

Validation Report
December 2019

Pakistan: Punjab Irrigated Agriculture Investment Program (Tranche 3 and Multitranche Financing Facility)

Reference Number: PVR-640
MFF Number: 0009
Project Number: 37231-013
Loan Number: 2299, 2300, 2841, 2971, and 3351



Raising development impact through evaluation

ABBREVIATIONS

ADB	–	Asian Development Bank
LBDC	–	Lower Bari Doab Canal
LBDCIP	–	Lower Bari Doab Canal Improvement Project
MFF	–	multitranche financing facility
OFWM	–	on farm water management
PCR	–	project completion report
PIAIP	–	Punjab Irrigated Agriculture Investment Program
PIAPPF	–	Punjab Irrigated Agriculture Project Preparation Facility
PID	–	Punjab Irrigation Department
PIDA	–	Punjab Irrigation and Drainage Authority
PMO	–	project management office
R&U	–	rehabilitation and upgrading
SFR	–	Special Fund Resources
PVR	–	PCR validation report

NOTE

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

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PROGRAM BASIC DATA

Project Number	37231-013	PCR Circulation Date	27 September 2018	
Loan Number	2971	PCR Validation Date	Dec 2019	
Program Name	Punjab Irrigated Agriculture Investment Program			
Sector and subsector	Agriculture, Natural Resources and Rural Development	Irrigation		
Strategic agenda	Environmentally sustainable growth Inclusive economic growth			
Safeguard categories	Environment		B	
	Involuntary Resettlement		A	
	Indigenous Peoples		C	
Country	Islamic Republic of Pakistan		Approved (\$ million)	Actual (\$ million)
ADB Financing (\$ million)	ADF: 0.00	Total Program Costs	665.74	559.20
	OCR: 890.00	Loan/Grant		
		2299, 2300, 3351	227.82	225.96
		2841	270.10	195.90
		2971	69.74	42.17
		Borrower		
		2299, 2300, 3351	53.58	42.09
	2841	39.10	31.70	
2971	12.40	8.70		
	Beneficiaries			
	Others			
Cofinancier		Total Cofinancing		
Approval Date		Effectiveness Date		
2299, 2300	13 Dec 2006	2299, 2300	20 Sep 2007	24 Aug 2007
2841	22 Dec 2011	2841	17 Feb 2012	17 Feb 2012
2971	13 Dec 2012	2971	29 Jul 2013	06 Jun 2013
3351	08 Dec 2015	3351	13 Mar 2016	11 Jan 2016
Signing Date		Closing Date		
2299, 2300	22 Jun 2007	2299	30 Sep 2007	30 Sep 2017
2841	18 Jan 2012	2300	30 Sep 2013	30 Jun 2017
2971	30 Apr 2013	2841	31 Dec 2016	30 Sep 2017
3351	14 Dec 2015	2971	31 Mar 2017	30 Sep 2017
		3351	30 Jun 2017	30 Sep 2017
Program Officers	B. Panela A. Ali R. Farrukh D. Walton A. Zafar	Location ADB Headquarters ADB Headquarters PRM PRM PRM	From Dec 2006 Mar 2010 Mar 2012 Dec 2013 Oct 2014	To Feb 2010 Feb 2017 Dec 2013 Oct 2014 Sept 2017

IED Review Director Team Leader	N. Subramaniam, IESP L.N. Guevara, Senior Evaluation Officer, IESP*
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ADB = Asian Development Bank, ADF = Asian Development Fund, IED= Independent Evaluation Department, IESP = Sector and Program Division, OCR = ordinary capital resources, PCR = Program completion report.

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I. PROGRAM DESCRIPTION

A. Rationale

1. Punjab province is the most important agricultural center in Pakistan, accounting for 57% of the country's agricultural output. Its agricultural sector accounts for 26% of Punjab's gross domestic product (GDP), 66% of national agriculture GDP, and over 40% of the Punjab province's labor force. Punjab's agriculture production relies on the Indus Basin Irrigation System (IBIS), which provides irrigation water to 8.4 million hectares (ha) of agricultural land in the province. The Punjab Irrigation Department (PID)¹ is responsible for operation and maintenance (O&M) and management of Punjab's surface irrigation. In 2006, PID's infrastructure had an estimated replacement value of \$20 billion.² Since then, however, that infrastructure had seriously deteriorated due to age, no asset management planning, and chronic underfunding and ineffective implementation of O&M.³

2. In December 2006, the Asian Development Bank (ADB) approved a \$900 million equivalent multitranche financing facility (MFF)⁴ for the Punjab Irrigated Agriculture Investment Program (PIAIP) to finance improvements to Punjab's irrigation sector, with institutional reforms focused on increased farmer management of downstream parts of the irrigation network to improve irrigation water delivery.⁵ The MFF was implemented in four tranches until the end of the MFF validity period on 30 September 2017. The MFF was deemed an appropriate modality for the PIAIP because it provided certainty of funding for a range of PIAIP projects, prior to undertaking the necessary due diligence and detailed design. It also enabled the borrower to respond to changes in funding requirement priorities during the MFF's implementation as a result of climatic events and changes in other development partner priorities. ADB completed three project completion reports (PCRs) — two tranche PCRs and one facility completion report that included the PCR for tranche 3.⁶ Accordingly, these PCRs were validated including this validation report for the completion of tranche 3 and the facility completion report.⁷

¹ Previously the Punjab Irrigation and Power Department (PIPD). In July 2013, PIPD was divided into two new departments – the PID and the Punjab Energy Department.

² More recently in 2017, the replacement value was estimated at \$15.2 million. Government of Punjab. 2017. *Annual Development Program 2017-2018*. Lahore.

³ ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranchise Financing Facility: Punjab Irrigated Agriculture Investment Program*. Manila.

⁴ \$890 million equivalent from ADB's ordinary capital resources (OCR) and up to \$10 million equivalent in Special Drawing Rights (SDR) from ADB's Special Fund resources.

⁵ ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program – Tranche 3 and MFF in Pakistan (Loans 2299, 2300, 2841, 2971 and 3351)*. Manila.

⁶ ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program in Pakistan – Tranches 1 and 4 (Loans 2299, 2300 and 3351)*. Manila.; ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program in Pakistan - Project 2 (Loan 2841)*. Manila.; and ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program – Tranche 3 and MFF in Pakistan (Loans 2299, 2300, 2841, 2971 and 3351)*. Manila.

⁷ The PVRs for projects 1 and 2 are: (i) ADB. 2019. *Validation Report. Pakistan: Punjab Irrigation Agriculture Investment Program – Project 1 (Tranches 1 and 4)*. Manila; and ADB. 2019. *Validation Report. Pakistan: Punjab Irrigation Agriculture Investment Program – Project 2 (Tranche 2)*. Manila.

B. Expected Impacts, Outcomes, and Outputs

3. The MFF's impact and outputs underwent changes during implementation. At MFF approval in 2006, the intended impact of the MFF was economic growth in the program areas of Punjab, and conservation of water and land resources. When the periodic financing request (PFR) for tranche 2 was approved in 2011, the MFF impact was eventually changed to increased agricultural production and farm income in Punjab irrigated agriculture program areas. The outcome statement changed slightly but the intent and focus remained the same. This was for Punjab irrigated agriculture program areas to receive a sustainably improved delivery of water services and management.

4. There were four original outputs from PIAIP. Output 1 was the Lower Bari Doab Canal Improvement Project (LBDCIP) serving as a prototype for other physical and non-physical investments. Output 2 was to execute subsequent projects in five parts – rehabilitation and upgrading (R&U) of the Pakpattan, Sindhnaï and Thal Canals; R&U of the Sulemakanki, Trimmu and Panjnad barrages and head works; groundwater conjunctive use and on farm water management (OFWM) activities developed and implemented in all project areas; establishment of farmer organizations (FOs) to undertake operation and maintenance (O&M) and manage the minor and distributor canals; and to prepare decentralized management strategies, upgraded operational procedures and rationalized staffing plans. Output 3 was improved Punjab provincial institutional framework for integrated water resources management, and output 4 was resettlement and environmental plans and procedures developed and executed.⁸ After the approval of tranche 2, there were five intended outputs. R&U of irrigation infrastructure, reduction in flood risks in the program area, and sustainable use of groundwater in the program area. Also, adoption of improved OFWM and agricultural support practices in the program area, and improvement in water management institutions.⁹ The most significant of these changes was related to the displacement of the R&U of the Trimmu and Panjnad barrages, among others. These were excluded from the program's scope and financed as stand-alone projects by ADB.¹⁰

C. Provision of Inputs

5. **MFF.** The program was approved in December 2006, and its implementation was completed in September 2017, 6 months after the planned completion date. At appraisal, the MFF period of utilization was March 2007 to September 2017. The total appraised cost was \$1,125.0 million, with \$900.0 million to be financed by ADB and \$225.0 million by the government. Ten million dollars of ADB's contribution was from ADB's Special Fund Resources (SFR). In December 2011, ADB approved an amendment reducing the MFF to \$700.0 million¹¹ and increasing the contribution from ADB's SFR to \$280.0 million. The actual cost of the MFF was \$559.2 million with ADB's share of \$474.7 million¹² and government's \$82.5 million.

6. Following the approval of tranche 3 in December 2012, there was \$129.0 million available under the MFF but the remaining loan period of 4.5 years was not sufficient to finance the next project. Instead, additional financing of \$26.6 million for Tranche 4 was approved in December 2015 to meet an expected shortfall in the financing of tranche 1. The next highest priority project, the Trimmu and Panjnad Barrages Improvement Project required \$150.0 million and 6 years to

⁸ Footnote 3, Appendix 1, Design and Monitoring Framework (DMF).

⁹ Footnote 5, Appendix 1, DMF.

¹⁰ ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Islamic Republic of Pakistan for Trimmu and Panjnad Barrages Improvement Project*. Manila.

¹¹ Due to currency fluctuations increasing its effective value.

¹² \$270.7 million from OCR and \$206.0 million from SFR.

complete.¹³ The eventual MFF savings of \$223.3 million was identified too late for it to be used for a fifth tranche project.¹⁴ All projects completed under the PIAIP were categorized as B for environment and involuntary resettlement and as C for indigenous peoples impacts. The Punjab province has no population fitting the ADB definition of indigenous peoples.¹⁵

7. The Punjab Irrigated Agriculture Project Preparation Facility (PIAPPF) component of tranche 1 and 4 included a package of consulting services to prepare and carry out final design of the subsequent projects to be financed under the MFF. At appraisal, this was anticipated to require 216 international consultant person-months and 712 national consultant person-months. At completion, a total of 124 international consultant person-months and 678 national consultant person-months had been used.¹⁶

8. **Tranches 1 and 4.** Two loans were approved with the MFF in December 2006, became effective in August 2007 and were closed in September 2017. Tranche 1 was approved for \$227.8 million (217.8 million equivalent from OCR and \$10.0 million equivalent from ADF). It had two components – the Lower Bari Doab Canal (LBDC) Improvement Project, covering the R&U of the Balloki Barrage and the LBDC Canal system, and the PIAPPF supporting institutional reforms, improved on-farm productivity and groundwater management, and preparation of subsequent MFF projects. While the planned closing date for these loans was September 2013, there were four extensions granted by ADB. Tranche 4 (para. 6) became effective in January 2016 and was closed in September 2017 after one extension. Delays in tranches 1 and 4 were due to poor project readiness at appraisal, slow civil works construction, and the completion of design for additional projects under the PIAPPF.

9. At appraisal, the total appraised cost of tranche 1 was \$281.4 million — \$271.1 million for the LBDCIP and \$10.3 million for the PIAPPF. ADB was to finance 77.4% and the government at 22.6%. At the Midterm Review for tranche 1 in 2011, as the loan amount (para. 8) denominated in yen had appreciated by 45%, the government requested the surplus to be cancelled, reducing the loan amount to \$258.0 million. However, subsequent depreciation of the yen saw the loan equivalent amount reduced by \$50.0 million, then the government requested the additional tranche 4 funding and converted the remaining loan proceeds to dollars to manage currency fluctuations. At completion, the actual cost of tranches 1 and 4 was \$280.7 million, with 85%¹⁷ from ADB and the rest from the government.

10. The R&U of the Balloki Barrage and the LBDC canal and distribution system both increased in cost compared to estimated base costs, because cost estimates were too low when detailed design was done, and procurement delays and price escalation occurred. Also, the PIAPPF component of tranche 1 was more expensive than anticipated due to a larger number of other projects being prepared for future implementation.

11. A total of 2,576 person-months of consultants was appraised for tranche 1 (512 person-months of international consultants and 2,064 person-months of national consultants). By loan closing date, a total of 4,380 person-months of consultants had been engaged – 324 person months of international consultants and 4,056 person months of national consultants. Subsequent

¹³ A loan of \$150 million for this project, outside of the MFF, was included in the subsequent country operations business plan (ADB. 2014. *Country Operations Business Plan, Pakistan, 2014-2016*. Manila).

¹⁴ Footnote 5, para. 22 and footnote 20.

¹⁵ Footnote 3, para. 80.

¹⁶ ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program in Pakistan – Tranches 1 and 4* (Loans 2299, 2300 and 3351). Manila., Appendix 7, Table A7.1.

¹⁷ \$228.6 million OCR financed and \$10.1 million Asian Development Fund financed.

to loan closing, there was an ongoing requirement for consultant engagement for civil works completion and defect liability period management. The increase in consulting inputs required was mainly due to the extended period of design and construction supervision requiring increased national consultant inputs.

12. **Tranche 2.** The loan for tranche 2 was approved in December 2011, became effective in February 2012 and was closed in September 2017, 9 months after the planned closing date. It covered construction of the Khanki Barrage to provide more reliable irrigation water supply to 1.2 million ha of agricultural farm land and reduce the risk of flooding around and upstream. The loan was extended twice, to accommodate the procurement of the major civil works. The 1 year delay was mainly due to the need to rebid two major civil works packages.¹⁸

13. The total appraised cost of tranche 2 was \$309.0 million (\$270 million from ADB loan and \$39 million from the government). Actual cost of tranche 2 was 73.7% of estimated cost, of which 86.1% was ADB financed and the remaining 13.9% was from the government. The cost underrun was due to lower costs for civil works, consulting services and project management as a result of lower bid prices and depreciation of the local currency and SDR against the US dollar. A large contingency allowance (\$45.0 million) had been included to cover emergency flood events but was not utilized. Although a flood in 2014 hit the tranche 2 site, no significant damages occurred because of the timely flood warning from the project management office (PMO).¹⁹

14. It was envisaged that 2,222 person-months of consulting services would be required for tranche 2, (84 person-months for international and 2,138 person-months of national consultants). At completion, 2,303 person-months of consultant inputs had been utilized (75 person-months of international and 2,228 person-months of national consultants).²⁰ However, the total cost of consultants at completion (\$8.5 million) was lower than expected (\$9.5 million) due to reduced cost of international consultant person-months offsetting the increased cost of national consultant person-months.²¹

15. **Tranche 3.** Tranche 3 was approved in 2012 to improve the Papkpattan Canal and Suleimanki Barrage and to provide reliable water supply to 1 ha of agricultural land. The loan became effective in June 2013 and was closed in September 2017, 6 months after the planned closing date and one extension to enable the completion of civil works. The total appraised cost of tranche 3 was \$85.4 million (86.0% from ADB loan and balance from the government). Actual cost was 59.6% of estimated, of which 82.9% was from ADB. The reduction in the project cost was due to changes in the design of civil works.

16. It was envisaged that 519 person-months of consulting services would be required (307 person-months for key experts and 212 person-months for non-key experts). At completion, a total of 1,079 person-months of consultant inputs had been utilized (374 person-months of key experts and balance for non-key experts). The additional consultant time required was due to the extension in the civil works contracts.²²

D. Implementation Arrangements

¹⁸ ADB. 2018. *Completion Report. Punjab Irrigated Agriculture Investment Program in Pakistan - Project 2 (Loan 2841)*. Manila., para. 30.

¹⁹ Footnote 18, para. 15 and footnote 22.

²⁰ Footnote 18, para. 28.

²¹ Government of Punjab, PID. 2018. *Project Completion Report PAK: Punjab Irrigated Agriculture Investment Program – Project 2 (New Khanki Barrage Construction Project)*. Lahore., para. 35.

²² Footnote 5, para. 33.

17. Tranche 1 and 4 had multiple components and the implementation arrangements were complex. The PID was assigned as executing agency for overall project implementation through a dedicated project management unit (PMU). The PID was to be supported by six entities. Component 1 was to be supported by a PMO Barrages (R&U of the Balloki Barrage Complex) and component 2 (R&U of LBDC canal network) by divisional project implementation units (PIUs). Component 3 (groundwater management) used groundwater cell in the PMU; PMO in the Department of OFWM was used for component 4 (OFWM); and PMO in the Punjab Irrigation and Drainage Authority (PIDA) was for component 5 (institutional strengthening and operation modernization). For the PIAPPF, an investment program planning and management unit was established within the PID strategic planning cell to oversee tranche 1 implementation and investment packages.

18. During the implementation of tranches 1 and 4, the government and ADB agreed to changes to expedite progress. The key changes were the reassignment of the Balloki Barrage Complex component to the PMU to resolve reporting line issues. The OFWM component was implemented through the Agriculture Department; institutional strengthening and operation modernization was initially established under the PMU but PIDA took control of this function in 2013; and the PIAPPF administration shifted several times before it moved to the PMU in 2015, where it remained until tranches 1 and 4 (and the MFF's) completion. PID was also the executing agency for tranches 2 and 3 through its PMO Barrages. These projects only involved civil works and were less complex. The executing agency had built up experience through the implementation of similar projects (e.g. the World Bank financed Jinnah Barrage Rehabilitation Project). Eleven staff were added for tranche 2. Construction supervision consultants supported the PMO.

19. Compliance with the loan covenants for all tranches was satisfactory. For tranche 1 and 4, out of the total 116 loan covenants, 90% were complied with, 5% were partly complied with, 4% was not achieved, and 1% was not yet due.²³ All of the covenants under tranche 2 were complied with, although 5% out of the 55 loan covenants encountered delays. For tranche 3, the borrower had complied with 95% out of 62 covenants. Of the three remaining covenants, one was partially complied with (relating to the completeness of information on PID's website), one was not yet due (relating to ongoing O&M of completed works) and one was not complied with.²⁴ The covenant on insurance of project facilities with a responsible insurer was not complied with as this was found to be not a normal practice. Although it did not negatively affect project performance, this should have been taken into account during project processing (i.e., a waiver should have been requested during the implementation).

II. EVALUATION OF PERFORMANCE AND RATINGS

A. Relevance of Design and Formulation

20. The PCR rated the program and tranche 3 relevant.²⁵ At appraisal, the LBDC and the PIAIP were well-aligned with ADB, government and major partners' strategies and sector programs. ADB's country strategy for Pakistan sought province-focused projects on conservation, drought mitigation, rehabilitation of the irrigation infrastructure and strengthening institutional

²³ Footnote 18.

²⁴ Footnote 18, Appendix 8.

²⁵ Projects 2 and 3 were rated relevant and highly relevant respectively in their PCRs (and PVRs).

capacities.²⁶ Following the earlier passing of the Punjab Irrigation and Drainage Authority Act in 1997, the 2006 Punjab Medium Term Irrigation Sector Reform Program had introduced reforms to the sector and the PID had commenced identifying priority projects for R&U. During the program's implementation and at its completion, it remained relevant with ADB's country partnership strategies for Pakistan 2009–2013²⁷ and 2015–2019²⁸ and ADB's Strategy 2020²⁹, which supported investments in rehabilitation, upgrade and expansion of the IBIS and irrigation and water resource reform initiatives. The government's Punjab Medium-Term Development Framework (2012–2015)³⁰ similarly sought to modernize irrigation infrastructure and implement reforms to improve service delivery, whilst the Punjab Growth Strategy³¹ referred to MFF-financed projects as key investments to improve irrigation.

21. The program underwent key changes during implementation. The facility amount was reduced, and ADF resources were increased. Design, selection, sequencing, and prioritization of subsequent tranches were changed using lessons learned from tranches 1 and 4, and the increased scope of PIAPPF which resulted in \$1.7 billion worth of projects prepared. The PIAPPF component improved project readiness by helping to prepare tranches 2 and 3 as part of the MFF program as well as other PID priority projects for financing by ADB and other development partners. Although the eventual composition of the subsequent tranches under the MFF program deviated from the projects that were originally identified, the changes were allowed under the program's Financing Framework Agreement (FFA). The timing of the preparation of these projects, however, was not well-planned as there was a gap of 5 years between the approval of the program facility (and the first tranche) in 2006 and the second tranche in 2011. This PVR considers the gap as a missed opportunity to fully utilize the program and fully implement the prepared projects within the MFF validity period (even though the projects that were supposed to be pipelined for MFF financing were financed via stand-alone ADB loans).³² This PVR also notes that while the key changes were approved via corrigendum to the MFF in December 2011, some of the changes, particularly the impact and outputs of the DMF, although fairly consistent with the original design, were not sufficiently documented.

22. This PVR assesses the MFF program relevant on the basis of its consistency with ADB and government strategies and programs, and the overall consistency of the outputs despite changes during implementation. The MFF modality for the PIAIP is also relevant as it provided funding continuity for high priority projects to achieve increased agricultural production and farm incomes for a large section of the Punjab province.

B. Effectiveness in Achieving Program Outcomes and Outputs

23. The PCR rated the program and tranche 3 effective.³³ The program outcomes and outputs have substantially been achieved (footnote 8). The program has achieved its intended outcome of a sustainably improved delivery of water services and management in the Punjab irrigated agriculture program areas as the command areas of the Balloki, New Khanki and Suleimanki barrages received 90% and above of water supplies compared to entitlements for kharif and rabi

²⁶ ADB. 2003. *Country Strategy and Program Update: Pakistan, 2004-2006*. Manila.

²⁷ ADB. 2009. *Country Partnership Strategy: Pakistan, 2009-2013*. Manila.

²⁸ ADB. 2015. *Country Partnership Strategy: Pakistan, 2015-2019*. Manila.

²⁹ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank*. Manila.

³⁰ Government of Punjab. 2012. *Medium Term Development Framework (2012-15)*. Lahore.

³¹ Government of Punjab. 2015. *Punjab Growth Strategy 2018: Accelerating Economic Growth and Improving Social Outcomes*. Lahore.

³² Loan 3159/3160 of Pakistan: Trimmu and Panjnad Barrages Improvement Project; Loan 3599 of Pakistan: Jalalpur Irrigation Project, and Loan 6006 of Pakistan: Project Design Advance for Jalalpur Irrigation Project.

³³ Projects 2 and 3 were rated effective in their respective PCRs (and PVRs).

seasons³⁴ in 2017 and 2018. The program upgraded distributaries and minor canals in the LBDC command area. The delivery performance ratio in the kharif season in tail reaches increased from 0.81 in 2006 to 0.95 in 2017 and the relative ratio increased from 0.94 to 1. Flood discharge capacities for the Balloki and Khanki Barrages have increased from a 20-year and 50-year probable flood to a 1 in 100-year probable flood. The outcome indicators at the tranche level were achieved for all tranches.

24. At the program level, only two out of the five outputs were fully achieved. These were the adoption of improved OFWM and agricultural support practices in the program area (output 4) and the improved water management institutions (output 5). Other program outputs were only partly achieved or delayed.

- i. The R&U of the irrigation infrastructure included the barrages of Balloki, Suleimanki, Trimmu, Khanki, and Panjnad. At completion, the Balloki, New Khanki, and Suleimanki Barrages were implemented under the program. The design of the Trimmu and Panjnad Barrages were completed under the PIAPPF, but were not financed under the MFF due to time and cost constraints but financed under a separate ADB project (footnote 32) and is expected to close in 2021 after the MFF program period.
- ii. The rehabilitation of the Pakpattan Canal and LBDC distribution was achieved with a 1-year delay from 2017 to 2018.
- iii. Flood capacity of the five barrages in the Chenab, Ravi and Sutlej rivers was only partially achieved with only the Balloki Barrage on Ravi River and the New Khanki Barrage on the Chenab River done but the Islam Barrage on the Sutlej River was unfinanced.
- iv. Groundwater regulation was not adopted and enforced. A Punjab Groundwater (Protection, Regulation and Development) Act was drafted by the Government of Punjab in 2017 but is still not approved.

25. At the tranche level, the unachieved output on groundwater regulation can be attributed to tranches 1 and 4. These included the measurement of outlet discharges by FOs which was not being fully institutionalized. The rehabilitation of the main and distributary canals at completion was only 91% out of the target 2,450 km while the constructed/rehabilitated appurtenant structures accounted for 3,443 out of the target 3,500 (98%). For tranche 2, only the output indicator on the awarding of contracts was not achieved. Tranche 3 achieved its outputs of eliminating the annual water leakage of 267 million cubic meters (m³) of the rehabilitated Pakpattan Canal and Sulueimanka Barrage by 2017, and enhancing the capacity of PID staff. This validation notes that the other output indicator on improving the length of canals and appurtenant structures by 2017 was only partly achieved. The PCR noted that of the target 336 km, only 89% of canals were improved and of the target 319, 68% of appurtenant structures were finalized after condition and joint surveys, for rehabilitation, reconstruction, new construction or repair. There were 200 completed and the remaining 16 are expected to be completed in 2018.³⁵

26. The Project Safeguard Assessment concludes that the program was correctly classified as B for Environment and Involuntary Resettlement, and category C for Indigenous Peoples. It rated ADB's safeguard work quality satisfactory both at project screening, preparation and appraisal and at project supervision. While no gender action plan was prepared for the program or individual projects, a number of the additional tranche 2 activities which benefitted the local communities had specific benefits for women (e.g. the girl's school and the health center). All

³⁴ Karif is the growing season from April to September and rabi is from October to March

³⁵ Footnote 5, Appendix 1, Table A1.2.

program outputs directly and indirectly have contributed and continued to contribute to improved livelihoods for persons including women.

27. This validation assesses the tranche 3 effective as it largely achieved its intended outcome and outputs. While the program outcome has been largely achieved, due to the lack of specificity in the outcome indicators, this validation notes that there has been underachievement in three out of the five outputs mainly due to the delays during the initial phase of the project that made the subsequent projects ready for financing under the MFF program. When the feasibility studies and designs were prepared, half of the implementation time had already elapsed. Although the final composition of the individual tranches was completed within the allowed time and budget, the MFF program as a whole, ended up with a reduced scope and disbursement. This PVR assesses the program less than effective.

C. Efficiency of Resource Use

28. The PCR rated the program and tranche 3 efficient.³⁶ It was originally approved for \$73.0 million but the actual cost was only 58% of the approved amount. The program was originally approved for \$900.0 million from ADB in 2006. At completion, only \$476.7 million or 53% of the original amount for the MFF program or 68% of the revised amount was used. This suggests underutilization of the resources due to delay in getting the projects ready for financing and implementation under the subsequent tranches.

29. The program encountered difficulties throughout implementation leading to two loan extensions for a cumulative period of 3 years from the original closing date. The second tranche was approved in December 2011, 5 years after the facility approval and the first tranche. The PFR report, serving as the basis for the second tranche approval, noted that the "MFF moved very slowly since its inception. ADB raised concerns with the authorities on the slow progress and informed them regarding possible cancellation of the facility unless enough priority projects were prepared and submitted." The program was completed in September 2017, 4 months after the planned program completion date but just within the MFF utilization period.

30. At appraisal, tranche 3 was envisaged to be completed in 2016 and loan closed in 2017. The delay in project implementation, however, led to the extension of the loan until the MFF completion date of 30 September 2017. Tranches 1 and 4 also had implementation delays.

31. While the PIAPPF component of tranche 1 supported the preparation of more than \$1.7 billion worth of projects, the timing of the delivery of these project proposals was not clearly specified. The timing of the approval of the second tranche suggests that the readiness of the projects for financing was only ascertained when the New Khanki Barrage project was endorsed for financing. The unutilized resource envelope of the MFF program at completion and the diversion of financing of the projects prepared under the PIAPPF to other financing instruments also suggest that the expected completion of these projects did not coincide with the MFF utilization period as the projects were developed late.

32. The economic internal rates of return (EIRRs) re-estimated for each of the projects at completion were compared with their EIRRs at appraisal. For tranches 1 and 4, the re-estimated EIRR is 23.0% (19.0% at appraisal), for tranche 2 the re-estimated EIRR is 19.6% (21.0% at appraisal) and for tranche 3 the re-estimated EIRR is 26.0% (29.1% at appraisal). These EIRRs relate to the R&U and renewal of barrages and canals. For all three projects, the extension and

³⁶ Tranches 2 and 3 were rated efficient in their respective PCRs (and PVRs).

delay in receipt of project benefits had the effect of lowering EIRRs. In the case of tranches 1 and 4, this was more than offset by the cropping intensity increasing faster than anticipated at appraisal. Some program benefits were not quantified. These were capacity building of the executing agency, improved transport links across barrages, and under tranche 2, construction of a girl's school, basic health unit, a recreational center and a park.³⁷ To this extent the re-estimated EIRRs are conservative. Despite the delays and reduced scope, the re-computed EIRRs were still substantially high. Based on re-estimated EIRRs being above 12% and additional program benefits not quantified, this validation assesses the program efficient.

D. Preliminary Assessment of Sustainability

33. The PCR rated the program and tranche 3 likely sustainable. Over the fiscal year from 2007 to 2018, the operational budget of PID more than doubled. The PCR indicated that the O&M and repairs budget of PID now better aligns with the requirements to prevent a backlog of deferred maintenance occurring. The improvements under the program to capital assets (e.g. the reduced flooding probability) will help to maintain them. There continues to be shortfalls in the collection of the irrigation service fee (*abiana*) from farmers and until this is rectified, there will be continued reliance on government budgets to cover this shortfall. At the approval of the program in 2006, the original output indicators included one target to establish FOs to undertake O&M with 75% collection efficiency for irrigation fees over 90% of the PIAIP area by end of the program. This indicator, has been removed in the final DMF. At the provincial level, the government is working with ADB technical assistance (TA) on a comprehensive policy and institutional review.³⁸ The World Bank is assisting the government to improve assessing irrigation service fees, tracking collection rates, and collecting data on water delivery performance ratios.³⁹ For tranche 3, the PCR indicated that PID staff are in place. The upgraded facilities will likely receive the appropriate O&M and repair funding.

34. Given the sufficiency of PID O&M budget allocations for the major upstream irrigation and flood control system assets, this validation assesses the program and tranche 3 likely sustainable. However, it notes the need for downstream assets (i.e. distributaries and minor canals) to receive adequate O&M funding for project benefits to be sustained. While the funds for this at project completion were still mainly being provided by the government, there is a need for this responsibility to be progressively passed onto the FOs.

III. OTHER PERFORMANCE ASSESSMENTS

A. Preliminary Assessment of Development Impact

35. The original impact of the MFF of economic growth in the program areas in Punjab was changed during implementation to a more focused and realistic scope of increased agricultural production and farm income in Punjab irrigated agriculture program areas. The PCR rated the development impact of the program and tranche 3 satisfactory. The program has had a significant developmental impact in improving irrigation services, drainage and flood management in an area of 3 million ha, benefitting 1.2 million farming families and some 8.8 million people, most of whom have limited income from small landholdings. At completion, the cropping intensities had

³⁷ Footnote 18, para. 12.

³⁸ ADB. 2016. *Institutional Transformation of the Punjab Irrigation Department to a Water Resources Department*. Manila.

³⁹ World Bank. 2017. *Strengthening Markets for Agriculture and Rural transformation Punjab Program*. Pakistan.

increased by 5%–9%, and farm incomes had increased by 15%–40%, with further increases expected from 2017 to 2021. At completion of tranche 3, the cropping intensity had increased by 9% between 2011 and 2016 and farm incomes had increased by 28% over the same period (footnote 37). On the basis of these achievements and the additional benefits delivered by the program (para. 32), this validation assesses development impact of the program and tranche 3 satisfactory.

B. Performance of the Borrower and Executing Agency

36. The PCR rated the performance of the borrower (government) and executing agency (PID) satisfactory, for both the program and tranche 3, reasons below. They demonstrated commitment to the success of the program, to implement the program in accordance with ADB guidelines and consult with ADB for guidance and approvals. Sufficient counterpart funds were provided in a timely manner. There was continuity of financing and implementation arrangements after loan closure to complete remaining works. They implemented the financial management system and separate and audited accounts and also prepared site-specific safeguards plans and communications strategy with affected communities. Shortcomings of the government and executing agency included the limited progress in establishing and supporting FOs (tranches 1 and 4) and the timely filling of staff vacancies. However, in the context of a large, complex program with a wide range of components and sub-components, these weaknesses did not unduly compromise the program's impact, outcomes and outputs. This validation assesses the performance of the borrower and executing agency satisfactory for the program and tranche 3.

C. Performance of the Asian Development Bank

37. The PCR rated the performance of ADB satisfactory for the program and tranche 3. ADB, together with other development partners, was involved with the streamlining of institutional reforms on irrigated agriculture during implementation. It addressed issues as they arose. It undertook timely loan cancellation to avoid commitment charges and loan currency changes to prevent currency fluctuation effects. ADB provided tranche 4 funding to complete tranche 1 and did regular review of progress and helped the executing agency resolve implementation issues like the rebidding of civil works packages and other procurement support. It provided separate loans for projects that could not be funded under the MFF. The PCR identified shortcomings such as low attention to progress on the institutional strengthening under tranche 1 and the changes in ADB project officers, which affected consistency in project administration.

38. In the context of the total program, these shortcomings were minor and this validation assesses the performance of ADB satisfactory. For tranche 3, the only identified issue was the changes in ADB staff. The performance of ADB is assessed satisfactory for tranche 3.

IV. OVERALL ASSESSMENT, LESSONS, AND RECOMMENDATIONS

A. Overall Assessment and Ratings

39. This validation assesses tranche 3 relevant, effective, efficient and likely sustainable while the program is assessed relevant, less than effective, efficient and likely sustainable. The overall assessment of the program (and each of projects 1, 2 and 3) is successful.

Overall Ratings

Validation Criteria	PCR	IED Review	Reason for Disagreement and/or Comments
Relevance L2299, L2300, L3351 L2841 L2971 MFF0009	Relevant Highly Relevant Relevant Relevant	Relevant Relevant Relevant Relevant	The project provided a modern barrage with an advanced operating system, but its features were not innovative enough for a highly relevant rating.
Effectiveness L2299, L2300, L3351 L2841 L2971 MFF0009	Effective Effective Effective Effective	Effective Effective Effective Less than effective	Underachievement in 3 out of 5 outputs due to initial delays resulting in reduced scope at completion.
Efficiency L2299, L2300, L3351 L2841 L2971 MFF0009	Efficient Efficient Efficient Efficient	Efficient Efficient Efficient Efficient	
Sustainability L2299, L2300, L3351 L2841 L2971 MFF0009	Likely Sustainable Likely Sustainable Likely Sustainable Likely Sustainable	Likely Sustainable Likely Sustainable Likely Sustainable Likely Sustainable	
Overall Assessment L2299, L2300, L3351 L2841 L2971 MFF0009	Successful Successful Successful Successful	Successful Successful Successful Successful	
Preliminary Assessment of Impact L2299, L2300, L3351 L2841 L2971 MFF0009	Satisfactory Satisfactory Satisfactory Satisfactory	Satisfactory Satisfactory Satisfactory Satisfactory	
Borrower and executing agency L2299, L2300, L3351 L2841 L2971 MFF0009	Satisfactory Satisfactory Satisfactory Satisfactory	Satisfactory Satisfactory Satisfactory Satisfactory	
Performance of ADB L2299, L2300, L3351 L2841 L2971 MFF0009	Satisfactory Satisfactory Satisfactory Satisfactory	Satisfactory Satisfactory Satisfactory Satisfactory	

Validation Criteria	PCR	IED Review	Reason for Disagreement and/or Comments
Quality of PCR		Satisfactory	Para. 45.

ADB = Asian Development Bank, IED = Independent Evaluation Department, PCR = Program completion report.
Source: ADB Independent Evaluation Department.

B. Lessons

40. PCR identified five **project-level** lessons which were useful. The institutional strengthening components of the program (tranches 1 and 4) was initially difficult to implement, it would have been useful if the program design adapted to the institutional structure and legal framework prevalent across command areas.⁴⁰ The implementation arrangement for tranches 1 and 4 was complex with multiple implementing units, reporting lines and use of funds, these needed to be streamlined during project implementation. The recruitment of consultants and detailed engineering design took longer for the program's projects, and capacity assessment of the construction industry is needed before presenting contract packages for bidding. The geographic spread of some civil works packages (the Pakpattan Canal (tranche 3) and LBDC distribution packages (tranche 1)), with operational flow constraints and short construction periods made these packages initially difficult to manage. This was resolved by PID operational staff joining the PMU and PIUs to improve progress, oversight ownership and resolve operational issues.

41. This validation identified the five lessons. At the **country level**, the preparation of a high quality PCR by ADB was likely assisted by a high quality government PCR prepared by international and national consultants engaged for project implementation. Future projects in all sectors would benefit from the preparation of a government PCR as part of the terms of reference of consultants. At the **sector level**, first, the ongoing delivery of benefits from an irrigation project aimed to improve upstream major assets is dependent on adequate financing and implementation arrangements for O&M of the downstream system of minor canals, distributaries and on-farm canals. Second, consideration should be given to protecting against currency fluctuations after loan effectiveness. One of the advantages of the MFF is that unexpected cost increases could be financed from contingency allowances, cost savings in other components as a result of reductions in their scope or from counterpart government budget funds. These could be explored first prior to securing additional financing. At the **program level**, first, for complex programs with a number of different components, activities addressing institutional reform may need to be ring-fenced from other program activities into their own separate project to prevent institutional reform not receiving the dedicated attention it requires. Second, close consultation with the government and readiness of the projects for financing are essential to avoid implementation delays.

C. Recommendations for Follow-Up

42. There were five program-related recommendations in the PCR. First, design of institution reform should not be overly complex and must take account of a thorough evaluation of farmers' willingness to pay irrigation service fees, the reallocation of water, and the potential for cost recovery. ADB's ongoing TA for a comprehensive policy and institutional review together with dialogue with government and development partners are timely. Second, the increased efficiency of water use and productivity through better collaboration with the agriculture department should be part of future irrigation sector projects. Third, improved asset management systems are needed to identify the backlog of maintenance and provide the basis for future projects. Fourth,

⁴⁰ The tranches 1 and 4 PCR also noted that the institutional reforms were difficult to implement as part of a project with other significant components (including civil works, OFWM, groundwater management and new project design components).

strong support of provincial governments is needed to help the enforcement of rules, strengthen area water boards, improve irrigation fee recovery, prevent water thefts and outlet tampering, impose and collect fines, and monitor channel discharges. Fifth, better monitoring and managing of groundwater resources is required.

43. The PCR recommended follow-up actions for PID. These included the completion of unfinished works (i.e., gate control electrification of the Balloki and Suleimanki barrages, FO facilities and the LBDC gauging, and discharge data calibration systems for the rehabilitated structures and channels); administration and close out of ongoing contracts during the defect liability periods; observation of channel hydraulics, outlet parameters and withdrawals and take any remedial measures necessary; strengthening of water measurement at outlets to assess water delivery performance; the repair of tampered or defective outlets and continuous regulation, enforcement and maintenance of the irrigation system.

V. OTHER CONSIDERATIONS AND FOLLOW-UP

A. Monitoring and Reporting

44. The data for the performance indicators at both the design and completion stages were adequate which reflected the capacity of the executing and implementing agencies to monitor the project performance data during and even after project implementation. This validation agrees with the PCR recommendation that the intended targets to the project impact should continue to be monitored and data should be collected by the PID by 2020 to confirm the achieved impact. The reporting on the compliance with the loan covenants was comprehensive and provided transparent information on the status of each covenant. The regular reports submitted were also noted to have been of acceptable quality and were generally received on time.

B. Comments on Program Completion Report Quality

45. Overall, the PCR is of good quality with detailed reporting on the project rationale, relevance, outputs and achievements, scheduling, financing, implementation arrangements, safeguards, and evaluation of performance. A detailed EIRR re-evaluation of tranche 3 is contained in an appendix to the PCR and a supplementary appendix contains the excel spreadsheets used for this analysis. The PCR preparation was likely aided by a detailed government PCR prepared for the MFF program. On the whole, the quality of the PCR is assessed satisfactory.

C. Data Sources for Validation

46. Data sources for this validation are the PCRs for tranche 1 and 4, tranche 2, and tranche 3 and MFF, the RRP, the PFR Reports for tranche 2, tranche 3⁴¹ and tranche 4 which was the basis for the additional financing for tranche 1, back to office reports and aide memoires relating to loan review missions, the program's safeguard assessment and the government's PCR.

D. Recommendation for Independent Evaluation Department Follow-Up

47. The PCR highly recommended the preparation of a project performance evaluation (PPER) report 2 years after the PCR to allow for a better assessment of the program's outcome

⁴¹ ADB. 2012. *Periodic Financing Request Report MFF 0009-PAK: Punjab Irrigated Agriculture Investment Program: Tranche 3*. Manila.

and progress of reforms. This validation recommends that a PPER should be undertaken after 2020 to allow for the latest data and information on the impact and outcome indicators to be more readily available. The PPER can also consider looking at the progress of the related irrigation projects financed by ADB that were originally included under the program, such as the Trimmu and Panjnad Barrages, Jalalpur Irrigation and Tanusa Barrages (footnote 35). The PPER will also be an opportunity to track the progress of the tranche and program output indicators that were partly or not achieved at completion.