



Report and Recommendation of the President to the Board of Directors

Project Number: 46528-002
November 2017

Proposed Loan Islamic Republic of Pakistan: Jalalpur Irrigation Project

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Asian Development Bank

CURRENCY EQUIVALENTS

as of 18 October 2017

Currency unit	–	Pakistan rupee (PRe/PRs)
PRe1.00	=	\$0.0094
\$1.00	=	PRs105.30

ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
EMP	–	environmental management plan
FAO	–	Food and Agriculture Organization of the United Nations
ha	–	hectare
HEIS	–	high-efficiency irrigation system
IBIS	–	Indus Basin Irrigation System
km	–	kilometer
LARP	–	land acquisition and resettlement plan
m ³	–	cubic meter
O&M	–	operation and maintenance
PAD	–	Punjab Agriculture Department
PAM	–	project administration manual
PDA	–	project design advance
PID	–	Punjab Irrigation Department
PIO	–	project implementation office
PMO	–	project management office
TA	–	technical assistance
WUA	–	water user association

NOTES

- (i) The fiscal year (FY) of the Government of Pakistan ends on 30 June. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2017 ends on 30 June 2017.
- (ii) In this report, “\$” refers to United States dollars.

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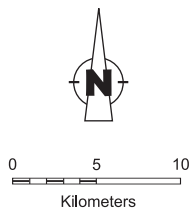
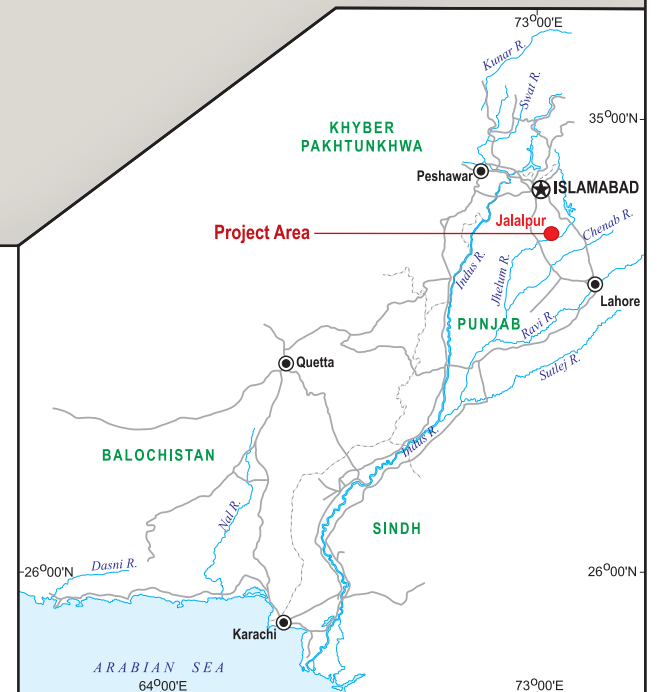
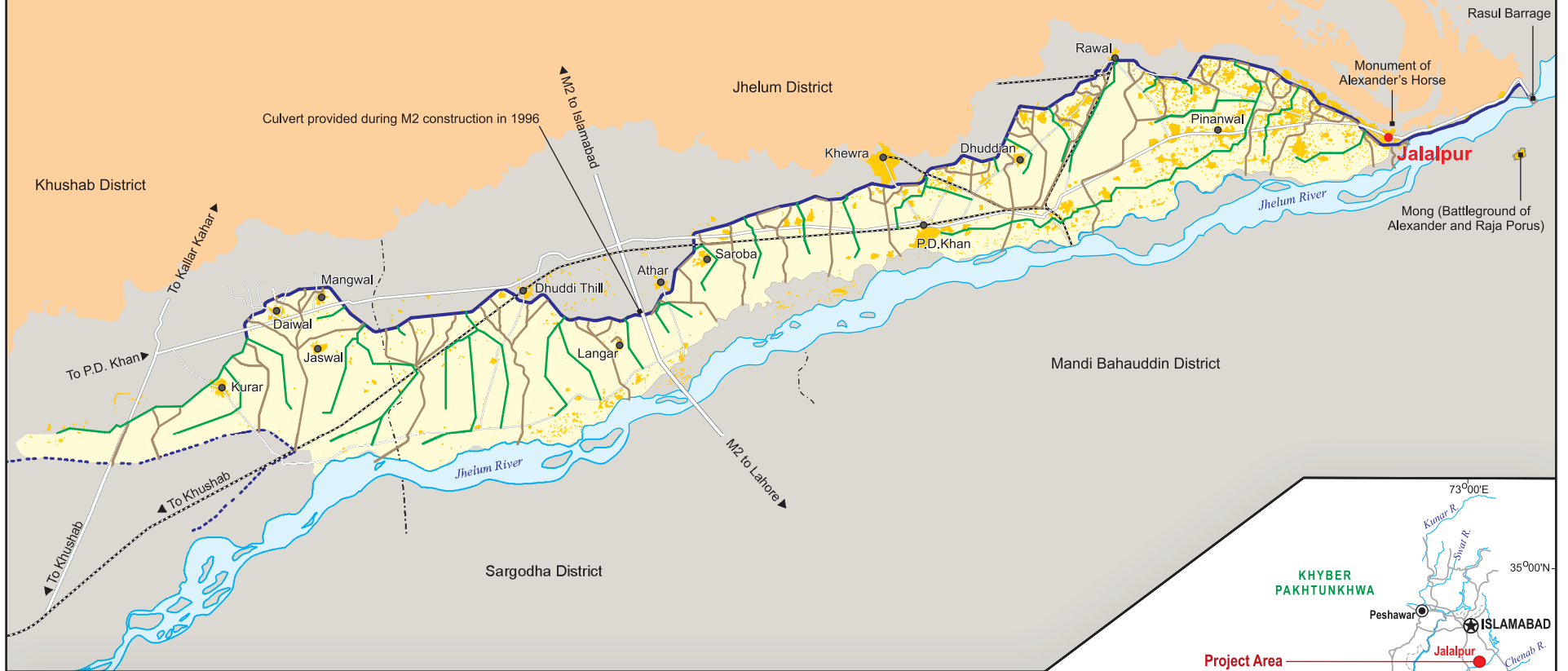
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PROJECT AT A GLANCE

1. Basic Data		Project Number: 46528-002	
Project Name	Jalalpur Irrigation Project	Department /Division	CWRD/CWER
Country	Pakistan	Executing Agency	Punjab Irrigation Department
Borrower	Islamic Republic of Pakistan		
2. Sector		ADB Financing (\$ million)	
✓ Agriculture, natural resources and rural development	Subsector(s)		
	Agricultural production		41.19
	Irrigation		233.44
		Total	274.63
3. Strategic Agenda		Climate Change Information	
Inclusive economic growth (IEG)	Subcomponents	Adaptation (\$ million)	1.70
	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	High
Environmentally sustainable growth (ESG)	Natural resources conservation		
4. Drivers of Change		Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Components	Effective gender mainstreaming (EGM)	✓
	Institutional development		
5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	No	Rural	High
Household Targeting	No		
SDG Targeting	Yes		
SDG Goals	SDG2, SDG6, SDG8		
6. Risk Categorization:		Complex	
7. Safeguard Categorization		Environment: A Involuntary Resettlement: A Indigenous Peoples: C	
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		274.63	
Sovereign Project (Regular Loan): Ordinary capital resources		274.63	
Cofinancing		0.00	
None		0.00	
Counterpart		85.96	
Beneficiaries		5.16	
Government		80.80	
Total		360.59	

PAKISTAN JALALPUR IRRIGATION PROJECT

SALT RANGE



- | | | | |
|--|--------------------|--|---|
| | National Capital | | Project Area |
| | Provincial Capital | | Proposed Distributaries and Minors |
| | City/Town | | Proposed Floor Carrier Channel |
| | Major Road | | Main Canal |
| | Minor Road | | Settlements |
| | Railway | | Salt Range |
| | River | | Boundaries are not necessarily authoritative. |
| | District Boundary | | |

This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Islamic Republic of Pakistan for the Jalalpur Irrigation Project.

2. The project will build a new *kharif* season (April to October) surface irrigation system covering about 68,263 hectares (ha) of less productive, predominantly rain-fed land in the Jhelum and Khushab districts in Punjab province.¹ The irrigation system will become part of the Indus Basin Irrigation System (IBIS) by diverting the flows of the Jhelum River at the Rasul Barrage. It will comprise a diversion structure, a 117-kilometer (km) main canal, 23 distributaries, 10 minor canals, 485 watercourses, and associated structures. The primary beneficiaries are 384,000 people in 80 villages in the project area.²

II. THE PROJECT

A. Rationale

3. **Sector overview.** Agriculture contributed 20% of gross domestic product and was Pakistan's largest employer, absorbing 42% of the country's total labor force in fiscal year (FY) 2015.³ About 30% of the population lived below the poverty line during FY2014, or about 55 million out of Pakistan's estimated population of 186 million (footnote 3). At 36%, the poverty incidence in rural areas in FY2014 was almost double the 19% rate in urban areas (footnote 3). Pakistan's major crops are wheat, rice, sugarcane, maize, and cotton, which account for 24% of the value added in overall agriculture and 5% of gross domestic product. Punjab's contribution to the agriculture sector is estimated at more than 80%. The province produced 76% of the nation's total output of wheat, 51% of rice, 65% of sugarcane, 81% of maize, and 72% of cotton.

4. The Ministry of Planning, Development and Reform has estimated that the agriculture sector has to grow 5% per year to reduce the poverty incidence and ensure food security, and for the national economy to reach its 7%–8% annual growth target.⁴ But agriculture's annual growth rate only averaged 2.8% during 2010–2014, a significant drop from 4.4% average annual growth rates experienced during 1990s and from 3.2% during 2000s.⁵ The sector is increasingly dominated by small farmers who produce mostly for their own food needs. Only 17% of farms are large, produce cash crops, and engage in value-added activities.⁶

5. In the Punjab Growth Strategy 2018,⁷ the government of Punjab sees growth in the agriculture sector as a key element in achieving inclusive growth, and highlights the following: (i) increased crop productivity through improved agriculture research and extension, on-farm water management, and farm inputs; (ii) better value chains; (iii) better use of energy; (iv) increased high-value agriculture; (v) improved land resources and environment and adaptability to climate

¹ *Kharif* refers to the sowing season for summer crops.

² The Asian Development Bank (ADB) provided project preparatory technical assistance for the Jalalpur Irrigation Project (TA 8404-PAK).

³ Government of Pakistan, Ministry of Finance. 2016. *Pakistan Economic Survey, 2015–16*. Islamabad.

⁴ Government of Pakistan, Ministry of National Food Security and Research. 2013. *Agriculture and Food Security Policy (Draft)*. Islamabad.

⁵ International Food Policy Research Institute. 2016. *How to Revitalize Pakistan's Agriculture Sector and Rural Economy*. 12 December. <http://www.ifpri.org/blog/how-revitalize-pakistans-agricultural-sector-and-rural-economy>

⁶ Food and Agriculture Organization of the United Nations (FAO), Investment Centre Division. 2012. *Pakistan: Priority Areas for Investment in the Agricultural Sector*. Rome.

⁷ Government of Punjab, Planning and Development Department. 2015. *Punjab Growth Strategy 2018: Accelerating Economic Growth and Improving Social Outcomes*. Lahore.

change impacts; (vi) increased cultivated area; (vii) improved productivity of water use by improving irrigation infrastructures; and (viii) improved regulatory and institutional changes, mainly on agriculture inputs. The Asian Development Bank (ADB) has been supporting the government of Punjab in strengthening on-farm water management, adapting to climate change impacts, and rehabilitating irrigation systems, all of which require substantial financing resources.

6. Because of the country's semi-arid climate, with an average annual rainfall of 240 millimeters in most parts of the country, about 80% of arable land and more than 90% of agriculture output depends on irrigation. One of the strengths of the agriculture sector is the availability of water from IBIS, the world's largest contiguous irrigation system covering 15 million ha of farmland, which accounts for 74% of the country's irrigated area.⁸ The operational performance of irrigation systems, including IBIS, however, is less than satisfactory. Crop water requirements have dramatically increased as a result of the increase in cropping intensities and the cultivation of high water-consuming crops. While demand for canal irrigation water has increased, surface water availability has essentially remained unchanged as no new reservoirs have been constructed on the Indus River since 1976. Irrigation efficiency is also low at about 40%. Agriculture productivity per unit of water, land, and other inputs is well below global and regional standards because of mismanagement of water resources.⁹

7. IBIS is also financially unsustainable, recovering on average only 24% of the costs necessary for the effective management of the irrigation infrastructure.¹⁰ As a result, asset management remains a pervasive problem as irrigation departments routinely defer maintenance because they lack funds to cover operation and maintenance (O&M) costs. To establish efficient and sustainable irrigation and drainage institutions, the government of Pakistan launched a far-reaching sector reform initiative in 1997 across Pakistan's four provinces with a view to converting the provincial irrigation departments into autonomous and self-accounting irrigation and drainage authorities. The reforms, however, were not fully successful and the self-accounting irrigation and drainage authorities still lack the capacity to carry out their intended tasks.¹¹ ADB, through its technical assistance (TA), is reviewing the reforms and their related plans and actions and will integrate them, as appropriate, into the transformation process of the Punjab Irrigation Department (PID) into the Water Resources Department.¹²

8. To address the country's water stress in the short to medium term, Pakistan needs to invest more in (i) water conservation, (ii) high-efficiency irrigation, (iii) the capture of unclaimed monsoon flows to irrigate rain-fed areas, and (iv) modern irrigation systems and measures to improve asset management and irrigation service delivery to ensure food security.

9. About 20% of Pakistan's cultivable area is outside IBIS. Farming in most of these areas (about 3.24 million ha) is rain fed, resulting in low agricultural productivity. Some of the country's poorest people live in these areas and depend on agriculture for their income. Without a secure source of water for irrigation, farming in rain-fed areas is both a low-productivity and a high-risk

⁸ FAO. 2012. Irrigation in Southern and Eastern Asia in Figures: AQUASTAT Survey 2011. *FAO Water Reports*. No. 37. Rome.

⁹ Friends of Democratic Pakistan Water Sector Task Force. 2012. *A Productive and Water-Secure Pakistan: Infrastructure, Institutions, Strategy*. Islamabad.

¹⁰ Government of Pakistan, Planning Commission. 2012. *Canal Water Pricing for Irrigation in Pakistan: Assessment, Issues and Options*. Islamabad.

¹¹ Irrigation subsector reform is discussed in the Project Administration Manual (accessible from the list of linked documents in Appendix 2).

¹² ADB. 2016. *Technical Assistance to the Islamic Republic of Pakistan for the Institutional Transformation of the Punjab Irrigation Department to a Water Resources Department*. Manila.

venture. Although Punjab accounts for 57% of the nation's cultivable area and accounts for 78% of the nation's irrigated area, about 13% of cultivable land in Punjab is still rain fed.¹³

10. **Proposed investment.** The project aims to increase agriculture production by bringing 68,263 ha of less-productive, predominantly rain-fed agricultural land under new IBIS coverage. More than 500,000 people live in the project area, and more than 70% of these people rely on farming for their livelihood.¹⁴ Available water for farming is limited, as runoffs from the nearby hills and the groundwater are highly saline. The project will provide as much as 284 million cubic meters of fresh and good quality water annually from the Jhelum River during the high-flow *kharif* season,¹⁵ in accordance with the Water Apportionment Accord that determines the agreed share of waters in the Indus Basin among the country's four provinces.¹⁶ ADB first identified the project for possible financing in 2013¹⁷ and completed a feasibility study in 2015 (footnote 2).

11. The analysis of climate change impacts in the project area for 2025 and 2050 shows that annual rainfall is likely to increase about 4.0% by 2025 and 6.5% by 2050, with the maximum increase likely to occur in the summer (July–September). The analysis also suggested a maximum increase in extreme rainfall events of about 6% by 2025 and 10% by 2050 for a 100-year return period. The temperatures will also rise throughout the year, increasing the water requirements of crops. Such increase will be compensated for by increased precipitation.¹⁸

12. The project is consistent with ADB's country partnership strategy for Pakistan, 2015–2019, which prioritizes the promotion of better water resource management and irrigation,¹⁹ and is included in ADB's country operations business plan for Pakistan, 2017–2019.²⁰ The project is included in the list of upcoming irrigation subsector investments (footnote 7). It is consistent with ADB's Water Operational Plan, 2011–2020 and will contribute to some outputs expected in the plan.²¹ Under the current partnership strategy, ADB has been financing two irrigation subsector projects for the Punjab government. The first was the four-tranche multitranche financing facility for the Punjab Irrigated Agriculture Investment Program in 2006. Except for slow progress in the first tranche, all tranches were completed by the original program completion date of September 2017 and delivered major intended infrastructure outputs.²² The second is the Trimmu and Panjnad Barrages Improvement Project approved in 2014, which is being implemented without serious implementation problems.²³

¹³ Government of Pakistan, Ministry of National Food Security and Research. 2013. *Agricultural Statistics of Pakistan 2011–2012*. Islamabad.

¹⁴ The Jalalpur Sharif, one of the beneficiary towns in the Jhelum district, is known as the camp site of Alexander the Great and his troops in May 326 BC, prior to his last great Battle of Hydaspes River (now Jhelum River) against Raja Porus. The Khewra Salt Mines is the world's second-largest salt mine and is located near Khewra town, another beneficiary town.

¹⁵ The volume of 284 million cubic meters (m³) considering the estimated conveyance efficiency of 68%.

¹⁶ Punjab's water withdrawal entitlement from the Indus system during the high-flow season is 45.7 billion m³, while the province's average actual water withdrawal in the same period during 1991–2012 was 41.3 billion m³. Thus, Punjab is entitled to an additional 4.4 billion m³ (the balance between the two). The total average water withdrawal of the Jalalpur irrigation system would be about 6.4% of this unclaimed water entitlement.

¹⁷ ADB. 2013. *Country Operations Business Plan: Pakistan, 2013–2014*. Manila.

¹⁸ Climate Change Risk Vulnerability Assessment and Adaptation Measures (accessible from the list of linked documents in Appendix 2).

¹⁹ ADB. 2015. *Country Partnership Strategy: Pakistan, 2015–2019*. Manila.

²⁰ ADB. 2016. *Country Operations Business Plan: Pakistan, 2017–2019*. Manila.

²¹ ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

²² ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to the Islamic Republic of Pakistan for the Punjab Irrigated Agriculture Investment Program*. Manila.

²³ ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Islamic Republic of Pakistan for the Trimmu and Panjnad Barrages Improvement Project*. Manila.

13. The community participatory approach for constructing 485 watercourses under output 2 reflects the lessons identified in the country assistance program evaluation, 2002–2012: (i) past projects were often successfully facilitated by community-based organizations; and (ii) ADB's desired shift to infrastructure operations, relying on only a few large contracts, should take into account that certain types of projects may lead to more complete development outcomes when nongovernment organizations and community-based organizations are involved.²⁴

14. The project is design and procurement ready. The PID completed the detailed engineering design, successfully and in a timely manner, in August 2017 under the project design advance (PDA) approved in January 2016 with \$5 million financing.²⁵ The PID has already been in the process of shortlisting the major project implementation consultants for this project. By the end of May 2018, the PID is expected to complete international competitive bidding for the construction of the main irrigation system, and engage the major project implementation consultants. Land acquisition for the main irrigation system is in the advanced stage, with 50% completed as of September 2017. The improved project readiness reflected the lesson identified in administering the first-tranche of the Punjab Irrigated Agriculture Investment Program, which took 10 years to complete because of the absence of its detailed design and draft bid document at the approval.

B. Impact and Outcome

15. The project is aligned with the following impact: growth of agriculture sector enhanced and food security ensured (footnote 7). The project will have the following outcome: agricultural production in the project area increased.²⁶

C. Outputs

16. **Output 1: Jalalpur irrigation distribution system established.** The structures to be constructed include an intake structure at the right bank of the Jhelum River at the Rasul Barrage, with a design discharge capacity of 38.2 cubic meters per second. The flow will be conveyed to the project area through a 117-km main canal and further distributed throughout the project area via 23 distributaries and 10 minor canals. The good quality water that will be delivered by the irrigation system will reduce the use of saline groundwater. Because the main canal will traverse natural drainage channels that carry seasonal and saline flood water from the Salt Range, the project will construct 72 cross-drainage structures for the safe passage of flood water across the main canal. The project will also construct 18 flood-carrier channels to drain saline flood water to the Jhelum River, protect the project area from floods, and restore soil productivity. In addition, the project will construct 253 associated structures, including 42 flow regulators and drops, 16 railway and road bridges, 15 footbridges, and 2 escapes. The project will also construct 485 watercourses and 17 drinking water supply outlets and, for easy access to water by livestock, 30 cattle baths.

17. The project will develop a monitoring and evaluation system using satellite remote sensing technology to assess irrigation efficiency, crop growing, water productivity, and the *abiana*;²⁷ and will train staff from the PID and the Punjab Agriculture Department (PAD) to use the system. To ensure sustainable O&M of the Jalalpur irrigation system, the project will develop a guideline and a sustainable plan for the system's O&M with improved asset management and irrigation service

²⁴ Independent Evaluation Department. 2013. *Country Assistance Program Evaluation: Pakistan: 2002–2012—Responding to the Changing Development Conditions*. Manila: ADB.

²⁵ ADB. 2016. *Project Design Advance: Jalalpur Irrigation Project in the Islamic Republic of Pakistan*. Manila.

²⁶ The design and monitoring framework is in Appendix 1.

²⁷ The *abiana* is the irrigation service fee assessed based on expected crop production.

delivery using the government of Punjab's committed budget allocation. To address potential risks against extreme torrents from the hilly terrain and floods from the Jhelum River, the project will also develop a flood disaster risk management plan.

18. **Output 2: Water-use capacity improved in project areas.** The project will construct 485 farm-level field channels (watercourses) to distribute irrigation water over 68,263 ha of farmland during April–October. The project will organize the beneficiary farmers into water user associations (WUAs) that will be responsible for the O&M of the watercourses and their associated structures, and provide training to strengthen their capacity. The project will involve the WUAs in planning, designing, and constructing the watercourses; and will provide precast parabolic concrete segments to cover 50% of the length of each watercourse.²⁸ To increase crop yields and irrigation application efficiency with minimum water wastage,²⁹ the project will provide the project area with precision land leveling covering about 12,140 ha, high-efficiency irrigation systems (HEISs) covering more than 800 ha, and 20 water storage ponds with solar pumping stations, under a cost-sharing arrangement with the beneficiary farmers. The project will train the WUAs and the farmers on climate-smart irrigation practices covering (i) the use of solar pumping stations, (ii) precise land leveling and HEISs, (iii) irrigation schedules based on crop water requirements, and (iv) other management techniques to maximize water productivity.

19. **Output 3: Farm management capacity improved in project areas.** The project will establish 664 agricultural demonstration farms of varying sizes covering 220 ha. The project will provide 6,000 farm households with advisory services and training on climate-smart irrigated agriculture practices and more profitable farm management through demonstration activities and farmer field schools. The services and training will cover cropping patterns for high-value crops, selection and adequate use of seeds and fertilizers, soil analysis and soil improvement techniques, and better marketing. The project will (i) organize knowledge-sharing events to promote modern water management and farming technologies, (ii) provide farmers with private agriculture support services for marketing and supply chain management of high-value agriculture, and (iii) help farmers develop links between growers and the market.

D. Summary Cost Estimates and Financing Plan

20. The project is estimated to cost \$360.59 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).³⁰

Table 1: Summary Cost Estimates
(\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Jalalpur irrigation distribution system established	263.19
2. Water-use capacity improved in project areas	34.48
3. Farm management capacity improved in project areas	2.34
Subtotal (A)	300.01
B. Contingencies^c	43.22
C. Financial Charges During Implementation^d	17.36
Total (A+B+C)	360.59

^a Includes taxes and duties of \$33.01 million, which the government will finance through cash contribution. Such amount does not represent an excessive share of the project cost. Farmers' contribution estimated at \$5.16 million is included in output 2.

²⁸ The remaining watercourse length will remain unlined, as further water reduction losses when more than 50%–60% is lined are not significant when compared with the cost of lining.

²⁹ The field application efficiency is estimated at 75%.

³⁰ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

^b In mid-2017 prices as of July 2017.

^c Physical contingencies computed at 3% for all expenditure accounts given the detailed technical due diligence. Price contingencies computed at an average of 2% on foreign exchange costs and 6% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

^d Includes interest and commitment charges. Interest during construction for the ordinary capital resources loan has been computed at the 5-year United States dollar fixed swap rate plus an effective contractual spread of 0.5%. Commitment charges for the ordinary capital resources loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

21. The government of Pakistan has requested a regular loan of \$274.63 million from ADB's ordinary capital resources to help finance the project. The loan will have a 20-year term, including a grace period of 5 years with straight-line repayment 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 rate and other charges during construction to be capitalized in the loan); and such other terms and conditions set forth in the draft loan and project agreements. Based on these loan terms and repayment method, the average loan maturity is 12.75 years and there is no maturity premium payable to ADB. The summary financing plan is in Table 2.

Table 2: Summary Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	274.63	76.2
Government ^a	85.96	23.8
Total	360.59	100.0

^a Includes farmers' contribution estimated at \$5.16 million.

Source: Asian Development Bank estimates.

E. Implementation Arrangements

22. The PID will be the executing agency and will oversee the entire project. It has experience implementing projects financed by ADB, the Japan International Cooperation Agency, and the World Bank, and has ample technical, procurement, and managerial capacity to oversee these investments. The project management office (PMO) for canals (PMO-Canals) for the Punjab Irrigated Agriculture Investment Program will execute output 1 of this project.³¹ The PMO-Canals staff has experience in managing ADB projects, such as the Lower Bari Doab Canal Improvement Project under the Punjab Irrigated Agriculture Investment Program (footnote 22). The PAD will be the implementing agency. A project implementation office (PIO) to be established in the PAD will implement outputs 2 and 3, under the overall coordination and oversight of the PID. Except for direct payments, all funds will be channeled through the PID and the PAD. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 30).

Table 3: Implementation Arrangements

Aspects	Arrangements
Implementation period	February 2018–December 2023
Estimated completion date	31 December 2023
Estimated loan closing date	30 June 2024
Management	
(i) Oversight body	Project Steering Committee

³¹ In September 2017, the PMO was transformed from the project management unit that implemented two loans under the Punjab Irrigated Agriculture Investment Program multitranchise financing facility for the Lower Bari Doab Canal Improvement Project.

Aspects	Arrangements		
	Chair: Chairperson, Planning and Development Board Members: PID and PAD secretaries, Punjab Finance Department, Punjab Environment Department, Board of Revenue member		
(ii) Executing agency	PID		
(iii) Implementing agency	PAD		
(iv) Project management office	About 30 main staff in Lahore		
(v) Project implementation office	About 35 main staff in Lahore and in the field		
Procurement	ICB	3 contracts	\$184.0 million
	Shopping	Multiple	\$26.2 million ^a
Consulting services	QCBS (90:10)	18 person-months, international 524 key person-months, national	\$13.3 million
	QCBS (90:10)	277 key person-months, national	\$2.8 million
	QCBS (90:10)	372 key person-months, national	\$2.3 million
	ICS	12 person-months, international 30 person-months, national	\$0.3 million
Retroactive financing and/or advance contracting	The project will use advance contracting and has requested retroactive financing for the engagement of the project implementation consultant.		
Disbursement	The loan proceeds will be disbursed following ADB's <i>Loan Disbursement Handbook</i> (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank, ICB = international competitive bidding, ICS = individual consultant selection, PAD = Punjab Agriculture Department, PID = Punjab Irrigation Department, QCBS = quality- and cost-based selection, WUA = water user association.

^a Includes \$20.7 million for the construction of 485 watercourses through community participatory procurements. This will enhance community mobilization, involvement and ownership of the WUAs, and the employment of labor-intensive techniques through a cost-sharing mechanism. The WUAs and the PAD will enter an agreement by which WUAs will execute the works.

Source: Asian Development Bank estimates.

III. DUE DILIGENCE

A. Technical

23. The initial 7 km of the Jalalpur main canal from the intake at the Rasul Barrage runs through a narrow space between the right bank of the Jhelum River and the steep hilly terrain. The PID, under the PDA, examined several alignment options of the initial section through a model experiment, considering potential risks from extreme torrents from the hilly terrain and floods from the Jhelum River, and selected the least-cost solution for capital investment and O&M. The project will build 72 cross-drainages to let the flood flows pass safely across the main canal, and 18 flood-carrier channels to let the saline flood flows pass to the Jhelum River. The design capacity of the cross-drainage structures and flood-carrier channels, with a 40-year return period for floods, is sufficient to incorporate the risk of the increase in flood events because of climate change.

24. **Value added by ADB assistance.** The project will incorporate innovative satellite remote sensing technology into the monitoring and evaluation system for the efficient and transparent assessment of irrigation efficiency, crop growing, water productivity, and the *abiana*. Precise land leveling of about 12,140 ha and HEISs covering more than 800 ha will increase irrigation application efficiency to reduce water wastage. The project will build a concrete flume on 50% of the length of each watercourse to avoid water losses.

B. Economic and Financial

25. The project's main economic benefits will be increased agricultural production made possible by the provision of seasonal irrigation water to about 68,263 ha of land with low agricultural productivity. Good quality irrigation, to be made available by the project during April–October every year, will help not only the summer crops but also the winter crops (October–May) because of the increased soil moisture at the end of the irrigation season and the gradual improvement in groundwater quality. Over its 6-year implementation period, the project will bring about diversification, increase crop intensity from 13% to 90%, and, depending on the crop, increase crop yield by between 12% and 141%. The estimated internal economic rate of return is 15%.³² The sensitivity analysis indicates that the economic viability of the project is most sensitive to a 2-year delay in the realization of benefits. Therefore, it is essential that the project is implemented as scheduled through the provision of technical and extension support to the project beneficiaries.

26. The management and O&M of Punjab's irrigation systems is estimated at \$51.30/ha per year. During 2013–2016, the government of Punjab has allocated \$158 million equivalent or \$18.60/ha annually on average for this purpose. Despite the financial gap, Punjab's irrigation systems are in reasonably good condition and deliver an acceptable level of water to end users. The government of Punjab will allocate adequate resources to fully implement the O&M plan to be developed under the project. During the development of the O&M plan, the PID and ADB will reassess and reconfirm the adequacy of the O&M requirement.³³ ADB will provide small-scale TA for the continued monitoring of the financial sustainability and O&M status of the Jalalpur irrigation system after project completion. Ensuring the financial sustainability of irrigation systems is the core agenda of irrigation sector reforms. ADB, through its TA, is reviewing the reforms and their related plans and actions and will integrate them, as appropriate, into the transformation process of the PID into the Water Resources Department under ADB TA (footnote 12).

C. Governance

27. The financial management assessment concluded that the PID and the PAD have satisfactory capability to record financial transactions and balances, provide regular records and monitor reports, and safeguard assets. But their financial management risks were assessed *substantial* because the assessment identified an accounting staff shortage in the PID and a lack of internal audit arrangement in the PID and the PAD. To address these weaknesses, the PID and the PAD will need to be strengthened by appointing additional staff.

28. Procurement of civil works and goods will follow ADB's Procurement Guidelines (2013, as amended from time to time), while consultant engagement will follow ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). All civil works contracts valued at \$10 million and above will be procured using international competitive bidding. Consulting services will be recruited in two packages for the project management and construction supervision of the PMO-Canals, and one package for implementation support of outputs 2 and 3 under the PIO, using the quality- and cost-based selection method with a 90:10 ratio. Two individual consultants (one for social and another for environment) will be required for the external monitoring of safeguard implementation under the PMO-Canals, and two other individual consultants will be required to support the PID secretary. The procurement risks of the PMO-Canals and the PIO

³² Economic and Financial Analysis (accessible from the list of linked documents in Appendix 2).

³³ A detailed financial sustainability assessment and a guidance note to develop a plan for the sustainable O&M of the Jalalpur irrigation system are in the project administration manual.

were rated *low*.³⁴ ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government of Punjab, the PID, and the PAD. The specific policy requirements and supplementary measures are described in the PAM (footnote 30).

D. Poverty, Social, and Gender

29. Agricultural land is turning barren because of groundwater salinity and the use of saline flood water from the Salt Range for agriculture, which ultimately reduces crop production and leads to increasing poverty in the region. The majority of farmers in the project areas have smallholdings and are considered poor. The construction of a new irrigation system; provision of irrigation supplies and agricultural support services; and training on the efficient use of irrigation water, irrigated agriculture practice, and more profitable farm management will contribute to poverty reduction by increasing agricultural production and improving the income of about 500,000 mostly poor rural people. Irrigated agriculture will create job opportunities for on-farm and off-farm labor in both farming and nonfarming communities. The communities will also benefit from the reliable supply of irrigation water, as well as improved water-use skills. The project will construct about 17 water supply outlets, which will help reduce poverty by increasing household access to safe water.

30. In addition to their household tasks, women perform a large proportion of agriculture- and livestock-related activities, which often require the use of water. Yet women farmers are often excluded from training on improved agricultural practices and water-use skills. They also have very little participation in decision making as they are often not WUA members. The project is classified *effective gender mainstreaming* and will address these gender issues by (i) installing water supply outlets, cattle baths, fencing, and crossing points in strategic places of the irrigation system; (ii) encouraging women's participation in the WUAs; (iii) training women on water-use skills; and (iv) ensuring women farmers' participation in training on irrigated agricultural practices and profitable farming systems.

E. Safeguards

31. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows:

32. **Environment (category A).** The PID prepared an environmental impact assessment (EIA) following the Safeguard Policy Statement. Major anticipated adverse environmental and social impacts related to construction include soil erosion, noise, cutting trees, and impacts on public structures and infrastructure. Among the potential adverse impacts during operation are floods from hill torrents, disposal of solid waste in canals, and use of fertilizers and pesticides. Protected zones near the project area are the Jalalpur Wildlife Sanctuary, which is a breeding area for the Punjab urial, and the Rasul Barrage Game Reserve. The EIA established that the project will not have any significant impact on the avifauna and aquatic life of the game reserve, nor will it affect wildlife in the wildlife sanctuary. The PID incorporated adequate mitigation measures into the project design and will implement them through an environmental management plan (EMP). The environment experts of the project implementation consultant will supervise the contractor in implementing the EMP. The PID will establish an environmental and social safeguard unit, which will ensure that the project is implemented in an environmentally sustainable manner. An external individual environment expert will ensure that all contractual obligations related to environmental and social compliance are met. The EMP includes provisions on environmental

³⁴ Procurement Risk Assessment (accessible from the list of linked documents in Appendix 2).

and social management, as well as an occupational health and safety development program, and the PMO-Canals and contractors will implement them through training and workshops at the preconstruction and construction stages. The project complies with public disclosure and consultation requirements. The PDA consultants held two rounds of community consultations during the EIA process and disclosed the EIA on the ADB website on 4 July 2017.

33. **Involuntary resettlement (category A).** The main canal, distributaries, and flood-carrier channels to be constructed under output 1 will require 3,283 ha of land. Almost 99% of the required land is privately owned and will need to be acquired. Out of this, 1,370 ha is agricultural land. Only about 5.6 ha is for residential and/or commercial purposes. At the main canal, 216 residential and 10 commercial structures may be affected, along with 43 tube wells and related structures. Construction of the distributaries may also affect about 39 miscellaneous private structures. About 8,000 people may be affected. Of these, 2,920 landowners may lose 10% or more of their agricultural land, while 166 owners of residential and commercial structures may need to relocate. The PDA consultants prepared a draft land acquisition and resettlement plan (LARP) following the Safeguard Policy Statement based on a socio-economic survey of 400 potentially displaced persons and community consultations. The PID disclosed the draft LARP on the ADB website on 25 August 2017. The PID will prepare the final LARPs following the notification of land acquisition under Sections 4 and 6 of the Pakistan Land Acquisition Act (1894), marking of the project boundaries in the field, census, detailed measurement surveys, and further consultations with affected persons. Under output 2, land will be required for the 485 watercourses to be constructed, along with more than 18,910 small farm turnout structures. The required land will be provided by the farmers and local communities as counterpart support, including other assets, therefore involuntary resettlement is not involved. Safeguard measures to ensure that contributions are voluntary and documented are provided in the PAM.

34. **Indigenous peoples (category C).** Punjabis comprise the majority of the population in the project area, and there are no communities or groups that may be considered as indigenous peoples as defined under the Safeguard Policy Statement. All ethnic groups are mainstreamed into the general Pakistan society and culture.

F. Summary of Risk Assessment and Risk Management Plan

35. ADB has identified and assessed the risks associated in the implementation and sustained performance of the project in aspects such as technical; economic and financial; governance; poverty, social, and gender; and safeguards. The project's overall risk was assessed *moderate*. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.³⁵

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Extreme weather events cause hill torrent floods above design discharges, damaging the irrigation system, farm land, and properties.	The PID examined several options for the initial section using a model experiment and selected the least-cost solution for capital investment and O&M. The PMO-Canals, with help from project implementation consultants, will develop the flood disaster risk management plan and will train PID staff to implement the plan.
Deteriorating irrigation cost recovery and inadequate budget support lead to poor asset management, reducing the financial and economic returns of the irrigation services.	The government of Punjab will provide an adequate O&M budget from FY2023 onward for the completed Jalalpur irrigation system and its associated facilities. The PID will monitor and record the actual O&M expenses, budget allocation, and assessment and recovery of <i>abiana</i>

³⁵ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Risks	Mitigation Measures
	(irrigation service fee) on an annual basis, and make such information available to ADB on request.
The PMO-Canals and the PIO lack financial management staff, which may cause project delay. The absence of internal auditing at provincial departments may affect effective risk management and control.	The PMO-Canals will establish an accountant and an assistant accountant positions, and the PIO will establish an accountant position. The PMO-Canals and PIO will adopt a financial management manual that is tailored to the needs of the project.

ADB = Asian Development Bank, FY = fiscal year, O&M = operation and maintenance, PID = Punjab Irrigation Department, PIO = project implementation office, PMO = project management office.

Source: Asian Development Bank.

IV. ASSURANCES AND CONDITIONS

36. The government and the PID have assured ADB that implementation of the project shall 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, which are set forth in the draft loan agreement and project agreements.

37. The government of Punjab has assured ADB that (i) by 31 November 2021, the PID will approve for the Jalalpur irrigation system (a) the guidelines and plan for sustainable O&M with improved asset management and irrigation service delivery, and (b) a flood disaster risk management plan; (ii) by no later than 30 June 2022, the PID will start the implementation of the plans; (iii) an adequate O&M budget for the completed Jalalpur irrigation system and its associated facilities is provided starting in FY2023; and (iv) actual O&M expenses, budget allocations, and assessment of recovery of *abiana* are monitored and recorded annually and promptly provided to ADB for at least 5 years following the project completion. The government of Punjab has also agreed that no withdrawals shall be made from the loan account until qualified accounting staff are engaged at the PMO-Canals in the PID and the PIO in the PAD.

V. RECOMMENDATION

38. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of \$274,630,000 to the Islamic Republic of Pakistan for the Jalalpur Irrigation Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 20 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

2 November 2017

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with			
Growth of agriculture sector enhanced and food security ensured (Punjab Growth Strategy 2018) ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
<p>Outcome Agricultural production in the project area increased</p>	<p>By 2024:</p> <p>a. Cropping intensity during <i>khari</i>^b season increased to 90% in the project area of 68,263 ha (2008–2014 average baseline: 13%)</p> <p>b. Crop yield in the project area during <i>khari</i> season increased by 141% for cotton, 12% for maize, 17% for rice, 29% for <i>tinda</i>,^c 45% for sorghum, and 66% for wheat (2008–2014 baseline: cotton 0.58 t/ha; maize 6.95 t/ha; rice 1.66 t/ha; <i>tinda</i> 7.56 t/ha; sorghum 7.95 t/ha; wheat 1.66 t/ha during the <i>rab</i>^d season)</p> <p>c. Coverage of topsoil with high salinity reduced to 10,239 ha (2015 baseline: 20,478 ha)</p>	<p>a–b. PAD’s crop reporting services through PMO-Canals complemented by M&E systems</p> <p>c. PMO-Canals and PID data</p>	<p>Shortage of water for diversion from the Jhelum River because of competition with other irrigation schemes or erratic river flows reduces agricultural benefits.</p>
<p>Outputs 1. Jalalpur irrigation distribution system established</p> <p>2. Water-use capacity improved in project areas</p>	<p>By 2022:</p> <p>1a. An intake structure with a design discharge capacity of 38.2 m³/s, 117 km-long main canal, 23 distributaries, 10 minor canals, 72 cross-drainage structures, 18 flood-carrier channels, and more than 250 associated structures for <i>khari</i> season irrigation constructed (2017 baseline: 0)</p> <p>1b. Guideline and sustainable O&M plan for the Jalalpur irrigation system approved by the PID (2017 baseline: not applicable)</p> <p>1c. Flood disaster risk management plan approved by the PID (2017 baseline: not applicable)</p> <p>1d. M&E system using satellite remote sensing technology to assess irrigation efficiency, crop growing, and the <i>abiana</i>^e certified as fully functional by the PID (2017 baseline: not applicable)</p> <p>By 2023:</p> <p>2a. 485 watercourses covering all project areas for <i>khari</i> season irrigation constructed (2017 baseline: 0)</p> <p>2b. 485 WUAs formed and their capacities improved for sustainable O&M of watercourses and efficient</p>	<p>1a–d. PMO-Canals and PID data</p> <p>2a–e. PAD and PIO data through the PMO-Canals</p>	<p>Extreme weather events cause hill torrent floods above design discharges, damaging the irrigation system, farm land, and properties.</p>

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
3. Farm management capacity improved in project areas	<p>water use during <i>kharif</i> season (2017 baseline: 0)</p> <p>2c. 12,140 ha of the project area flattened (2017 baseline: 0)</p> <p>2d. HEISs covering 809 ha of the project area installed (2017 baseline: 0)</p> <p>2e. More than 6,000 households (about 20% of the total estimated number of beneficiary households) improved water-use skills, at least 30% of whom are women (2017 baseline: 0)</p> <p>By 2023:</p> <p>3a. More than 6,000 households (about 20% of the total estimated number of beneficiary households) improved their capacities on irrigated agriculture practices, at least 30% of whom are women (2017 baseline: 0)</p> <p>3b. More than 6,000 households (about 20% of the total estimated number of beneficiary households) improved their capacities on profitable farming systems, at least 30% of whom are women (2017 baseline: 0)</p> <p>3c. More than 6,000 farmers accessed private agriculture support services in the project area (2017 baseline: 0)</p>	3a–c. PAD and PIO data through the PMO-Canals	
<p>Key Activities with Milestones</p> <p>1. Jalalpur irrigation distribution system established</p> <p>1.1 Construct Jalalpur irrigation distribution structures (Q3 2018–Q2 2022)</p> <p>1.2 Develop M&E system for Jalalpur irrigation system (Q2 2020)</p> <p>1.3 Complete training of PID and PAD staff on the use of the M&E system (Q2 2022)</p> <p>1.4 Develop guideline and sustainable O&M plan and flood disaster risk management plan (Q1 2021–Q4 2021)</p> <p>1.5 Complete training of PID staff on the use of the plans (Q2 2022)</p> <p>2. Water-use capacity improved in project areas</p> <p>2.1 Establish 485 WUAs (Q3 2018–Q1 2023)</p> <p>2.2 Construct 485 watercourses with farmers' participation (Q1 2019–Q2 2023)</p> <p>2.3 Undertake WUA training for efficient O&M and their organizations (Q2 2021–Q3 2023)</p> <p>2.4 Undertake precision land leveling of 12,140 ha of the project area (Q1 2019–Q4 2023)</p> <p>2.5 Install HEISs (e.g., drip irrigation) covering 809 ha and 20 water storage ponds with solar pumping stations (Q1 2019–Q4 2023)</p> <p>2.6 Undertake farmer training for climate-smart irrigation practices (Q2 2021–Q3 2023)</p> <p>3. Farm management capacity improved in project areas</p> <p>3.1 Establish 664 demonstration plots covering 220 ha (Q2 2021–Q3 2023)</p> <p>3.2 Conduct farmer field schools and farmers' training (Q2 2021–Q3 2023)</p> <p>3.3 Hold farmer fairs and other knowledge-sharing events (Q2 2021–Q3 2023)</p> <p>3.4 Provide private agriculture support services (Q2 2021–Q3 2023)</p>			

<p>Project Management Activities Complete detailed engineering design (Q3 2017) Initiate bid process for the major civil works contract (Q3 2017) Mobilize project implementation consultant (Q4 2017) Mobilize project support consultant for outputs 2 and 3 activities (Q1 2018–Q3 2018) Award major civil works contract (Q3 2018)</p>
<p>Inputs ADB: \$274.63 million Government: \$80.80 million Beneficiaries: \$5.16 million</p>
<p>Assumptions for Partner Financing Not applicable</p>

ADB = Asian Development Bank, ha = hectare, HEIS = high-efficiency irrigation system, M&E = monitoring and evaluation, m³/s = cubic meter per second, O&M = operation and maintenance, PAD = Punjab Agriculture Department, PID = Punjab Irrigation Department, PIO = project implementation office, PMO = project management office, Q = quarter, t/ha = ton per hectare, WUA = water user association.

^a Government of Punjab, Planning and Development Department. 2015. *Punjab Growth Strategy 2018: Accelerating Economic Growth and Improving Social Outcomes*. Lahore.

^b *Kharif* refers to the sowing season for summer crops, which is generally from April to October.

^c *Tinda* is a small vegetable that is also referred to as Indian squash, round melon, Indian round gourd, apple gourd, or Indian baby pumpkin.

^d *Rabi* refers to the sowing season for winter crops, which is generally from October to April.

^e *Abiana* is the irrigation service fee assessed based on expected crop production.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=46528-002-3>

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Agriculture, Natural Resources, and Rural Development
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Economic and Financial Analysis
8. Country Economic Indicators
9. Summary Poverty Reduction and Social Strategy
10. Risk Assessment and Risk Management Plan
11. Gender Action Plan
12. Environmental Impact Assessment
13. Resettlement Plan

Supplementary Documents

14. Financial Management Assessment
15. Procurement Risk Assessment
16. Climate Change Risk Vulnerability Assessment and Adaptation Measures
17. Detailed Economic and Financial Analysis