencies	Punjab Irrigation Department
(iv) Implementation unit	Project Management Unit in Lahore with six key staff. Three Project sub-offices in Khanewal, Okara and Shaiwal with 9 key staff
Procurement	Not applicable. All contracts for works/goods have been awarded
Consulting services	Not applicable. All consulting services contracts have been awarded
Retroactive financing and/or advance contracting	Retroactive financing for construction supervision consulting services of up to \$0.75 million, which does not exceed an amount equivalent to 20% of the individual loan
Disbursement	The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2015, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.

E. Project Readiness

21. The civil works contracts are ongoing under the supervision of the consultants and PMU. No new procurement is required. Implementation of the LARPs and Site Specific Environmental Management Plans (SSEMP) are either complete or ongoing. The government has given assurances that additional financing will not require revision in the PC-1.¹⁶ As such, there are no anticipated problems in start-up compliance, including signing and effectiveness.

F. Advance Contracting and Retroactive Financing

22. The government has awarded civil works contract ICB-06A and has agreed, as its contribution to the project, to bear all expenses incurred before the effectiveness of additional financing. The government also requested retroactive financing of consulting services amounting to up to \$0.75 million, which does not exceed an amount equivalent to 20% of the individual loan. The PID and the Government of Punjab were informed that the agreement on advance actions does not commit ADB to provide financing through the MFF.

IV. DUE DILIGENCE

23. The PID submitted the project documents, including the detailed cost estimates and financing plan, resettlement completion and external monitoring reports of tranche 1, a summary of social safeguards on tranches 2 and 3, and bi-annual environmental monitoring reports of all tranches. The project team reviewed and found the submissions complete for consideration of the additional financing.

¹⁶ PC-1 stands for the Planning Commission Proforma 1. It is used for the government's approval or revision of projects. The original PC-1 for the project was approved in 2007 and updated in 2011, to accommodate the expected increase in cost due to delays in procurement.

A. Technical

24. All civil works are awarded. Five of 10 contracts have been completed. The risks of further delays in construction are mitigated by corrective measures through increased contractor resources and by undertaking parallel construction activities at various sections of the distribution system. As per construction schedules, the works will be completed by the end of the proposed implementation period in 2016 and within the revised cost. The EA will resume the training of new FOs after the elections and conduct the external performance evaluation and financial audit of previous ones. The reports will be provided to ADB in the second half of 2016. The EA established a Monitoring and Evaluation Cell in PIDA for FOs and AWB internal performance evaluation. In place of Irrigation Management Units proposed under the project, PID field staff are providing services to FOs and AWB for O&M and engineering guidance.

B. Economic and Financial

25. The updated economic analysis shows that the project is economically feasible, with a benefit-cost ratio of 1.2 and 6.6 for the LBDC system and Balloki Barrage, respectively, and 3.9 for the overall project. The corresponding mean Economic Internal Rate of Return is 21.3% and Economic Net Present Value is PRs8,154 million (mean value of PRs4,077 million).

26. The financial sustainability was assessed. The total project O&M cost is estimated at PRs286 million—PRs253million for LBDC system and PRs33 million for Balloki Barrage. The O&M of the barrage and main canal is financed through government budgetary allocations and is implemented by PID. Historically, adequate budgetary allocations were provided for operations of the canal network and delivery of water. The institutional reforms, central to distributary and minor O&M, are taking longer to deliver. The water charges collection in AWBs ranges from 27% to 93%. LBDC AWB recovered 47% (PRs304 million) in three fiscal years. The O&M requirements can be fully met with improved irrigation service fee recovery and with the government providing adequate funds. The project provides upgraded infrastructure and reduces the O&M expenditure.

C. Governance

27. ADB notes that Punjab has a well-defined budgeting process in the Annual Development Program. It has acceptable accounting standards for formulating and reporting the budget, and for recording the current and development expenditures and revenues. This was confirmed by Punjab's Public Financial Management Assessment conducted jointly by ADB, the World Bank and other institutions. The assessment noted that the Government of Pakistan's established budgetary, accounting, financial reporting and auditing systems and procedures are functioning effectively. The various risks and mitigation measures are included in the detailed assessment, while key risks are set out in the risk assessment and management plan. On the whole, the pre-mitigation financial management risk levels are assessed to be moderate. Issues relating to the quality of financial reporting and auditing will be addressed under an on-going Regional Technical Assistance Project.

28. The existing project performance management system will continue to function until completion, and the project website will be upgraded for additional financing information disclosure. ADB's Anticorruption Policy (1998, as amended to date) was discussed with the government and the PID. The specific policy requirements and supplementary measures are described in the PAM (Appendix 5).

D. Poverty, Social and Gender Dimensions

29. **Poverty Reduction.** Two-thirds of Pakistan's population lives in rural areas, where poverty and vulnerability are high. Punjab's irrigation system supplies water to 8.4 million ha, representing a major livelihood source for more than 40 million people. Land ownership in the project area is skewed, with about 10% of farm families holding more than 40% of the farm area in the medium to large farm category (farm size above 5 ha). The average landholding is 12.4 ha. However, the vast majority are smaller farms below 5 ha, amounting to about 58% of the area, with farms owned by about 295,000 families in the canal command area (nearly 2 million people). The average landholding within this group is 1.5 ha. In the districts in LBDC command area, about 24% of the farm area is occupied by farms that are less than 2 ha. However, because of the skewed land tenure, this area supports 64% of the farms and farm families, or 1.4 million people. The average landholding for this group of farmers is 0.8 ha. The project supports farmers with limited income from small landholding and subsistence farming.

30. **Social and Gender Dimensions.** In the project, specific gender issues were identified. Women's work was relegated to mostly household and childcare (98%), social obligations (80%), livestock rearing (32%) and farm and crop activities (18%). While many women work on the farms, their contribution is not counted. This explains the low participation rate of women in farm and crop activities. Through a number of consultations with local women, the project was able to identify and address women's concerns, including the safety of women and children in and around the construction sites, and the employment of male members of their households in construction activities. The project also led to the formation of 11 Rural Women's Groups in three districts. More than 1,000 women received training in vegetable growing, seed grading (wheat), clean cotton picking, livestock management, and storage of agriculture produce. The project will ensure continued compliance with the gender conditions of contracts. The additional financing is re-categorized to "No Gender Elements" from the original "Some Gender Elements".

E. Safeguards

31. **Social and Environmental Safeguards:** The additional financing covers cost overruns within the existing project scale and scope, and no new impacts are anticipated. The project is classified category C for environment, involuntary resettlement, and indigenous people safeguards.¹⁷ In Tranche 1, all nine resettlement plans (RPs) were updated, approved and disclosed, of which six are completed while the rest are at various stages of implementation. The implementation of RPs is validated through external monitoring. PMU is providing ADB with monitoring reports confirming the implementation of RPs. The PID will strengthen the environment and social safeguards unit by hiring a dedicated unit head. The SSEMPs were prepared for all sub-projects under implementation. There are no outstanding corrective actions on site and the PMU conducts monthly missions to ensure compliance. In case of non-compliance, corrective action plans are prepared and implemented. Reporting is carried out through biannual environmental monitoring reports that are submitted to ADB and disclosed.

32. **Climate Change.** The region has experienced major flood events in the recent past, and may face future water stress due to extreme or high seasonal temperatures coinciding with relatively low rainfall. The project design provides for meeting future water requirements through an upgraded main canal delivering its maximum flow allocation, improved conveyance efficiency, supplemented conjunctive use of water and recharged water table. The groundwater recharge

¹⁷ ADB. *Operations Manual, Section 7, OM Section F1/OP (1 October 2013)*. Manila.

and its quality improvement are essential for mitigating future water stress. The improved barrage will prevent failure and decrease floods risks.

F. Risks and Mitigating Measures

33. Major risks and mitigating measures are described in Table 5 and in detail in the risk assessment and risk management plan.¹⁸ The integrated benefits and impacts of the project are expected to outweigh the costs.

Table 5: Risks and Mitigating Measures

Risks	Mitigating Measures
Extreme and frequent flood event	The upgraded Balloki Barrage with new spillway provides increased and safer passage of floods
Reduced water availability caused by climate change or energy-driven reservoir releases	The project provides additional and improved water supplies in the command area, recharges groundwater and augments conjunctive use. Other parallel investments of water-efficient farm technologies in the area and augmentation of water from the Mangla reservoir during low flows will minimize the climate-induced reduction in water flows or shortages
Internal audit unit is non-operational	The PMU will liaise with the line department and Project Management Office (implementing tranche 2 and 3 of the MFF) to operationalize an internal audit unit. ADB will follow up to ensure that the unit is in place within the year.
The EAs and IAs lack sufficient systems to integrity violations during implementation	The National Accountability Bureau and Punjab's anticorruption establishment handle corruption cases. A proactive judiciary, Transparency International, vibrant media, and active civil society act as watchdogs. At the project level, the project steering committee will monitor and report implementation.

G. Risk Categorization

34. The tranche is low risk as, (i) the loan amount does not exceed \$200 million; (ii) the safeguard categorization is C; (iii) there are no risks of institutional arrangements since ADB has more than 30 years of experience of working in the sector in Pakistan; and (iv) the PID has implemented several irrigation and barrage projects with ADB, the World Bank, JICA and other donors as an executing agency.

V. ASSURANCES

35. The government and the PID have assured ADB that implementation of the project will conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents. The government and the PID have agreed with ADB on certain covenants for the project. These are set forth in the legal agreements (see footnote 14).

VI. RECOMMENDATION

36. On the basis of the approval by ADB's Board of Directors for the provision of loans under the multitranche financing facility in an aggregate principal amount not exceeding \$700,000,000 to the Islamic Republic of Pakistan for the Punjab Irrigated Agriculture Investment Program, it is recommended that the President approve the proposed tranche as described in paragraphs 18 and 19 and such other terms and conditions as are substantially in accordance with those set forth in the draft legal agreements for the proposed tranche (see footnote 14).

¹⁸ Updated Risk Assessment and Risk Management Plan (Appendix 9).

**DESIGN AND MONITORING FRAMEWORK FOR TRANCHE 4
(ADDITIONAL FINANCING FOR PROJECT 1)**

Impact the Project is aligned with:

Current Project

Increased agricultural production and farm income in Lower Bari Doab Canal command area.

Overall project

The target achievement year is changed from 2017 to 2021.

Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome LBDC command area receives a sustainably improved delivery of water services and management	<p>Current project All 3,500 outlets receive design water supply throughout the year by 2015. Design discharges diverted to the distributary and minor canals throughout the year by 2015</p> <p>Overall project All 3,500 outlets receive design water supply throughout the year by 2016. Design discharges diverted to the distributary and minor canals throughout the year by 2016</p>	PPMS PID Directorate of flow regulation data in tail reaches	<p>Risks Reduced water availability for Punjab irrigated agriculture impacted by climate change effect or energy driven reservoirs releases.</p>
Outputs Output 1. Current Project A groundwater management plan and conjunctive use strategy for LBDC is operational Overall project Unchanged	1a. <p>Current project Groundwater data base in use by PID by 2015 Overall project Unchanged</p> 1b. <p>Current project Groundwater model in use by PID by 2015 Overall project Unchanged</p> 1c. <p>Current project By 2015 PID uses guidelines for groundwater use Overall project Unchanged </p>	1a. Project quarterly reports and PID's Directorate for Groundwater Management data 1b-c. Project quarterly reports and PPMS	

<p>Output 2.</p> <p>Current project Area Water Board (AWB) and Farmers Organizations (FOs) take responsibility for operations of canal systems</p> <p>Overall project Unchanged</p>	<p>2a.</p> <p>Current project One AWB, 50 FOs and more than 3,000 <i>Khal Punchayats</i> established by 2015</p> <p>Overall project One AWB, 52 FOs and more than 3,000 Khal Punchayats established by 2015^a</p> <p>2b.</p> <p>Current project All the FOs trained in operation and maintenance of distributary and minor canals by 2015</p> <p>Overall project All the FOs trained in operation and maintenance of distributary and minor canals by 2016</p> <p>2c.</p> <p>Current project All the FOs measure outlet discharges by 2015</p> <p>Overall project Unchanged</p>	<p>2a-b.</p> <p>Project quarterly reports and PPMS</p> <p>2c.</p> <p>FO discharge database</p>	
<p>Output 3.</p> <p>Current project Balloki Barrage rehabilitated on time and within budget</p> <p>Overall project Balloki Barrage rehabilitated on revised time schedule and within budget based on the detail design and model studies</p>	<p>3a.</p> <p>Current project Barrage reliably diverts up to a sanction discharge of 278 m³s⁻¹ to LBDC by 2015</p> <p>Overall project Barrage reliably diverts up to a sanction discharge of 278 m³s⁻¹ to LBDC by 2016</p> <p>3b.</p> <p>Current project Barrage's safe flood capacity increased from 6,400 m³s⁻¹ in 2009 to 7,000 m³s⁻¹ in 2015</p> <p>Overall project Barrage's safe flood capacity increased from 6,400 m³s⁻¹ in 2009 to 10,700 m³s⁻¹ in 2016^a</p>	<p>3a-b</p> <p>PID Directorate of flow regulation data</p>	<p>Risks Project is unable to employ quality foreign consultants and contractors due to security issues.</p> <p>Weak implementation of civil works, contract and construction management will further cause delays in project.</p>

Output 4	4a. Current project Due diligence of subsequent tranches Overall project Unchanged	4a. Current project 7 subprojects prepared Overall project Unchanged	Project quarterly reports
Output 5	5a. Current project Farmers use improved on-farm water management practices Overall project Unchanged	5a. Current project 40 demonstration plots established on 200 ha by 2015 Overall project Unchanged	Project quarterly reports and PPMS
Output 6	6a. Current project The LBDC and distribution system rehabilitated on time and within budget Overall project The LBDC and distribution system rehabilitated on revised time schedule and within budget based on detail design	6a-b. Current project 1,700 km main and distributary canals and 3,000 appurtenant structures rehabilitated by 2015 Overall project 2,450 km main and distributary canals and 3,500 appurtenant structures rehabilitated by 2016 ^a 6b. Current project The cost remains within contingencies Overall project The cost remains within the original and additional financing	Risks Project is unable to employ quality foreign consultants and contractors due to security issues. Weak implementation of civil works, contract and construction management will further cause delays in project.

Key Activities with Milestones																													
<p>1. A groundwater management plan and conjunctive use strategy for LBDC is operational</p> <p>1.1. Recruit consultants by 28 December 2010 (completed). 1.2. Establish database by 28 February 2013 (completed). 1.3. Develop and validate groundwater model by 31 March 2013 (completed). 1.4. Simulate groundwater changes for different scenarios by 31 March 2013 (completed). 1.5. Compile results, trained staff and transfer model to PID by 7 March 2013 (completed). 1.6. Develop groundwater management strategy by 10 March 2013 (completed). 1.7. PID develops and implements GW management plan by 31 December 2015.</p>																													
<p>2. Area Water Board (AWB) and Farmers Organizations (FOs) take responsibility for operations of canal systems</p> <p>2.1. Establish <i>Khal Panchayats</i> and FOs by 31 December 2013 (completed). 2.2. Adopt rules & regulations for decentralized management system by 30 June 2012 (completed). 2.3. FOs participates in rehabilitation of distributaries and minor canals by 1 March 2012 (completed). 2.4. Every FO establishes a minimum of one pilot demonstration plot by 31 December 2012 (completed). 2.5. All FOs are trained and measure out discharges and establish the discharge database by 31 December 2016 (changed). 2.6. AWB maintain discharges database of LBDC system by 31 December 2016 (changed).</p>																													
<p>3. Balloki Barrage rehabilitated on time and within budget</p> <p>3.1. Establish and staff PMO/PIO by 30 June 2008 (completed). 3.2. Recruit design and supervision consultants by 19 September 2008 (completed). 3.3. Complete design and prepare tender documents by 31 October 2010 (completed). 3.4. Carryout prequalification, evaluate bids and award contract by 15 June 2011 (completed). 3.5. Resettlement plan preparation and implementation by 30 June 2016 (changed). 3.6. Implement environmental management plan by 30 September 2016 (changed). 3.7. Complete construction by 30 April 2016 (changed).</p>																													
<p>4. Due diligence of subsequent tranches</p> <p>4.1. Recruitment of Consultants by 22 April 2009 (completed). 4.2. Preparation of subprojects and support for due diligence by 30 September 2016 (changed).</p>																													
<p>5. Farmers use improved on-farm water management practices</p> <p>5.1. Recruit consultants by 28 December 2010 (completed). 5.2. Identify pilot demonstration areas with FOs by 30 June 2012 (completed). 5.3. Develop pilot demonstration areas with FOs 30 September 2012 (completed). 5.4. Operate field programs by 31 December 2012 (completed).</p>																													
<p>6. The LBDC and distribution system rehabilitated on time and within budget.</p> <p>6.1. Complete design and prepare tender documents by 31 December 2011 (completed). 6.2. Carryout prequalification, evaluate bids and award contract by 23 June 2015 (completed). 6.3. Resettlement plan preparation and implementation 30 September 2016 (changed). 6.4. Implement environmental management plan by 30 September 2016 (changed). 6.5. Complete construction by 31 December 2016 (changed).</p>																													
Inputs																													
<table border="1"> <thead> <tr> <th colspan="3">ADB</th> </tr> <tr> <th>Total</th><th>OCR</th><th>ADF</th></tr> </thead> <tbody> <tr> <td>\$ 218.4 million (current)</td><td>\$208.4 million</td><td>\$10 million</td></tr> <tr> <td>\$ 26.6 million (additional)</td><td>\$26.6 million</td><td></td></tr> <tr> <td>\$ 245.0 million (overall)</td><td>\$235 million</td><td>\$10 million</td></tr> <tr> <th colspan="3">Government</th></tr> <tr> <td>\$ 30.4 million (current)</td><td></td><td></td></tr> <tr> <td>\$ 3.4 million (additional)</td><td></td><td></td></tr> <tr> <td>\$ 33.8 million (overall)</td><td></td><td></td></tr> </tbody> </table>			ADB			Total	OCR	ADF	\$ 218.4 million (current)	\$208.4 million	\$10 million	\$ 26.6 million (additional)	\$26.6 million		\$ 245.0 million (overall)	\$235 million	\$10 million	Government			\$ 30.4 million (current)			\$ 3.4 million (additional)			\$ 33.8 million (overall)		
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Assumptions for Partner Financing

Not applicable

ADB = Asian Development Bank; ADF = Asian Development Fund; AWB = Area Water Board; FOs = Farmers Organizations; GW= groundwater; ha=hectares; LBDC= Lower Bari Doab Canal; OCR = Ordinary Capital Resources; PPMS = Project Performance Monitoring System; PID = Punjab Irrigation Department; PIO= Project Implementation Office; PMO= Project Management Office

^aThe statement of overall project is revised to reflect the updated output indicator of the current project.

Notes:

1. "Current Amount" refers to the amount in US\$ net of cancellation and incurred or expected expenditures.
2. "Additional Financing" refers to the additional amount required for completion of the project
3. "Overall project" refers to the original project including additional financing
4. *Khal Panchayats* are water user associations

Source: Asian Development Bank

LOAN AGREEMENT

(Available as a separate volume)

PROJECT AGREEMENT

(Available as a separate volume)

PERIODIC FINANCING REQUEST FOR ADDITIONAL FINANCING FOR PROJECT 1
(provided separately)

PROJECT ADMINISTRATION MANUAL FOR TRANCHE 4

(Available as a separate volume)

UPDATED CONTRIBUTION TO THE ADB RESULTS FRAMEWORK

No.	Results Framework Indicator	Targets	Method Used
1	Land improved through irrigation services, drainage and/or flood management (hectares)	1.95 million	Rehabilitated and upgraded Lower Bari Doab Canal Irrigation System will improve land area of 700,000 hectares. The rehabilitated and upgraded Balloki Barrage will improve land area of 1,250,000 hectares (in addition to above) through flood management comprising area; (i) adjacent to the right bank of Balloki Barrage; and (ii) irrigated through Balloki Sulemanki Link Canal.

ECONOMIC AND FINANCIAL ASSESSMENTS FOR PROJECT 1

A. Introduction

1. The economic and financial analysis of the project was undertaken according to Asian Development Bank (ADB) guidelines and describes the rationale for project investment. The project is facing cost overrun which is met through additional financing. The revised analysis quantifies the benefits and costs of the investment for rehabilitation and upgrading the Lower Bari Doab Canal Irrigation System (LBDCIS) and Balloki Barrage (Barrage) in economic terms and measures the net worth of the project to the country.¹ The analysis confirms that the overall project investment remains economically viable with cost overrun and implementation delays. The project ensures farmers' benefits, increased production and reduced flood risks.
2. The approach at approval of project in 2006, characterized continued degradation of the LBDCIS, reduction in canal water, limiting groundwater recharge, declining water table, increased pumping and loss of access to water in tail and saline-affected areas. In the last 10 years since project approval and with implementation ongoing, the agriculture production increased as more groundwater was mined for meeting shortages in canal supplies, primarily due to progressive farming in the area, increasing population and farms fragmentation. The updated analysis takes the same approach and factors in the changed situation.
3. In line with previous analysis, two scenarios are considered: without and with-project for the LBDCIS and Barrage. Without project, LBDCIS supplies no additional water, hence no increase in agriculture production attributable to the river source. With project, river water availability increases agriculture production and decreases pumping cost. Similarly, without project, Barrage failure and frequent flooding occurs, inflicting damages and losses. With project conditions assume elimination of these losses, the primary benefit being continuation of current crop areas and yields without disruption. The benefits in case of Barrage are dependent upon the year of its failure, which is unknown. The analysis takes probability of various failure scenarios for the quantification of benefits.

B. Macroeconomic Assessment

4. In Pakistan, during fiscal year (FY) 2010-2014, the average annual growth rate was 3.6% compared with 5.1% in 2005-2009 and 6.3% in 2005-2008. In 2014, agriculture accounted for 21% of GDP (gross domestic product) and 44% of employment. Agriculture plays an important role in Pakistan's transformation towards industrialization, supplies raw materials to industries such as textiles and food processing, and is among the biggest purchasers of industrial products. Agriculture also accounts for the majority of Pakistan's exports in the form of semi-processed and agro-based products, and is one of the main sources of foreign exchange earnings. In Punjab, irrigated agriculture (8.4 million hectares) accounts for 28% of Punjab's GDP, employs more than 40% of the labor force and produces 90% of Punjab's agricultural outputs. Continued investment is critical for generating higher incomes and attaining Punjab's targeted growth rate of 8% by 2018.²

¹ The Economic and Financial Analysis for the original project was undertaken in 2006. The analysis was revised with updated data and information based on 2015 prices.

² Accelerating Economic Growth and Improving Social Outcomes. *Punjab Growth Strategy*. 2018.

C. Demand Analysis

5. The LBDCIS is a conjunctive use farming system. The annual crop water use is estimated as 6,400 million cubic meters (MCM) in the command area. Of the annual canal water supplies of 4,500 MCM, about half is available for crop use in view of irrigation efficiencies. Most of the canal water lost in conveyance and application losses became seepage to the ground. Nearly 60% of crop water requirements are met by groundwater extraction. Overall, the current rate of groundwater use is not sustainable as water table levels have declined in 84% of the area and quality of ground water is deteriorating. About 20% command area has water classified as hazardous for irrigation purposes. There is no restriction from government on groundwater usage.

6. The LBDC (Lower Bari Doab Canal) was remodeled in 1966-72 for a discharge of 244 cubic meters per second (m^3/s). In 1984, the sanctioned flow was increased to 279 m^3/s however due to insufficient capacity of the canals and structures, the maximum operational discharge remained at 244 m^3/s . During the five-year period (2006-2010), the flows into LBDC were on average 16% less than design flows during *Kharif* and 38% less during *Rabi*.³ The Barrage diverts water to LBDC and the Balloki Sulemanki Link Canal to irrigate 1.9 million hectares (ha). The century old Barrage suffers with safety and performance issues. It passed the maximum flood in 1988 exceeding its capacity by more than 70%. This and several other floods passed with the operation of breaching section, causing inundation and damages in the area.⁴

D. Rationale

7. To meet future water requirements sustainably, increase and maintain agricultural production and reduce flood risks, rehabilitation and upgrading of LBDCIS and Barrage is needed. The bulk of canal water supply, upgrade of large infrastructure and flood control is unlikely to be provided by the private sector, hence requiring the public sector investment. Through improved infrastructure, the project will support the newly created decentralized farmers management organizations and irrigation sector reforms in Punjab.

E. Project Alternatives

8. The alternatives for LBDCIS are two; provide additional canal water at the farm gate through the project or continue with existing flows. In the first alternative, the benefits of increased agricultural production outweigh the cost. In the second alternative, groundwater abstraction and depletion continues with more farming till marginal revenue exceeds the marginal cost of pumping. The project alternative upgrades the irrigation system and provides farmers with additional river water in increasing agriculture production further.

9. There are two alternatives for management of the Barrage: (i) immediate rehabilitation and (ii) rehabilitation deferred to some future year. With the first alternative, there are high initial investment costs but these are offset by the expected benefits from the protection of agricultural production following possible Barrage failure and elimination of potential flood losses. The second alternative will involve reduced investment costs with emergency repair costs required in

³ *Rabi* crops are sown in winter and harvested in late winter or during early summer, and *Kharif* crops are sown in summer and harvested in late summer or early winter.

⁴ Breaching section is an earthen dike which is breached to allow water to pass (as safety valve) so that the main barrage structure is not damaged in case of floods exceeding the safe capacity of the barrage.

the years following a possible Barrage failure, and associated agricultural losses due to reduced water supply in the canals while a barrage is under repair.

F. Methodology

10. **LBDCIS:** In the command area, wheat is grown at highest cropping intensity during *Rabi* followed by cotton in *Kharif*. High percentage of area is also under forages due to comparatively higher number of livestock heads per household and industrial units of livestock in the area. Other crops with high intensity are fodders, rice, maize and sugarcane. In part of the command area, Spring Maize-Rice-Potato or Spring Maize-Autumn Maize-Potato farming system results in a high cropping intensity. The increased agriculture production through the project is a function of increased crop areas and improved yields. Benefits to crops are anticipated to increase to their full potential within 5 years and to be realized after project completion while benefits of reduced pumping will remain for 30 years analysis period. Latest available data for crop and land is used and weighted averages were applied to the baseline and incremental production.

11. The analysis is based on the constrained flow scenario, based on historic trends as explained in para. 6. The increase in crop areas and yields is calculated from the increased LBDC supplies, available during *Kharif* period, and existing flows conveyance efficiency improvements throughout the year, totaling 556 MCM. Of this, 286 MCM will be available for crop use. The farmers take advantage in two ways; (i) increase the crop area where annual crop water requirement is met; and (ii) utilize balance water in increasing yields. Given the volume of additional water, timing of availability and cropping season, it is estimated that nearly 60% will fully meet annual crop water use, resulting in new crop area added. Rice, cotton and autumn maize will benefit the most utilizing 73, 40, and 31 MCM followed by wheat 13.8 MCM. Potatoes and *Kharif* fodder areas will be increased by utilizing about 4.5 MCM each. The application of balance water, 2% of the annual crop use, results in yield increase.

12. For calculating the reduction in pumping cost, the findings of a groundwater model were analyzed wherein the command area was divided in eight hydrologically similar units and application of annual increase was added to the stochastic data.^{5,6} The model quantifies savings in pumping cost for two reasons. The first cost saving is from additional canal water availability (substitute water) i.e. reduction in pumping equivalent of increased canal supply. The second pumping cost saving is from water table improvements attributed to recharge and pumping reduction. The economic analysis for the project does not consider first benefit of the model as farmers will continue improving agriculture production, using increased canal water and without reducing pumping. As the groundwater will improve through recharge, for simplification, the reduced pumping benefits of model were reduced to half and used in the economic analysis.

13. **Balloki Barrage:** Without the project, one flood event will occur during the 30-years period, damage the Barrage, affect its operating conditions and hydraulic stability and, result in reduction in canal supplies. The water shortage in the area is estimated at 30% in year 1, 20% in years 2 and 3, with full restoration achieved in year 4 through emergency repairs. Failure of the Barrage will affect the areas serviced by LBDC and Balloki Sulemanki Link. As the year of Barrage failure is not known, a cumulative probability distribution for the year of failure was

⁵ Flood flows are also added to the increase which could be additionally utilized beyond the sanctioned flows. The simulation of stochastically generated 50 year's flow series based on past observed LBDC withdrawals for post Tarbela period (1977-78 to 2010-11).

⁶ Spatial and Temporal Appraisal of Groundwater Depth and Quality in LBDC Command-Issues and Options. M. Basharat, *Pakistan Journal of Engineering and Applied Science*, www.uet.edu.pk. 2012

taken - year (5, 10, 15, 20, 25, 30) and cumulative probability of (5%, 15%, 70%, 85%, 95%, 100%). The effect of the failure is proportionately adjusted to the crop productivity.⁷ The cropping intensity without project is estimated to reduce from 152.7% to 140.4% during the first cropping year following the partial failure of the Barrage. With the emergency repairs and rehabilitations, the crop production would recover in 4 years after the failure.

14. The second benefit of Barrage rehabilitation and upgrade is minimizing incidence of floods. In the project, the Barrage is upgraded to increased flood capacity which is expected to reduce damage from operating breaching sections from future floods.⁸ The estimation is based on an inundated area of 8,868 ha from historic flooding. It includes damages to agriculture, livestock, housing, roads and other infrastructure. The avoided costs of these changes were calculated as part of Barrage benefits. Hence, the project benefit will be the elimination of the combined impacts of lost agricultural production, emergency Barrage repair costs and other direct and indirect losses.

G. Data

15. The analysis assumes project life at 30 years, although some infrastructure should yield benefits far longer than this. The opportunity cost of capital is taken as 12% for economic analysis. All costs and benefits are expressed in fiscal year (FY) 2015 constant prices.⁹ The exchange rate is taken as PRs.102.70 to a US Dollar in July 2015. The project capital cost comprises civil works including material and labor, equipment, services and land acquisition. The annual recurring cost and, operation and maintenance cost is spread equally over the period of 30 years.

16. For economic analysis project costs includes physical contingencies but exclude price contingencies. The analysis was undertaken at border price level in domestic currency. The analysis uses a world price numeraire. The financial costs were converted to economic costs by applying standard conversion factor (SCF) of 0.914 calculated as average for FY2009-FY2014 for Pakistan.¹⁰

17. The border prices of tradable commodities like wheat, rice, seed cotton and sugarcane have been computed on the basis of latest available prices. Local commodities for which Pakistan does not enter into international trade, wholesale prices prevailing in districts Okara, Sahiwal and Khanewal markets of Punjab during respective harvesting periods were collected and adjusted to the farm gate by deducting marketing costs between the farm and the market.

18. **Costs.** The base financial capital cost of the LBDCIS is PRs28,990 million and Barrage is PRs2,662 million. The cost of emergency repairs is PRs60 million. The annual recurring, operation and maintenance management cost (O&M) is estimated as PRs286 million.

⁷ It constitutes 68.2% *Kharif*, 78.3% *Rabi* and 6.2 perennial crops.

⁸ The floods estimates at project approval were updated.

⁹ The project was approved in 2006 and part of the cost was already incurred. For the purpose of analysis these costs were converted to 2015 prices using domestic and international inflation factors for respective years.

¹⁰ An average SCF for the 2009-10 to 2013-14 was calculated using the formula $SCF = (M+X) / [(M+T_m)+(X-T_x)]$ where M is CIF value of imports, X is FOB value of exports, T_m is net value of taxes on imports, T_x is net value of taxes on exports. The financial cost of components of civil works were converted to economic values using specific conversion factors for material (steel 0.88, cement 0.6), skilled (1.0), and unskilled (0.75) labor.

H. Results

19. **LBDCIS:** With increased canal supplies, there is substantial recovery in groundwater levels in the head, whereas in tail-end areas there is also little improvement, which gradually reduces to zero towards the extreme tail-end. The improvements in water level during the 30 years period will reduce the pumping cost from PRs77.8 billion to PRs63.7 billion, with a saving of PRs14 billion (PRs 468 million annually).

20. Major crops additionally grown are; wheat will increase by 1%, cotton by 2.9%, rice by 7.3%, potatoes by 2.8%, autumn maize by 11.9% and *Kharif* fodder by 1%. The balance water results in yield increase estimated as: wheat (2%), cotton (2.5%), rice (2%), fodders (1-3%), maize (1-2%) and potatoes (6%). As a result of LBDCIS system upgrade, the agriculture benefits are summarized in Table 1.

Table 1: Major Crop Area, Intensity, Yields, and Production With and Without Project

Item	Wheat	Cotton	Rice	<i>Kharif</i> Fodder	<i>Rabi</i> Fodders	Maize Autumn	Potatoes	Others	Total
CI (%)									
Without Project	57.5	31.8	17.4	14.4	11.8	9.2	7.2	18.9	168.2
With Project	58.1	32.8	18.6	14.5	11.9	10.3	7.4	19.0	172.5
CY (kg/ha)									
Without Project	3,320	2,250	3,446	13,644	33,113	6,425	20,991	Varies	-
With Project	3,386	2,306	3,515	13,780	34,107	6,489	22,251	Varies	-
CA (ha'000)									
Without Project	404.7	224.0	122.2	101	83.3	64.7	50.4	133.3	1,183
With Project	408.5	230.5	131.1	102	83.6	72.4	51.8	133.5	1,213
Change	3.8	6.5	8.9	1.0	0.3	7.7	1.4	0.2	30

CA=Cropped Area; CI=Cropping Intensity; CY=Crop Yield; ha'000= 1000 hectares; kg/ha=kilogram per hectares;

21. **Balloki Barrage:** In case of Barrage failure (averted due to project), the total reduction in cropped area is estimated as 0.25, 0.3 and 0.3 million hectares in the three years of water shortage in the area. With project, the gross margins loss of PRs61,934 million will be avoided. In case of operating breaching section to protect the Barrage, estimated damages are: 6,956 ha crops (PRs 939 million), livestock (PRs1,337 million), and houses (PRs1,408 million). The flood losses due to breach were converted to economic values, and applying these from 20-years to 100-years return period using a Gumbel distribution and calculating the returned average annual flood benefits.

22. **Economic Analysis:** The investment in LBDCIS and Barrage is economically viable, if taken separately or integrated in the project. The comprehensive and integrated approach of the project helps to achieve the overall benefits. The economic analysis shows that the project is economically feasible and generates benefits in excess of costs with a benefit-cost ratio of 1.2 and 6.6 for LBDCIS and Barrage respectively (mean 3.9); corresponding EIRR (Economic Internal Rate of Return) is 13.6% to 29.1% (mean 21.3%). The Economic Net Present Value is PRs2,131 million for LBDCIS and PRs6,023 million for Barrage (total PRs8,154 million and mean PRs4,077 million).

23. In case of Barrage, there is a significant variability surrounding the means with an EIRR standard deviation of 16.8% (implying a coefficient of variation of 0.58). The EIRR ranged from a minimum of 11.5% to a maximum of 114% (median 25.27%). Sensitivity analysis is not applied as the main parameters affecting project benefits and costs are treated as random

variables and consequently the variability is captured within the risk analysis. In case of LBDCIS, a sensitivity analysis was conducted by decreasing benefits by 10%, increasing costs by 10% and a combination of both. The project is equally sensitive to a decrease in benefits and an increase in costs however, the EIRR remains above 12.5%. With the combination of reduction in benefits and increase in cost, the mean EIRR for LBDCIS drops to 11.70%. As project is near completion, LBDCIS cost increase is less likely and therefore the economic benefit remains robust. The summary of results is given in Table 2.

Table 2: Summary of Results

Component	Economic Analysis		
	EIRR %	NPV PRs million	BCR
Lower Bari Doab Canal Irrigation System	13.59	2,131	1.18
Balloki Barrage			
Mean	29.1	6,023	6.6
SD	16.8	4,351	4.1
CoV	57.8	72.2	61.3
Mean	21.32	4,077	3.91

EIRR = economic internal rate of return, ENPV = economic net present value, SD = standard deviation; CoV = coefficient of variation.

Source: Asian Development Bank estimates.

24. Distribution and Poverty Impacts: The distribution of the project benefits across poor and nonpoor producers was estimated. The ENPV of PRs8,154 million was derived from the present value of the benefits (PRs20,845 million) less the present value of the costs (PRs12,691 million). The distribution of the project benefits across poor and non-poor beneficiaries was estimated based on the World Bank poverty head count ratio at purchasing power parity with population living at \$1.25/day and \$2.0/day. Poor farmers are primary beneficiaries of the project benefits. The Government costs include the capital and O&M costs of the investment. The total benefit to the poor is PRs 10,568 million (of which PRs 2,647 million goes to extremely poor) with project poverty impact ratio of 0.51.

25. Land ownership in the LBDCIS command area is skewed, with about 10% of farm families holding more than 40% of the farm area in the medium to large-farm category (farm size is above 5 ha); their average landholding is 12.4 ha. However, the vast majority are smaller farms below 5 ha, which is about 58% of the area, 90% of all farms, and owned by about 295,000 farm families (nearly 2 million people). The proportionate of farm size below 5 ha of the command area has increased from 55% to 58% since project approval. The average landholding within this group is 1.5 ha. Based on this landholding, the gross margins of the average small farm will see an annual average increase from about \$1,586 to \$1,703 at full development.¹¹ About 24% of the farm area is occupied by farms that are less than 2 ha, yet due to the skewed land tenure this area supports 64% of the farms and farm families of 1.4 million people. The average landholding for this group of farmers is 0.8 ha. The project therefore supports farmers with limited income from small landholding and subsistence farming.

¹¹ Based on the average incremental production.

I. Financial Sustainability

26. The Punjab Irrigation Department (PID) has six decades experience of irrigation system O&M including barrages, irrigation canals and distribution systems. For barrages, the PID's Barrage Manual provides comprehensive guidance on O&M including periodic inspection and maintenance records. The barrage team within the PID submits annual operation, maintenance, and monitoring reports of each barrage to PID headquarters, where experts analyze the data and arrange for special inspections if required. Independent auditors audit the annual budget. The Government of Punjab allocates annual funds for operation in its provincial budget including funds for flood and other emergency situations, when needed.

27. The O&M of canal and distribution system is guided by the irrigation sector reforms of decentralization, participatory irrigation management and improved service delivery. The functions of PID are being shared by establishing new institutions; Punjab Irrigation and Drainage Authority (PIDA) at provincial level, Area Water Board (AWB) at Canal Command level, Farmers Organizations (FOs) at distributary level and water user associations (*Khal Punchayats* (KP)) at water course or outlet level. Since 2004, 5 AWBs comprising of 401 FOs and 19,404 KPs have been established in Punjab. In LBDCIS, one AWB has been commissioned in February 2012 with 52 FOs and 3,779 KPs formed. The operational management structure for Balloki Barrage and LBDCIS is given in Table 3.

Table 3: Punjab Government Operational Management Staff at the Barrages

Sr. No.	Component	O&M Responsibilities	Estimated O&M Requirements PRs million	Composition
1	Balloki Barrage	PID	33.3	SE (1), EE (1), SDO (2), TS (143), NTS (112)
2	Main Canal (with Branch Canals)	PIDA / PID / AWB	43.8	SE and CE (1), ¹ EE (3), SDO (9), TS (448), NTS (727); C (1), VC (1), one farmer member from each territorial unit and Non-Farmer Members (9)
3	Distributary and Minors	FOs	209.1	52 FOs each with General Body; Management Committee (9 Members); O&M technical support currently provided by PID
4	Watercourses	KPs	-	3,779 KPs each comprising C (1), Members (4)

AWB=Area Water Board, C=Chairman, CE= Chief Executive, EE=Executive Engineer, FO= Farmers Organizations, KP=*Khal Punchayat* (water user associations), NTS= Non-Technical Staff, O&M= Operation and Maintenance Management, PID=Punjab Irrigation Department, PIDA=Punjab Irrigation and Drainage Authority, SDO=Sub Divisional Officer, SE=Superintending Engineer, TS=Technical Staff, VC=Vice Chairman.

¹ SE is common for both Balloki Barrage and LBDC.

28. The O&M cost is estimated as PRs286 million, comprising PRs253million for LBDC main canal and distribution system, and PRs33 million for Barrage. The Barrage and main canal receives O&M funding from government's budgetary allocation. Except for the low O&M expenditures in 2013-2014 due to ongoing rehabilitations, the past ten years records show PID utilizing full O&M funding while independent auditors audit the expenditures. The previous two years expenditures since creation of AWBs/FOs are given in Table 4.

29. The institutional reforms, central to distributary and minors O&M, are taking longer to deliver. Since its creation, the performance of decentralized farmer's management structure remains mix. Flat rate assessment of *abiana* (water charges) is used for collection. Of this, after

deducting share of Indus River System Authority and AWB, FOs are authorized to utilize half of the amount for O&M while PIDA receives the rest. In case of shortfall, as is expected in the short-run due to ongoing reform efforts, the government will provide funds to ensure O&M is fully covered.

30. The key performance indicator of *abiana* collection in area water boards in Punjab shows collection ranging from 27% to 93%. The LBDC AWB recovered 47% (PRs 304 million) in three fiscal years.¹² The external performance evaluation and audit of FOs in LBDCIS for the first three years (2012-2015) will be completed in 2016 and results will be shared with ADB before the completion of the project and MFF. The project O&M requirements can be fully met with improved *abiana* recovery while government providing adequate funds from the provincial budget to sustain the O&M cost. Further, the project provides upgraded infrastructure which reduces the O&M expenditure, especially lining of channels.

Table 4: Annual Expenditure for Operations and Maintenance

Component / Organization	Actual Expenditures ^a	
	2013-2014 PRs million	2014-2015 PRs million
Lower Doab Canal Irrigation System		
Farmers Organizations	31.6	22.1
Punjab Irrigation Department	45.8	42.5
	77.4	64.6
Balloki Barrage		
Punjab Irrigation Department	23.4	35.2
	Total	100.8
		99.8

FY = Fiscal year;

^a This includes maintenance, repair, operational management and emergency repair when needed.

¹² PIDA's website. 31 August 2015

UPDATED SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

Country:	Pakistan	Project Title:	Punjab Irrigated Agriculture Investment Program Tranche 4
Lending/Financing Modality:	Multitranche Financing Facility	Department/Division:	Central and West Asia Department Pakistan Resident Mission

I. POVERTY AND SOCIAL ANALYSIS AND STRATEGY

Poverty targeting: General intervention

A. Links to the National Poverty Reduction and Inclusive Growth Strategy and Country Partnership Strategy

Pakistan's National Economic Council approved the Government's "Vision 2025" in May 2014. The vision envisages a strategy of sustained and inclusive higher growth to be achieved by enhancing the pace of growth, investment and productive employment opportunities, while ensuring that the benefits are shared by all. The strategy includes enhancing the productivity in the agricultural sector. Pakistan's current Poverty Reduction Strategy Paper II (Pillar III: Increasing Productivity and Value Addition in Agriculture) emphasizes (para. 1.4.4.1) more productive use of water through high efficiency irrigation systems. The Government of Punjab Growth Strategy 2018 "Accelerating Economic Growth and Improving Social Outcomes" lists increasing agriculture productivity as one of the key strategic components of the Agriculture Growth Strategy. The strategy also confirms that since Punjab's agriculture is heavily reliant on irrigation, the Government is currently undertaking or planning to undertake major investments in improving the irrigation infrastructure to improve the productivity of water use through investments in projects like Lower Bari Doab Canal Improvement Project (LBDCIP). The Punjab government's Medium Term Development Framework 2015–2018 aims to provide adequate, equitable and reliable irrigation supplies to the cultivable lands of Punjab and enhanced agricultural productivity with focus on broad based institutional reforms. The Asian Development Bank (ADB) country partnership strategy 2015-2019 for Pakistan aims at stronger water resource management and irrigation to improve agricultural productivity, increase farm incomes, strengthen food security, buttress the natural resource base, and enhance resilience to future natural hazard-related disasters. The MFF Punjab Irrigated Agriculture Investment Program remained ADB's and Government's priority in the previous CPS (2009-13) and aligns well with ADB's strategic thrust in the sector under the ongoing CPS 2015-19.

B. Results from the Poverty and Social Analysis

1. Key poverty and social issues: Despite being the most agriculturally productive province in Pakistan (labeled the "bread basket" of Pakistan), Punjab has a high incidence of poverty at 32.4% of the rural population and 26.5% of the urban population. While Punjab has districts producing the most surplus food in Pakistan, it also demonstrates high intensities of food insecurity, particularly in rural areas. About 60% of the province's population of around 100 million is rural, depending almost entirely on agriculture for its livelihood. Irrigated agriculture is vital to sustain the livelihood base and employs over 40% of the labor force.

2. Beneficiaries: Lower Bari Doab Canal (LBDC) and Balloki Sulemanki (BS) Link Canal off-takes from Balloki Barrage. LBDC and BS Link feed about 23% of irrigated area of Punjab. The LBDC serves a cultivable command area of about 0.7 million hectares in Districts Kasur, Okara, Sahiwal and Khanewal. More than 300,000 farm families in the LBDC command derive their livelihoods directly from crops grown over the command area including wheat, rice, maize, cotton, sugarcane, fodder, flowers, vegetables, and citrus and other orchard crops. Land ownership in the LBDC command area is skewed, with about 10% of farm families holding more than 40% of the farm area in the medium to large farm category (farm size is above 5 ha); their average landholding is 12.4 ha. However, the vast majority are smaller farms below 5 ha, which is about 58% of the area, 90% of all farms, and owned by about 295,000 farm families (nearly 2 million people). The average landholding within this group is 1.5 ha. In the districts under LBDC, about 24% of the farm area is occupied by farms that are less than 2 ha, yet due to the skewed land tenure this area supports 64% of the farms and farm families of 1.4 million people. The average landholding for this group of farmers is 0.8 ha. The project therefore supports farmers with limited income from small landholding and subsistence farming.

The Balloki Barrage capacity will be strengthened against the floods and the resident population around the barrage will benefit from the floods. The Project will minimize the risk of floods in about 8,000 hectares on the right bank of River Ravi and associated loss of life, animals, structures, crops, and livelihoods. The Project will reduce the risk of "income foregone" in case Balloki Barrage fails and canal supplies are reduced which provides water to more than 1.9 million hectares. The Project will also offer some local employment opportunities, as typically a minimum of 60% of unskilled and semiskilled workers employed by contractors are from local communities.

3. Impact channels. The impact channels comprise (i) increased agriculture productivity; (ii) protection against loss of income, crops, and houses; (ii) sustained agricultural productivity; (iii) farmers organizations, water user

associations, capacity development support programs; and (iv) new jobs in project-related works for poor people.

4. Other social and poverty issues: In addition to the contributions of this project to poverty reduction, employment and skills, education, and health, various other government and donor programs addressing social and poverty issues in the area. One of the most important is the Benazir Income Support Program, a social protection initiative, to which ADB is a major contributor.

5. Design features: Relevant design features include one Area Water Board, 52 farmer organizations (FO), more than 3,000 water user associations called *Khal Panchayats* (KP), trainings of FOs in operation and maintenance of distributary and minor canals and establishment of 40 demonstration plots.

C. Poverty Impact Analysis for Policy-Based Lending. N/A

II. PARTICIPATION AND EMPOWERING THE POOR

1. Participatory approaches and project activities.

Formation, training and consultation of Area Water Board, 52 FOs and more than 3,000 water user associations. The decentralized farmer management structure takes on operation and maintenance of distributary and minor canals. Consultations will continue on resettlement and environmental issues and during remaining period of implementation.

2. If civil society has a specific role in the project, summarize the actions taken to ensure their participation.
As stated in 1 above, the actions include trainings and capacity building.

3. Civil society organizations.

4. The following forms of civil society organization participation are envisaged during project implementation, rated as high (H), medium (M), low (L), or not applicable (NA):

M Information gathering and sharing M Consultation M Collaboration L Partnership

5. Participation plan. There are two components of the investment plan under the Project which supports the project-level participation plan of civil society through farmers' organizations, water user association and AWB. The activities under the components are implemented through Department of On-Farm Water Management and, Punjab Irrigation and Drainage Authority.

Yes. The component of "On-Farm Water Management and Agriculture" supported development of field programs on selected watercourses in the service area of each farmer organization. The component of "Institutional Strengthening and Operation Modernization" supported development of farmer organizations and decentralized management structure. No.

III. GENDER AND DEVELOPMENT

Gender mainstreaming category: No Gender Elements (The additional financing is categorized to 'No Gender Elements' from the original project categorization of 'Some Gender Elements')

A. Key issues. Agriculture contributed more than 40% of total labor force employment. While women's share in agricultural activities has risen steadily, their restricted mobility prevents them from leaving their communities to access irrigation or to take their products to market. Women often cannot participate in community decision making about irrigated water as members of water users' groups due to (i) lack of land rights, (ii) illiteracy, (iii) household and agricultural work load, and (iv) cultural norms that block women from participating in public meetings.

B. Key actions. Key actions were completed in the overall project which includes, (i) conducting consultations with local women to identify their needs and concerns; (ii) gender orientation training for the staff of OFWM and PIDA staff; (iii) formation of more Rural Women Groups (RWGs); (iv) strengthening RWGs through systematic mentoring process and trainings; (v) conducting coordination meetings with all the stakeholders, males and females alike, at provincial and district levels; (vi) conducting additional trainings improving specific farm and livestock management skills for women in various FOs/DCs. The remaining component of civil works associated with additional financing does not have specific gender actions other than obligations of the contractors in the contract, (i) to use their best efforts to employ women; and (ii) not to differentiate between men and women's wages or benefits for work of equal value. The project also led to the formation of 11 Rural Women's Groups in 3 districts, which held 48 trainings for more than 1,000 women participants on vegetable growing, seed grading (wheat), clean cotton picking, livestock management, and storage of agriculture produce.

Gender action plan Other actions or measures No action or measure

IV. ADDRESSING SOCIAL SAFEGUARD ISSUES	
A. Involuntary Resettlement	Safeguard Category: <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> FI
1. Key impacts. There are 324 affected people and the associated resettlement cost is \$0.48 million. This has been documented in 9 resettlement plans approved by ADB. In 129 cases, the structures are affected; in 29 cases permanent land, and in 108 cases temporary land is involved. There are 56 squatters and 2 farm employees. The impacts are part of the original project, and components financed under the additional financing will not entail new impacts.	
2. Strategy to address the impacts. The resettlement plans were prepared under the resettlement framework. A social safeguard unit was established in the Project Management Unit of the Project. All resettlement plans were approved by ADB and disclosed. The implementation of resettlement plan is validated through external monitoring. The Grievance Redress Committees (GRC) were established as soon as the design and award of works progressed; 15 L and Jandraka (16 September 2009), ICB-01, ICB-02 and ICB-03 (27 November 2010), Balloki Barrage (27 October 2011), ICB-04 (2 February 2012), ICB-05 (27 November 2012) and ICB-06 (1 January 2013).	
3. Plan or other Actions.	
<input checked="" type="checkbox"/> Resettlement plan	<input type="checkbox"/> Combined resettlement and indigenous peoples plan
<input checked="" type="checkbox"/> Resettlement framework	<input type="checkbox"/> Combined resettlement framework and indigenous peoples planning framework
<input type="checkbox"/> Environmental and social management system arrangement	<input type="checkbox"/> Social impact matrix
<input type="checkbox"/> No action	
B. Indigenous Peoples	Safeguard Category: <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> FI
Not Applicable. There are no indigenous peoples, as defined in the Safeguard Policy Statement (2009), in the project area.	

V. ADDRESSING OTHER SOCIAL RISKS	
A. Risks in the Labor Market	
1. Relevance of the project for the country's or region's or sector's labor market, indicated as high (H), medium (M), and low or not significant (L).	
<input checked="" type="checkbox"/> M [positive] unemployment <input checked="" type="checkbox"/> M [positive] underemployment <input checked="" type="checkbox"/> L retrenchment <input checked="" type="checkbox"/> L core labor standards	
2. Labor market impact. Typically at least 60% of unskilled and semiskilled project jobs are allocated by contractors to people from the local community. Provision for adherence to core labor standards is provided in the bidding documents.	
B. Affordability Not applicable	
C. Communicable Diseases and Other Social Risks	
1. The impact of the following risks are rated as high (H), medium (M), low (L), or not applicable (NA):	
<input checked="" type="checkbox"/> L Communicable diseases <input type="checkbox"/> NA Human trafficking	
<input type="checkbox"/> Others (please specify) NA	
2. Risks to people in project area.	
The Health, Safety, and Environment Plan are prepared for each sub-project and are being monitored. Corrective actions plan were suggested where shortcomings were found.	
VI. MONITORING AND EVALUATION	
1. Targets and indicators: The DMF includes addressing poverty reduction and inclusive social development. This will be achieved through the decentralized farmers organizations through establishment of Area Water Board, 52 Farmer Organizations (FO), more than 3,000 water user associations called <i>Khal Punchayats</i> (KP), trainings of FOs in operation and maintenance of distributary and minor canals and establishment of 40 demonstration plots. The monitoring and source of information is given in the DMF.	
2. Required human resources: Monitoring will be carried out by the PMU's social safeguard unit. Independent validation will be provided by an independent entity. For resettlement, external monitoring is being conducted in close consultation with displaced people and biannual reports will be disclosed on the internet.	
3. Information in the project administration manual: Quarterly progress reports as stipulated in the PAM.	
4. Monitoring tools. Department of Agriculture statistics and crop data	

Source: Quarterly Progress Report, Punjab Irrigated Agriculture Investment Program - Project 1

UPDATED RISK ASSESSMENT AND RISK MANAGEMENT PLAN

Risk Description	Risk Assessment	Mitigation Measures or Risk Management Plan
A. Governance Public Financial Management Internal Audit unit is non-operational	High	<p>The existing financial management unit will manage the auditing and accounts for the overall project including the new loan for additional financing. PID will use the ongoing and established process of a pre-audit function of payments which serves the purpose of internal audit. ADB will continue to provide disbursement trainings to such staff which is part of annual process. Last training was given in September 2015. The PMU will liaise with the line department and Project Management Office (implementing tranche 2 and 3 of the MFF) to operationalize an internal audit unit. ADB will follow-up to ensure that the unit is in place within the year.</p>
Corruption The concurrent incidence of poor project performance and cost overruns under the current project may attribute to potential integrity violation	Low	<p>The project performance has improved and cost overrun is not attributable to factors involving integrity violations. ADB will hold at least one loan review mission in six months till completion of the project.</p>
The EAs and IAs lack sufficient systems to mitigate practices of corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations arises during implementation.	Medium	<p>The NAB and ACE at provincial level are the main institutions mandated to prosecute corruption-related offenses. The OAGP and the Office of the Ombudsman share responsibility in engendering public accountability in the spheres of financial management and ensure that public institutions follow regulations and procedures laid down by law. The primary oversight function is fulfilled by PAC in the national and provincial assemblies. Transparency International, vibrant media, and active civil society act as watchdogs. At the project level, the project steering committee will monitor implementation. ADB will take all actions including cancelling the portion of the financing allocated to a contract if it determines at any time that representatives of the borrower or of a beneficiary of ADB-financing engaged in integrity violations without the borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation. ADB will take remedial actions and impose sanction if integrity violation is established, on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines</p>

Risk Description	Risk Assessment	Mitigation Measures or Risk Management Plan
<p>B. Climate Change High risk of climate change events in the project area, causing extreme and frequent floods, inflicting losses to beneficiary and adjoining areas</p> <p>Reduced water availability for Punjab irrigated agriculture impacted by climate change effect or energy driven reservoirs releases</p>	Medium	<p>The improved barrage with spillway will prevent failure and significantly reduce the frequency of operating breaching sections of floods</p> <p>The project design provides meeting future water requirements for sustainable conjunctive use. The project will enable the LBDC to deliver its maximum flow allocation, improve conveyance efficiency, reduce excessive ground water mining and recharge the depleting water table. Other parallel investments in the canal command area include water efficient farm technologies and practices. Augmentation of water from Mangla reservoir through Rasool-Qadirabad and Qadirabad-Balloki link canals during low flows will minimize the climate-induced reduction in water flows or shortages.</p>
<p>C. Project Management and Implementation Project is unable to employ quality foreign consultants and contractors due to security issues. Weak implementation of civil works, contract and construction management will further cause delays in project.</p>	Low	<p>This risk was addressed during the procurement and PID was able to recruit a good mix of foreign and local construction and consulting firms. To mitigate the construction delays, the PID has awarded the unfinanced contract under the loan (due to cost overrun) and agreed its financing through own resources prior to loan effectiveness. The contractors of ongoing contracts have increased their resources and sub-contracted part of their works for improving the progress. The Government also agreed to bear any shortfall in excess of the additional financing to enable successful completion of the project if part of works remains incomplete by the end of completion period.</p>
Overall	Medium	

ADB = Asian Development Bank, ACE = Anti-corruption Establishment, IPSAS = International Public Sector Accounting Standards, LBDC=Lower Bari Doab Canal, MFF = Multitranche financing facility, NAB = National Accountability Bureau, OAGP = Office of the Auditor General of Pakistan, PAC = Public Accounts Committees, PID=Punjab Irrigation Department, PMU=Project Management Unit.

Source: Asian Development Bank.