



Report and Recommendation of the President to the Board of Directors

Project Number: 47235
September 2014

Proposed Loans Islamic Republic of Pakistan: Trimmu and Panjnad Barrages Improvement Project

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 20 August 2014)

| | | |
|---------------|---|--------------------------|
| Currency unit | – | Pakistan rupee (PRe/PRs) |
| PRe1.00 | – | \$0.00996 |
| \$1.00 | – | PRs100.40 |

ABBREVIATIONS

| | | |
|-------------------|---|--|
| ADB | – | Asian Development Bank |
| ADF | – | Asian Development Fund |
| CAPE | – | country assistance program evaluation |
| EIRR | – | economic internal rate of return |
| FPC | – | flood passage capacity |
| GDP | – | gross domestic product |
| ha | – | hectare |
| JICA | – | Japan International Cooperation Agency |
| km | – | kilometer |
| LARP | – | land acquisition and resettlement plan |
| m ³ /s | – | cubic meter per second |
| MFF | – | multitranches financing facility |
| O&M | – | operation and maintenance |
| OCR | – | ordinary capital resources |
| PAM | – | project administration manual |
| PID | – | Punjab Irrigation Department |
| PMO | – | project management office |
| SDR | – | special drawing right |

GLOSSARY

| | | |
|---------|---|---|
| barrage | – | gated hydraulic structure built across a river or other water course to control, regulate, and divert flows to canals or to facilitate navigation |
|---------|---|---|

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., FY2014 ends on 30 June 2014.
- (ii) In this report, "\$" refers to US dollars.

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PROJECT AT A GLANCE

| | | | |
|---|---|--|------------------------------|
| 1. Basic Data | | Project Number: 47235-001 | |
| Project Name | Trimmu and Panjnad Barrages Improvement Project | Department /Division | CWRD/CWER |
| Country | Pakistan | Executing Agency | Punjab Irrigation Department |
| Borrower | Government of Pakistan | | |
| 2. Sector | Subsector(s) | ADB Financing (\$ million) | |
| ✓ Agriculture, natural resources and rural development | Irrigation | | 100.00 |
| | Rural flood protection | | 50.00 |
| | | Total | 150.00 |
| 3. Strategic Agenda | Subcomponents | Climate Change Information | |
| Inclusive economic growth (IEG) | Pillar 2: Access to economic opportunities, including jobs, made more inclusive | Adaptation (\$ million) | 13.00 |
| Environmentally sustainable growth (ESG) | Disaster risk management | Climate Change impact on the Project | Medium |
| | Global and regional transboundary environmental concerns | | |
| 4. Drivers of Change | Components | Gender Equity and Mainstreaming | |
| Governance and capacity development (GCD) | Client relations, network, and partnership development | Effective gender mainstreaming (EGM) | ✓ |
| Knowledge solutions (KNS) | Knowledge sharing activities | | |
| 5. Poverty Targeting | | Location Impact | |
| Project directly targets poverty | Yes | Rural | High |
| Geographic targeting (TI-G) | Yes | | |
| 6. Risk Categorization: | Complex | | |
| 7. Safeguard Categorization | Environment: B Involuntary Resettlement: A Indigenous Peoples: C | | |
| 8. Financing | | | |
| Modality and Sources | | Amount (\$ million) | |
| ADB | | 150.00 | |
| Sovereign Project loan: Ordinary capital resources | | 50.00 | |
| Sovereign Project loan: Asian Development Fund | | 100.00 | |
| Cofinancing | | 0.00 | |
| None | | 0.00 | |
| Counterpart | | 23.00 | |
| Government | | 23.00 | |
| Total | | 173.00 | |
| 9. Effective Development Cooperation | | | |
| Use of country procurement systems | | No | |
| Use of country public financial management systems | | Yes | |

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on proposed loans to the Islamic Republic of Pakistan for the Trimmu and Panjnad Barrages Improvement Project.¹

2. The project will rehabilitate and upgrade the Trimmu and Panjnad barrages, which are 80–90 years old, to (i) provide reliable irrigation water to 1.74 million hectares (ha) through six main canals; (ii) primarily benefit 600,000 farming families (about 4.0 million people) in seven districts in Punjab; and (iii) help reduce risk of communities against floods (150,000 people), droughts, and pressure on groundwater abstraction.² The Trimmu barrage is on the Chenab River downstream of its confluence with the Jhelum River. Sedimentation has reduced the barrage's flood passage capacity (FPC) by 30% from 18,265 cubic meters per second (m³/s) in 1939 to 12,743 m³/s in 2013. The Panjnad barrage is also on the Chenab River, 250 kilometers (km) downstream from the Trimmu barrage. Aging, structural deterioration and instability, and low FPC exposed these barrages to high risk of failure and resulted in unreliable irrigation supplies and downstream flooding.³

II. THE PROJECT

A. Rationale

3. Irrigated agriculture on 8.4 million ha in Punjab (i) accounts for 28% of Punjab's gross domestic product (GDP), (ii) employs 54% of the labor force, (iii) produces 90% of Punjab's agricultural output, and (iv) uses more than 90% of the water resources. Punjab's agricultural GDP is 66% of the national agricultural GDP. Of Punjab's population, 77% live in rural areas that mainly depend on agriculture for livelihood and where the incidence of poverty is 30%–35%. Irrigated agriculture is crucial to generating higher incomes and attaining Punjab's targeted 6%–7% growth rate (3% in 2011–2012).

4. ADB's country partnership strategy, 2009–2013 for Pakistan prioritizes improving the irrigation infrastructure.⁴ ADB's agriculture sector evaluation for Pakistan emphasized improving water resources and irrigation.⁵ The water sector road map identified improving the infrastructure, institutions, and agricultural production to drive sustainable agricultural growth. Punjab's Medium-Term Development Framework (2012–2015) estimates an investment requirement of over \$100 million per year for irrigation and allocates PRs9 billion (\$90 million equivalent) for new irrigation projects.⁶ The country assistance program evaluation (CAPE), 2002–2012 assessed Pakistan's agriculture and natural resource sector *less than successful*, but it evaluated the program *relevant* in terms of its alignment with government and ADB strategies.⁷ The CAPE rated the agriculture and natural resources program *satisfactory* for its strategic positioning and the evaluation viewed as appropriate ADB's commitment to support Pakistan in responding to the need to rehabilitate and expand the Indus River irrigation system.

¹ The design and monitoring framework is in Appendix 1.

² The districts are Bahawalpur, Jhang, Lodhran, Multan, Muzaffargarh, Rahimyar Khan, and Vehari.

³ The project was prepared under the multitranchise financing facility for the Punjab Irrigated Agriculture Investment Program; project preparatory technical assistance was not provided.

⁴ ADB. 2009. *Country Partnership Strategy: Pakistan, 2009–2013*. Manila. A new country partnership strategy 2015–2019 for Pakistan is under preparation.

⁵ R. Greer and S.A.H. Jagirdar. 2006. *Evaluation of the Agriculture and Natural Resources Management Sector*. A Report to the Operations Evaluation Department, Asian Development Bank. Manila: ADB.

⁶ Because of its 3-year rolling plan, Punjab has adopted the Medium-Term Development Framework for 2008–2011 as the Medium-Term Development Framework for 2012–2015.

⁷ ADB. 2013. *Country Assistance Program Evaluation: Pakistan, 2002–2012*. Manila.

The recommendations of the CAPE regarding agriculture, natural resources, and rural development sector have been incorporated in the project design.

5. In Punjab, the irrigation infrastructure has seriously deteriorated because of aging and deferred maintenance. Climate variability will further add risks by changing frequency and intensity of extreme events such as flood and drought.⁸ The infrastructure has an estimated replacement value of \$20.0 billion,⁹ while the estimated cost to upgrade the system to modern standards is \$3.5 billion. Barrages constitute the most strategic component of the large contiguous irrigation systems. Their structural stability and effective operations are important for agricultural production and averting potential disaster during flood. Although groundwater has helped against waterlogging and drought and has augmented unreliable canal water supplies, its overextraction in some areas has caused saltwater intrusion and land degradation and increased pumping and production costs. The Punjab Irrigation Department (PID) is working with ADB, the World Bank, and the Japan International Cooperation Agency (JICA) to improve irrigated agriculture and related infrastructure.¹⁰

6. Three tranches of ADB's \$700 million multitranche financing facility (MFF) (2007–2017) for the Punjab Irrigated Agriculture Investment Program have been supporting the upgrade of irrigation infrastructure serving 3 million ha, on-farm agriculture, and institutional reforms.¹¹ All the three tranches of the MFF have been approved and their implementation is on track. Following the approval of \$73 million for tranche 3 on 13 December 2012, the balance MFF amount of \$129 million (equivalent) is not sufficient to finance the project. The proposed loan of \$150 million was included in ADB's country operations business plan for Pakistan, 2014–2016 as a firm loan for processing in 2014.¹² The MFF will be closed by 30 September 2017.

7. The project is proposed as a stand-alone project loan as (i) required funding is not available under the MFF, (ii) the project scope is limited to two barrages on the same river facing similar problems, (iii) the project area is well defined, and (iv) the project implementation period will be relatively short (4–5 years). Detailed engineering design and approved PC-1 are available.¹³ The project concept was discussed with the World Bank, the International Fund for Agricultural Development, and JICA. In March 2012, Punjab initiated the \$423.5 million (\$250 million loan) Punjab Irrigated Agriculture Productivity Improvement Program for on-farm water and agriculture management.¹⁴ The program (March 2012–December 2018) covers the Trimmu and Panjnad barrages command areas and complements the project.

⁸ Ministry of Climate Change. 2012. *National Climate Change Policy*. Islamabad: Government of Pakistan. <http://pc.gov.-pk/usefull%20links/Taskforces/TFCC%20Final%20Report.pdf>

⁹ The irrigation infrastructure includes 13 barrages, 19 inter-river link canals, 6,429 km of main canals, 31,214 km of distribution and minor canals, 58,000 field outlets, 3,228 km of flood protection embankments, and 54 small dams.

¹⁰ Punjab is undertaking rehabilitation of seven barrages (Balloki, Jinnah, Khanki, Panjnad, Suleimanki, Taunsa and Trimmu) and five canal systems (Lower Bari Doab, Lower Chenab, Pakpattan, Sidhnai, and Thal).

¹¹ ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility for the Punjab Irrigated Agriculture Investment Program*. Manila (\$900 million, approved on 13 December), which comprised up to \$890 million equivalent from ADB's ordinary capital resources and up to \$10 million equivalent in special drawing rights (SDR) from ADB's Special Funds resources (Asian Development Fund [ADF]). On 15 December 2011, the ADB Board of Directors approved an amendment to the MFF for the program, which (i) reduced the facility to an amount not exceeding the equivalent of \$700 million, and (ii) increased the limit on the use of ADF resources for the MFF to an amount not exceeding the equivalent of \$280 million.

¹² ADB. 2014. *Country Operations Business Plan: Pakistan, 2014–2016*. Manila.

¹³ A PC-1 is the project document, which must be approved by the Planning Commission, Government of Pakistan.

¹⁴ World Bank. 2012. *Project Agreement: Loan for the Punjab Irrigated Agriculture Productivity Improvement Program approved on 20 March 2012*. Washington, DC.

B. Impact and Outcome

8. The impact of the project will be sustained agricultural production in the command areas of the barrages. The outcome will be that the Trimmu and Panjnad barrages will be safe and will deliver reliable irrigation water supplies to their canals.

C. Outputs

9. The project outputs will be (i) rehabilitated and upgraded Trimmu barrage, (ii) rehabilitated and upgraded Panjnad barrage, and (iii) improved capacities of the communities and PID. The outputs will be achieved by (i) increasing the flood capacities of the Trimmu barrage from 12,743 m³/s in 2014 to 24,777 m³/s (94% increase), and of the Panjnad barrage from 19,822 m³/s in 1932 to 24,495 m³/s (25% increase); (ii) improving the stability of the existing structures against floods, climate variability, erosion, and sedimentation; (iii) training the communities and PID staff in flood risk management and integrated water resources management; and (iv) providing social facilities such as a public park and an upgraded basic health unit and a girls' school. The details are in the design and monitoring framework (Appendix 1).

D. Investment and Financing Plans

10. The project is estimated to cost \$173 million (Table 1). Detailed cost estimates are in the project administration manual (PAM).¹⁵

Table 1: Project Investment Plan
(\$ million)

| Item | Amount ^a |
|--|---------------------|
| A. Base Cost^b | |
| 1. Output 1: Rehabilitated and upgraded Trimmu barrage | 95.10 |
| 2. Output 2: Rehabilitated and upgraded Panjnad barrage | 47.00 |
| 3. Output 3: Improved capacities of the communities and Punjab Irrigation Department | 2.00 |
| Subtotal (A) | 144.10 |
| B. Contingencies^c | 21.69 |
| C. Financial Charges During Implementation^d | 7.21 |
| Total (A+B+C) | 173.00 |

^a Includes taxes and duties of \$16.33 million to be financed from government resources as cash contribution.

^b In end-2013 prices.

^c Physical contingencies computed at 5% for civil, mechanical, and electrical works as well as 5% for field research and development, training, surveys, and studies. For foreign currency, price contingencies are computed at 2.2% per annum in 2014, 1.9% in 2015, and 1.8% thereafter. For local currency, price contingencies are computed at 9.0% per annum for 2014, 8.0% for 2015, 7.7% for 2016, 7.6% for 2017, and 7.5% thereafter. This 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 implementation for the ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5%, and interest for the Asian Development Fund loan has been computed at the rate of 2.0% per annum during the grace period and thereafter. Commitment charges for an OCR loan are 0.15% per year to be charged on the undisbursed OCR loan amount.

Source: Asian Development Bank estimates based on approved PC-1 by the Government of Pakistan.

11. The Government of Pakistan has requested a loan of \$50 million from ADB's OCR to help finance the project. The loan will have a 20-year term, including a grace period of 5 years,

¹⁵ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year (the interest and other charges during construction to be capitalized in the loan), and such other terms and conditions set forth in the draft loan and project agreements.¹⁶

12. The government has also requested a loan in various currencies equivalent to SDR64,982,000 (\$100 million equivalent) from ADB's Special Funds resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years, an interest rate of 2% per annum during the grace period and thereafter, and such other terms and conditions set forth in the draft loan and project agreements. This is a nonrevenue project with high direct poverty reduction content.

13. The financing plan is in Table 2.

Table 2: Financing Plan

| Source | Amount (\$ million equivalent) | Share of Total (%) |
|-----------------------------------|--------------------------------|--------------------|
| Asian Development Bank | 150.0 | 86.7 |
| Ordinary capital resources (loan) | 50.0 | 28.9 |
| Special Funds resources (loan) | 100.0 | 57.8 |
| Government | 23.0 | 13.3 |
| Total | 173.0 | 100.0 |

Source: Asian Development Bank estimates based on approved PC-1 by the Government of Pakistan.

14. ADB funds are expected to finance a proportion of works, social development, project management, capacity building, resettlement cost (excluding cost of land acquisition), and vehicles and equipment less taxes and duties.¹⁷ The resettlement costs will be eligible for ADB financing only if they are incurred in compliance with all applicable requirements under ADB's Safeguard Policy Statement (2009) and the ADB-approved resettlement plan. Financial charges during implementation and works contract for the Trimmu barrage will be financed from both the OCR and the Asian Development Fund (ADF) loans. All other eligible expenses will be financed from the ADF loan as per the financing percentage set forth in the loan agreements, except for land acquisition and taxes and duties, which will be fully financed by the government.

E. Implementation Arrangements

15. The government of Punjab, through the PID, will be the executing agency. The PID has experience of implementing projects financed by ADB, JICA, and the World Bank and has ample technical, procurement, and managerial capacity to oversee these investments.¹⁸ The department will have overall responsibility for implementation, reporting on both physical and financial progress, and assuming direct responsibility for barrage improvement works. The PID's

¹⁶ A maturity premium on repayment is not applied on the 20-year term and 5-year grace period following straight line repayment procedure because the average loan maturity period remains less than 13 years.

¹⁷ The cost of (i) works includes environment and climate change; (ii) social development includes family parks, school and basic health unit; (iii) project management includes consulting services and PMO's operating cost; and (iv) capacity building covers training of communities/women and Punjab Irrigation Department staff, and strengthening the Strategic Policy Review Unit and the Punjab Engineering Academy.

¹⁸ The PID has completed three World Bank-financed projects—the Taunsa barrage rehabilitation project (\$123 million); irrigation system rehabilitation project (\$200 million); and a development policy loan supporting public finance reforms, strengthening devolution and service delivery, and improving the fiduciary system (\$100 million). The PID is currently implementing the World Bank-financed Jinnah barrage (\$145 million), JICA-financed Lower Chenab Canal Improvement Project (\$100 million), ADB-financed Lower Bari Doab Improvement Project (\$228 million), New Khanki Barrage Project (\$270 million equivalent), and Pakpattan Canal Suleimanki Barrage Improvement Project (\$73 million).

existing project management office (PMO) for barrages will be responsible for project implementation. The PMO has established engineering, safeguards, procurement, and finance units and has experience implementing four similar projects.¹⁹ Provision has been made for additional staff, a construction supervision consultant in the role of engineer as defined by the International Federation of Consulting Engineers (FIDIC), and a management support consultant. A functional project steering committee and ADB's sound experience of working with the PID will further ensure timely implementation.

16. Lessons from ongoing projects helped in packaging two main international competitive bidding works contracts, advancing detailed design and bidding process, and conducting meaningful consultation with potentially affected people. An experienced international resettlement expert conducted field verification and reviewed the land acquisition and resettlement plan (LARP). The bidders evaluation and qualification criteria will be reviewed, a site visit of the potential bidders will be arranged, and at least 90 days will be provided for bid submission.

17. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 11).

Table 3: Implementation Arrangements

| Aspects | Arrangements | | |
|--|---|---|-----------------|
| Implementation period | March 2015–September 2020 | | |
| Estimated completion date | 30 September 2020 (loan closing date: 31 March 2021) | | |
| Management | | | |
| (i) Oversight body | Project steering committee Chair: Punjab Planning and Development Board Members: Member Infrastructure, Punjab Planning and Development Board and secretaries of departments of irrigation, agriculture, environment, and finance | | |
| (ii) Executing agency | Government of Punjab, through the Punjab Irrigation Department | | |
| (iii) Key implementing agencies | Punjab Irrigation Department | | |
| (iv) Implementation unit | Project management office (barrages), Canal Bank, Mustafa Abad, Lahore with 18 existing key staff and 7 proposed additional staff | | |
| Procurement | International competitive bidding | 2 contracts | \$128.4 million |
| | Shopping | 6 contracts | \$480,000 |
| Consulting services | Supervision consultants (quality- and cost-based selection 90:10) | 32 person-months of international and 1,213 person-months of national consultants' inputs | \$9.0 million |
| | External monitoring consultant - social safeguards (individual) | 8 person-months of national individual consultant input | \$0.08 million |
| Retroactive financing and/or advance contracting | Recruitment of consultants and procurement of works contracts will be initiated under advance contracting but retroactive financing is not considered. | | |
| Disbursement ^a | The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2012, as amended from time to time) and detailed arrangements agreed upon between the government and ADB. | | |

Source: Government of Punjab and Asian Development Bank estimates.

¹⁹ The World Bank-financed Taunsa and Jinnah barrages and ADB-financed Khanki and Suleimanki barrage projects.

III. DUE DILIGENCE

A. Technical

18. The project is located on a transboundary river. The Indus Waters Treaty, 1960 allocates all waters from the Indus, Jhelum, and Chenab rivers to Pakistan. Therefore, no transboundary impact on the project is foreseen. The project's technical viability and sustainability has been assessed as part of a due diligence exercise. The assessment indicates that (i) both barrages are running at a high risk of failure, (ii) their failure would affect 1.74 million ha of land and deprive 600,000 farming families of irrigation water for several crop seasons in seven districts, (iii) the recovery cost will be high and time consuming, and (iv) the need to rehabilitate and upgrade these barrages is justified.²⁰ Further, the project will minimize the flood risk to lives, properties, and livelihood. The proposed interventions follow accepted international standards, will ensure structural safety, and are technically proven and justified.

19. Barrage technology is well known in the region. The PID has 60 years of experience in the operational management of 13 barrages serving 8.4 million ha. A team of around 200 engineers, technicians, and support staff manages the operations of the Trimmu and Panjnad barrages. The barrage manual provides guidance on operation and maintenance (O&M) procedures and practices. Annual O&M reports are prepared and appropriate actions are taken following recommendations by the experts. The project will review the barrage manual for improved management practices, including provision of special inspections every 5 years. The operations management of the barrages is technically and institutionally sustainable.

B. Economic and Financial

20. The main benefit will be sustained production as a result of improved barrages, as opposed to declining production and falling farm income resulting from either catastrophic barrage failure or continually decreasing reliability of irrigation deliveries as the barrages age further because of deferred rehabilitation. The other beneficiaries include residents (farming and nonfarming) in those areas subject to damage from either intentional or accidental breaching of the flood bunds upstream of the barrages as increased safe flood passage capacities of the barrages will significantly reduce the flood risk.

21. **Economic viability.** Economic analysis of the project yielded a mean economic internal rate of return (EIRR) of 23.4% (standard deviation 11.3%). The EIRR ranged from 6% to 65%, with a 15% probability that the EIRR would be less than the 12% threshold. Individual analysis yielded a mean EIRR of 24.3% on the Trimmu barrage investment, and 21.9% on the Panjnad barrage investment. Consumers of agricultural produce are a significant beneficiary of the project, with 79% of the present value of benefits (PRs26,606 million), with producers assuming the remaining benefits. The poor (PRs15,932 million) and extremely poor (PRs5,974 million) are primary beneficiaries of the project benefits (83% of present value of benefits). Overall, the project will have a positive impact on improving the welfare of poor people in Pakistan.

22. **Financial sustainability.** The government of Punjab allocates \$1,057,790 annually for O&M of the Trimmu barrage and \$847,352 for the Panjnad barrage.²¹ This allocation is based

²⁰ The Trimmu barrage supplies irrigation water to the Haveli main line canal (146.4 m³/s), Taunsa-Sindhnaï link canal (354.0 m³/s), and Rangpur canal (76.74 m³/s). The Panjnad barrage supplies irrigation water to the Panjnad Abbasia canal (220.0 m³/s), Abbasia canal (30.1 m³/s), and Abbasia link canal (158.6 m³/s).

²¹ Actual allocation for O&M in Pakistan rupees was converted to US dollar equivalent using the 2 June 2014 exchange rate.

on assessment conducted under the World Bank's development and policy loan in 2006, which was updated twice (2010 and 2012). The next revision of the O&M funds is scheduled in 2015. The government also provides additional funding for floods and emergency situations. Further, under the project, a periodic inspection by independent experts is proposed, including review of O&M cost and removal of sediments every 5 years. The government will allocate funds for the proposed inspection and removal of sediments, if needed. One such inspection will be arranged under the project during construction. Independent auditors audit the annual budget. Therefore, the operations management of the barrages is financially sustainable.

Table 4: Allocations and Expenditures for Operation and Maintenance of the Barrages
(\$)

| Barrage | Annual Allocation | Actual Expenditures | | |
|-----------------|-------------------|---------------------|---------|---------|
| | | FY2011 | FY2012 | FY2013 |
| Trimmu barrage | 1,057,790 | 1,217,562 | 974,752 | 896,229 |
| Panjnad barrage | 847,352 | 836,248 | 817,238 | 713,457 |

Source: Punjab Irrigation Department, Government of Punjab.

C. Governance

23. The financial management assessment concludes that the PMO has satisfactory financial management capability to record financial transactions and balances, provide regular records and monitoring reports, and safeguard assets. Financial management assessment identifies two vacant staff positions and lack of internal audit arrangement under the PMO as the main issues requiring attention. The related risks and mitigation measures have been included in the risk assessment and management plan. The PMO's financial management capacity will be strengthened by providing additional staff and PID support in internal audit.

24. Procurement of civil works and goods will be carried out in accordance with ADB's Procurement Guidelines (2013, as amended from time to time), while engagement of consultants 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 one package for construction supervision using the quality- and cost-based selection method with a 90:10 ratio, including provision for management support consultants.²² One individual consultant will be recruited for external monitoring of the safeguards. Because of different equipment and vehicle types and varying procurement times, these items will be procured through six shopping contracts. All procurement and consultant recruitment will be undertaken by the procurement unit of the PMO in accordance with the project's procurement plan. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government. The specific policy requirements and supplementary measures are described in the PAM (footnote 11).

D. Poverty and Social

25. Approximately, 85% of the rural households are below the poverty line of \$2 per day per person as adopted by ADB, and at least 50% of the project benefits will reach these people. Residents around the barrages have suffered from increasingly frequent floods, specifically in 2010 and in 1992, and the project will minimize the risk of further such events and associated loss of life, livestock, structures, crops, and livelihoods. The key poverty and social issues for these people include limited livelihood opportunities, low skill levels, poor educational provision,

²² This method is used because with unique structures in rivers, quality is more important.

substandard health facilities, and lack of recreational options. The project will offer employment opportunities for unskilled and semiskilled workers.

26. The project is categorized as effective gender mainstreaming. A gender action plan has been prepared, and key related actions include enhanced livelihood skills, better education, health and recreational facilities, and reduced travel time to these facilities.²³ Some 8,500 families will benefit from the new health centers, post-primary school enrolment is expected to double, and 500 women will receive training in livelihood skills. These are significant advances in the context of southern Punjab, where indicators for health and education are particularly low.

27. There are some concerns about compliance with the core labor standards in Pakistan in certain industries such as brick kilns. This issue was specifically raised with the Punjab Labor Department and the local branch of the Pakistan Workers' Federation. They noted that this area falls within their remit for monitoring and compliance; however, they do not expect violations during barrage rehabilitation. An effective judicial system, proactive civil society, and vibrant media provide protection against forced labor.²⁴ Nevertheless, provisions for identifying any issues will be included in the monitoring responsibilities of the supervision consultant's safeguards team. The Punjab Labor Department and the Pakistan Workers' Federation will be notified of any noncompliance issues for their action.

E. Safeguards

28. **Environmental safeguard.** The two subprojects—Trimmu and Panjnad barrages—have been categorized B for environment. Separate initial environmental examinations for the two subprojects were prepared and disclosed on ADB website on 5 June 2014, as required by ADB's Safeguard Policy Statement (2009). The Panjnad barrage subproject involves limited civil works in a contained area without impacting the biodiversity. The environmental impacts will be limited to the construction phase and can be addressed through implementation of the environmental management plan. The Trimmu barrage subproject involves slightly more extensive civil works, which will encroach into the wetlands that have been created within the area of the guide banks. The barrage area is not a declared protected area. However, based on a preliminary biodiversity scan, some of the species have been identified as sensitive according to the International Union for Conservation of Nature Red List of Threatened Species. Because of the contained civil works and limited scale of the project, direct impacts on biodiversity are not expected and the mitigation measures designed for the activities will address all likely impacts. As sensitive species have been reported in the area, a comprehensive biodiversity survey including large and small mammals, birds, fish, reptiles, and vegetation was conducted by the WWF-Pakistan to assess the distribution and prevalence of these species. The recommendations of the biodiversity report have been integrated into the final initial environmental examination for the Trimmu barrage. The targeted mitigation measures will be incorporated in the site-specific environmental management plan, ensuring protection of the habitat of these species during and after construction. This is an environmental enhancement feature.

29. **Social safeguard.** The project is categorized A for involuntary resettlement and C for indigenous peoples safeguards. There are no indigenous peoples, as defined for operational

²³ Gender Action Plan (accessible from the list of linked documents in Appendix 2).

²⁴ Pakistan's Constitution regarding labor prohibits all forms of slavery, forced labor, and child labor (Article 11). Despite the constitutional protection, the International Labour Organization publications reflected bonded labor in cottage industries in Pakistan.
<http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1014&context=forcedlabor>

purposes by ADB's Safeguard Policy Statement (2009), in the project area. No private land is being impacted by the project, although 86 households comprising 548 persons squatting on state barrage land will be either physically or significantly economically displaced. Social impact assessments including detailed measurement surveys were conducted in consultation with affected people and an entitlement matrix and a resettlement plan were prepared by the executing agency. Compensation for nonland assets is based on replacement cost principles, and relocation and income restoration measures adequately enable security of tenure for dwellings and impacted business. The executing agency's environment and social safeguards unit exhibits a good level of proficiency in understanding the laws, rules, and procedures for land acquisition and resettlement-related tasks and ADB's social safeguards requirements. The executing agency has demonstrated institutional capacity to implement the land acquisition and resettlement plans through ongoing consecutive tranches of the MFF. The draft LARP, which was approved by the executing agency, was disclosed in the project area and on the ADB website on 4 June 2014. The executing agency will prepare monitoring reports of LARP implementation and will retain a qualified and experienced external expert to verify the borrower's monitoring information. The verification reports will be disclosed on the internet.

30. **Climate change.** Future climate trends in Pakistan show an increase in temperature in the range of 1.3°C–1.5°C by the 2020s, 2.5°C–2.8°C by the 2050s, and 3.9°C–4.4°C by the 2080s; this is similar to the 2.8°C–3.4°C increase in the average global surface temperature by 2100. Projections on annual precipitation show a slight increase in summer and decrease in winter but no significant changes in annual precipitation. Monsoon rain variability will increase and enhance the frequency and severity of extreme events such as floods and droughts.²⁵ The contributing flows to the Indus River system (Indus River 44%, Chenab River 19%, Jhelum River 16%, Kabul River 16%, and other small streams 5%) will be affected as the water resources in the system come from rainfall and snow and glacial melt from the Hindukush, Karakoram, and Himalaya mountain ranges.

31. The project will strengthen the existing structures against climate variability, erosion, and sedimentation and will increase their flood passage capacity significantly. The project will also build capacity of communities in flood risk management, making both the structures and the communities resilient to extreme events such as flood. The upstream structures reasonably buffer the two barrages against high water and sediment flows.

F. Risks and Mitigating Measures

32. The CAPE 2002–2012 identified (i) weak institutional capacity, (ii) lack of government support, (iii) complex and inappropriate project designs, (iv) insufficient project supervision, and (v) complex or unclear institutional arrangements as the most pervasive factors (footnote 6). Major risks and mitigating measures are summarized in Table 5 and described in detail in the risk assessment and risk management plan.²⁶

Table 5: Summary of Risks and Mitigating Measures

| Risks | Mitigating Measures |
|---|--|
| Extreme events and flow variability: (i) climate-induced frequent floods and reduction in river flows, and (ii) intersector competition for water | The mitigation measures include (i) the project design, which includes enhancing flood passage capacity of the two barrages and allocates funds; and (ii) provision of water from the Jhelum and Indus rivers through the inter- |

²⁵ Planning Commission. 2010. *Task Force on Climate Change: Final Report*. Islamabad: Government of Pakistan. <http://pc.gov.-pk/usefull%20links/Taskforces/TFCC%20Final%20Report.pdf>

²⁶ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

| Risks | Mitigating Measures |
|---|--|
| could result in reduced water availability for irrigation | river link canals and the ongoing agricultural water productivity enhancement program to reasonably mitigate the risk. |
| Deterioration of security conditions may reduce interest of international firms | Both barrages are located in low-to-medium security risk areas. Bidders and consultants will be offered the use of government facilities and will build security costs into their proposals. |
| Corruption can constrain project implementation | Punjab's anticorruption laws and establishment and the National Accountability Bureau take corruption cases and disclose results on their websites. A proactive judiciary, Transparency International, vibrant media, and active civil society act as watchdogs. Punjab Irrigation Department will monitor monthly progress. |
| Project specific: complex project design, insufficient staff, and weak implementation and poor governance may delay the project | A simple project design is proposed. The consultant will be given the role of engineer as defined by the International Federation of Consulting Engineers. The project management office will be strengthened and procurement and safeguard related information will be disclosed on the office's website. |

Sources: Project's feasibility study and due diligence reports.

IV. ASSURANCES

33. The government and 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.

34. The government and PID have agreed with ADB on certain covenants for the project, which are set forth in the loan agreements and project agreement.

35. Both loans will become effective on the same date upon completion of all the conditions to effectiveness.

V. RECOMMENDATION

36. I am satisfied that the proposed loans would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

- (i) the loan of \$50,000,000 to the Islamic Republic of Pakistan for the Trimmu and Panjnad Barrages Improvement Project, from ADB's ordinary capital resources, 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; and
- (ii) the loan in various currencies equivalent to SDR64,982,000 to the Islamic Republic of Pakistan for the Trimmu and Panjnad Barrages Improvement Project, from ADB's Special Funds resources, with an interest charge at the rate of 2.0% per annum during the grace period and thereafter; for a term of 25 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

1 September 2014

DESIGN AND MONITORING FRAMEWORK

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|--|--|---|
| <p>Impact Sustained agricultural production in the command areas of the barrages</p> | <p>Average annual crop production of 10 tons/ha maintained, saving annual crop losses, in Trimmu barrage area in 2024 (2014 baseline: 10 tons/ha)</p> <p>Average annual crop production of 15 tons/ha maintained, saving annual crop losses, in Panjnad barrage area in 2024 (2014 baseline: 15 tons/ha)</p> | <p>PAD's CRS</p> <p>PAD's CRS</p> | <p>Assumption Governments of Pakistan and Punjab continue to give importance to irrigated agriculture for food security and economic growth in Punjab</p> |
| <p>Outcome Safe Trimmu and Panjnad barrages deliver reliable irrigation water supplies to their canals</p> | <p>Trimmu barrage main irrigated area is maintained at 1.08 million ha in 2021 (2014 baseline: 1.08 million ha)</p> <p>Panjnad barrage main irrigated area is maintained at 0.66 million ha in 2021 (2014 baseline 0.66 million ha)</p> | <p>PAD's CRS</p> <p>PAD's CRS</p> | <p>Risk Climate-induced reduction in river flows and intersector competition for adjudication of water could result in reduced water availability for irrigation</p> |
| <p>Outputs</p> <p>1. Rehabilitated and upgraded Trimmu barrage</p> <p>2. Rehabilitated and upgraded Panjnad barrage</p> <p>3. Improved capacities of the communities and PID</p> | <p>Trimmu barrage water supply capacity (to the associated canals) is maintained at 577.14 m³/s in 2020 (2014 baseline: 577.14 m³/s)</p> <p>Water losses through the gates reduced to zero by 2020 (2014 baseline: 15.3 m³/s)</p> <p>Trimmu barrage flood capacity is increased to 24,777 m³/s by 2020 (2014 baseline: 12,743 m³/s)</p> <p>One women's basic health unit is upgraded by 2020 (2014 baseline: 'none')</p> <p>Panjnad barrage water supply capacity (to the associated canals) is maintained at 408.7 m³/s in 2020 (2014 baseline: 408.7 m³/s)</p> <p>Water losses through the gates are reduced to zero by 2020 (2014 baseline: 14.2 m³/s)</p> <p>Panjnad barrage flood capacity is increased to 24,495 m³/s by 2020 (2014 baseline: 19,822 m³/s)</p> <p>One girls' primary school is upgraded to a high school by 2020 (2014 baseline: 'none')</p> <p>50 women trained at vocational centers by 2020 (2014 baseline: zero)</p> <p>PID uses revised guidelines for O&M of the</p> | <p>PID barrage operation data</p> <p>PID barrage operation data</p> <p>PID quarterly reports</p> <p>PID quarterly reports</p> <p>PID quarterly reports</p> <p>PID barrage operation data</p> <p>PID barrage operation data</p> <p>PID quarterly reports</p> <p>PID quarterly reports</p> | <p>Assumption Trained staff of PMO and PID are retained throughout the project life</p> <p>Risk Deterioration of security condition may reduce interest of international contractor</p> |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|--|-----------------------|
| | barrages by 2020 (2014 baseline: 'no') At least 10 PID's PMO staff and local population use skills in IWRM and FRM approaches by 2020 (2014 baseline: zero) Executing agency's SPRU and PEA operationalize IWRM and FRM approaches in PID by 2020 (2014 baseline: 'no') | PID quarterly reports PID quarterly reports | |
| Activities with Milestones 1. Rehabilitation and upgrading of Trimmu barrage 1.1 Recruitment of PMO staff for the project (Sep 2014–Mar 2015) 1.2 Recruitment of consultants (Sep 2014–Sep 2015) 1.3 Bid invitation, evaluation, and award of ICB-01 contract (Jan 2015–Feb 2016) 1.4 Implementation of resettlement plan (Jan 2015–Mar 2016) 1.5 Construction works on ICB-01 (Apr 2016–Mar 2020) 1.6 Implementation of environmental management plan (Apr 2016–Mar 2020) 1.7 Commissioning and operation tests (Apr 2020–Mar 2021) 2. Rehabilitation and upgrading of Panjnad barrage 2.1 Bid invitation, evaluation, and award of ICB-02 contract (Mar 2015–Apr 2016) 2.2 Implementation of resettlement plan (Jan 2015–Mar 2016) 2.3 Construction works on ICB-02 (Jun 2016–Mar 2020) 2.4 Implementation of environmental management plan (Jun 2016–Mar 2020) 2.5 Commissioning and operation tests (Apr 2020–Mar 2021) 3. Improved capacities of the communities and PID 3.1 PID's PMO staff on-the-job and special trainings (Apr 2015–Mar 2018) 3.2 Communities awareness raising in FRM, girls' education, and health care (Apr 2016–Jun 2019) 3.3 Local women training at vocational and health centers (Oct 2015–Apr 2019) 3.4 Preparation of guidelines for robust O&M for the barrages (Oct 2016–Apr 2018) 3.5 Ten PID's PMO staff trained (2–3 externally) in IWRM by Sep 2018 3.6 Capacity building of executing agency's SPRU and PEA in IWRM and FRM by Jun 2018 3.7 Holding of a national workshop on IWRM not later than Dec 2016 | | Inputs ADB: \$150 million (equivalent) OCR: \$50 million ADF: \$100 million (equivalent) Government: \$23 million | |

ADB = Asian Development Bank, ADF = Asian Development Fund, CRS = crop reporting services, FRM = flood risk management, ha = hectare, ICB = international competitive bidding, IWRM = integrated water resources management, m³/s = cubic meter per second, O&M = operation and maintenance, OCR = ordinary capital resources, PAD = Punjab Agriculture Department, PEA = Punjab Engineering Academy, PID = Punjab Irrigation Department, PMO = project management office, PPMS = project performance monitoring system, SPRU = strategy and policy reform unit.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://adb.org/Documents/RRPs/?id=47235-001-3>

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

Supplementary Document

16. Climate Change Vulnerability Assessment and Adaptation Strategy