



Report and Recommendation of the President to the Board of Directors

Project Number: 39364
February 2008

Proposed Loans
Islamic Republic of Pakistan: Barani Integrated
Water Resources Sector Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 30 January 2008)

Currency Unit	–	Pakistan rupee/s (PRe/PRs)
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\$1.00	–	PRs62.54

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
CABI	–	Commonwealth Assistance Bureau international
EA	–	executing agency
EARP	–	Environmental Assessment Review Procedure
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
EPA	–	Environmental Protection Agency
GDP	–	gross domestic product
KFK	–	Kot Fateh Khan
km ²	–	square kilometer
LARF	–	land acquisition and resettlement framework
LARP	–	land acquisition and resettlement plan
LARS	–	Land Acquisition and Resettlement Section
LIBOR	–	London interbank offered rate
m ²	–	square meter
m ³	–	cubic meter
M&E	–	monitoring and evaluation
NCB	–	national competitive bidding
NGO	–	nongovernment organization
O&M	–	operation and maintenance
OCR	–	ordinary capital resources
PIDA	–	Provincial Irrigation and Drainage Authority
PIPD	–	Punjab Irrigation and Power Department
PISRP	–	Punjab Irrigation Sector Reform Program
PMU	–	project management unit
QCBS	–	quality- and cost-based selection
SDO	–	Small Dams Organization
SEMU	–	Social and Environment Monitoring Unit
SSPC	–	Subproject Selection and Planning Committee
TA	–	technical assistance
TMA	–	<i>tehsil</i> municipal administration

GLOSSARY

<i>abiana</i>	–	irrigation water charges
barani	–	rain-fed
district	–	A district notified under the Provincial Land Revenue Act
<i>tehsil</i>	–	administrative subdivision in other provinces of Pakistan (subdistrict)
<i>warabandi</i>	–	roster of turns on irrigation watercourse

NOTES

- (i) The fiscal year (FY) of the Government of Pakistan ends on 30 June.
- (ii) In this report, "\$" refers to US dollars.

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LOAN AND PROJECT SUMMARY

Borrower	Islamic Republic of Pakistan
Classification	Targeting classification: General intervention Sectors: Agriculture and natural resources; water supply, sanitation, and waste management Subsectors: Water resource management; water supply and sanitation Themes: Sustainable economic growth; environmental sustainability; gender and development Subthemes: Developing rural areas; natural resources conservation; gender equity in opportunities
Environment Assessment	Category A. An environmental impact assessment (EIA) of a subproject was undertaken.
Project Description	<p>The sector Project will support the Punjab government's efforts to develop water resources and improve their management in four districts of the barani areas of Punjab that suffer from water scarcity. The Project intends to improve households' income and health by increasing crop and livestock productivity through irrigation development and increased access to water and sanitation. Activities will include (i) the construction of dams and appurtenant structures to increase water availability in the area; (ii) watershed management to enhance the dams' life expectancy; (iii) development of the rural water supply for communities in the vicinity of the dam; (iv) development of community-managed irrigation distribution network; (v) agriculture extension services to support the transition to irrigated agriculture; and (vi) institutional support. The Project will also rehabilitate and develop irrigation schemes, provide extension support, and improve watershed management in existing dams. To address the problem of sustainability and low economic returns observed in previous dam projects in barani areas, the Project will change the subsector implementation practices and follow an integrated approach looking simultaneously at dam development, watershed management, and command area development. Similarly, it will support devolution of the water scheme to organized water users and foster a demand-driven approach through the inclusion of social mobilization support.</p>
Rationale	<p>About one quarter of Pakistan's cultivable area remains outside the Indus canal system and suffers from chronically low agricultural productivity. In Punjab, about 19% of cultivable lands lie in barani areas where local rain-fed farming systems and existing water sources can no longer support the growing local population. Yet significant gains in agriculture and livestock productivity and related economic growth can be obtained through water resources development for which little investment support has been made available to date. With suitable topography and</p>

rainfall, the best potential option is the development of water storage through the construction of dams. Previous experiences show, however, that an integrated approach must be used in developing dams in barani areas to ensure the full attainment of the potential economic benefits. As such, the provision of infrastructure will need to be demand-driven and accompanied with the development of community-managed irrigation schemes, on-farm water management support, irrigated agriculture support services, and support for developing market linkages, watershed conservation to prevent fast sedimentation, and targeted interventions to ensure the full development of stored water for domestic water supplies.

Impact and Outcome	The Project's impact is to improve households' income and health in the districts of Attock, Rawalpindi, Jhelum, and Chakwal in the barani areas of Punjab province. The Project's outcome is to increase agriculture and livestock productivity and household access to domestic water supply.
Components and Outputs	The project outcome will be achieved through the following outputs: (i) increased sustainable water storage capacity; (ii) sustainable and profitable command areas and domestic water supply developed; and (iii) enhanced dam planning, management, and implementation capacity. The second output has the following components: (i) developed sustainable rural water supplies and sanitation and increased small towns' domestic water entitlements, (ii) efficient community-based management irrigation schemes, and (iii) improved farmers' access to production support and market services.
Project Investment Plan	The investment cost of the Project is estimated at \$104.5 million equivalent, including taxes and duties of \$14.4 million equivalent. Financial charges during implementation (comprising interest during implementation and commitment charges) are estimated at \$7.5 million.
Financing Plan	The Government has requested a loan of \$75 million—\$55 million from the Asian Development Bank's (ADB) ordinary capital resources (OCR) and \$20 million from the Asian Development Fund (ADF)—to help finance the Project. The loans will finance 71.8% of the project cost.
Loan Amount and Terms	<p>A loan of \$55,000,000 from the OCR of ADB will be provided under ADB's London interbank offered rate (LIBOR)-based lending facility. The loan will have a 25-year term including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions set forth in the draft Loan Agreement.</p> <p>The ADF loan equivalent to \$20 million will have a 32-year term</p>

including a grace period of 8 years, an interest rate of 1% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the draft Loan Agreement.

Allocation and Relending Terms	The Government will relend the proceeds of the loans to the Punjab government upon terms and conditions satisfactory to ADB and will cause the Punjab government to apply such proceeds to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreements and the Project Agreement.
Period of Utilization	1 July 2008–31 December 2014
Estimated Project Completion Date	30 June 2014
Executing Agency	Punjab Irrigation and Power Department (PIPD)
Implementation Arrangements	PIPD will be the Executing Agency for the Project and responsible for overall project management and implementation. A PMU headed by a PIPD-appointed project director will be established. Three PMU field offices, one for Attock and Rawalpindi districts, one for Chakwal district, and one for Jhelum district will be established. Each office will be staffed with a full-time specialist seconded from the Punjab government departments of agriculture, livestock, and forestry. The PMU will assume the following roles: (i) overall interagency and district coordination; (ii) recruiting consultants and nongovernment organizations (NGOs), and awarding procurement and consulting contracts, as well as all project financial management; (iii) consolidating, reviewing, and submitting regular progress and financial reports to the Project Steering Committee (PSC) and ADB; and (iv) monitoring and evaluating project outputs and results. The PMU will also be responsible for directly implementing the watershed management activities under the first, second, and third outputs. The Small Dams Organization (SDO) will be responsible for implementing dam planning and construction activities under the first output. In implementing those activities, SDO will receive specific advisory support on safeguard and technical matters from the PMU. For each subproject under its responsibility, SDO will appoint a subdivisional officer who will supervise the dam feasibility and, detail design studies, and the engineering construction supervision consultants. In implementing the water supply-related activities, the PMU will involve the relevant tehsil municipal administration (TMAs) in (i) assessing the demand for water supplies, (ii) organizing the future water supply users, and (iii) supervising the overall execution of works and services related to

water supply activities.¹

To expedite project implementation, the subprojects will be prepared in batches equivalent to 2,000 hectares (ha) of irrigated agriculture development (between one and four subprojects). There will be a total of four batches in addition to the core subproject. All subprojects in each batch will be prepared simultaneously by SDO and the contract awarded by the PMU to only two contractors. One contract will be awarded for the implementation of the feasibility study, the detailed design, and construction supervision, while the other one will be awarded for the construction of the dams, the main channel, and water supplies. Implementation of both contracts will be supervised by SDO. Watersheds and command area-related works will be tendered after organization of the farmer organizations and participatory planning. The PMU will prepare the technical specification and award the works to ideally one single contractor per batch.² Contract implementation will be supervised by the PMU. The timing between batches will be minimized. As soon as the PMU and SDO finish the identification and the pre-feasibility studies of the first batch, preparation of the second batch will start. The preparation of the first batch will start before loan effectiveness and the social mobilizers will be recruited in advance through retro-active financing to ensure that the demand-driven approach is carried out.

Procurement

Equipment, materials, goods, and services for ADB-financed contracts will be procured following ADB's *Procurement Guidelines*. Civil works contracts will be split between (i) dam and associated construction works, and (ii) command area development works. For each subproject, the procurement of civil works worth \$10 million or less should be awarded to suitable pre-qualified contractors following national competitive bidding (NCB) procedures acceptable to ADB, as national contracting capacity exists to successfully undertake these works. Civil works contracts costing more than \$10.0 million will be awarded under international competitive bidding (ICB) to suitable prequalified contractors. ADB will review at least the first three NCB contracts awarded. Equipment and materials worth less than \$100,000 will be procured through the shopping mode. The procurement plan will be updated at least annually, covering the first 18 months of procurement activity. NCB procedures will be conducted in accordance with the Government's Public Procurement Rules 2004, subject to the clarification of the rules that have been agreed upon with ADB for the purpose of ADB's *Procurement Guidelines* (2007, as amended from time to time).

¹ Feasibility studies, detailed design, construction and engineering supervision of water supplies will be undertaken by the firms engaged for dam construction.

² The watershed and command area works design requires time for social mobilization and participatory planning and therefore cannot be packaged under the same package as the dam, appurtenant structures, and water supplies.

Consulting Services

The Project will provide a total of 651 person-months of national and 46 person-months of international consulting services through both consulting firms and individual consultants. All consulting services will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

Social mobilization for the Project will be provided by a qualified local NGO to be recruited through the quality- and cost-based (QCBS) method using a full technical proposal. The training and mentoring services on participatory extension services (Farmers Field School) will be provided by Commonwealth Assistance Bureau International (CABI) using single source selection as this organization has (i) unique expertise and (ii) demonstrated good track record in the delivery of such services. Consulting services will also be required to produce (i) subproject feasibility studies; (ii) detailed designs and construction supervision; and (iii) environment assessment studies. For these services, consulting firms will be recruited through the quality- and cost-based selection (QCBS) and the consultant qualification selection (CQS) method.

Project Benefits and Beneficiaries

The Project should increase the agricultural income of 20,000 households (160,000 people) and provide increased and clean domestic water to 9,050 households (72,400 people). Other benefits are (i) the provision of bulk water to municipalities, and reforestation and land erosion control in the dam watershed, as well as (ii) increased production opportunities for private fish growers. The core subproject's economic internal rate of return is 14.3%.

Risks and Assumptions

The design assumes that community mobilization can be carried out effectively to ensure a demand-driven approach in dam selection and the formation of farmer organizations. The social mobilization teams, staffed with an adequate gender balance and trained by Punjab Irrigation and Drainage Authority (PIDA), will enable the Project to work with organized community groups, maximize positive impact on women, and support the formation of legally autonomous farmer organizations.

The demand-driven and integrated approach requires good coordination between the different activities and precise phasing between the subprojects to ensure synergies and avoid implementation delays. The project implementation arrangements have been designed to avoid interagency coordination problems, reduce procurement delays, and facilitate contract management.

Political stability in Pakistan has deteriorated recently and could further deteriorate with the election process. Nevertheless, the project area is a particularly stable area where project implementation is currently not affected by the political turmoil.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on two proposed loans to the Islamic Republic of Pakistan for the Barani Integrated Water Resources Sector Project. The project design and monitoring framework is in Appendix 1.

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

A. Performance Indicators and Analysis

2. Pakistan is known for its significant development of water resources, particularly the Indus River irrigation system, which is the largest contiguous irrigation system in the world. The system supplies irrigation water to over 14.9 million hectares (ha), and has transformed agriculture and improved the livelihood of tens of millions of Pakistanis. However, about 25% of Pakistan's cultivable area remains outside the Indus River system and suffers from low agricultural productivity.

3. In Punjab, the Indus River system irrigates 8.4 million ha and irrigated agriculture (i) accounts for 28% of Punjab's gross domestic product (GDP) output, (ii) employs 54% of the labor force, (iii) produces 90% of agricultural output, and (iv) uses over 95% of the water resources. The province contributes about 58% of the national GDP, and 66% of the national agricultural GDP. In Punjab, about 19% of cultivable lands lie in these barani¹ areas, mainly in the Pothwar plateau between the Indus and Jhelum rivers. The plateau covers an area of 2.2 million ha, of which 1.0 million ha is under rain-fed agriculture.

4. Agriculture and livestock have been the traditional sources of revenue for people of the Pothwar plateau. With no or limited secure water sources, farming is almost exclusively dependent on rainfall, which is irregular in both annual and seasonal amounts as well as intensity in any given storm event. The traditional crops are wheat and gram in winter and sorghum, millet, groundnuts, or maize in summer when rainfall is sufficient. A fallow period between two crops is common and, on average, the farmers get a reasonable harvest every 4–5 years. Although barani agriculture uses limited inputs, the grain production rarely justifies the investment made. Average yields remain typically 100–150% lower than those from irrigated agriculture. Only the strong integration of livestock with agriculture, developed over the centuries by barani farmers, has rendered barani farming systems viable. The strategy consists of cultivating crops that can easily be converted into quality fodder when the rainfall does not allow full maturation. In good years, the grain and cash crop harvested is seen as a bonus that will lower the number of head of livestock to be sold to support the household. Livestock production is therefore the main output of barani farming systems.

5. With the increasing fragmentation of landholding² due to population growth and limited improvement in agriculture and livestock productivity, these traditional farming strategies are no longer adequate to sustain households. Significant numbers of barani households are gradually moving to the off-farm sectors for livelihood opportunities, mainly through temporary migration to the cities or abroad. While migration would appear to be a necessary strategy for some of the excess labor force, barani areas remain home to 4.2 million people and agriculture still accounts for 40% of their income. Improvement in their livelihood, especially for a large majority of small landholders and tenant farmers, will depend to a large extent on gains in agriculture and

¹ Barani areas traditionally depend on rain-fed agriculture. However, the percentages given here cover also pockets of irrigated agriculture developed with a limited source of water. The Project will focus on areas dependent on rain-fed agriculture.

² Approximately 60% of the farms are below subsistence size of 2 ha in Punjab.

livestock productivity and growth in the local nonfarm sector. In barani areas, water scarcity is the major impediment to development. It prevents the establishment of productive irrigated agriculture and poses a major challenge for the provision of domestic water supply to the quickly growing rural communities and small towns located in barani areas.

6. While figures from the government of Punjab indicate that between 75% and 80% of the population have access to safe drinking water in the Pothowar plateau, the real availability of water to households in this area is extremely limited. Reliable perennial water sources, including groundwater, are very scarce, so while a modern water supply system may be present, generally the population gets water for only a couple of hours per day throughout most of the year. This constraint seriously impedes the sustainable development of local industrial and service activities, and causes a loss of productive potential in families, mainly women, who may spend hours collecting water daily.

7. As early as in the 1960s, dams were developed to increase water availability in the Pothowar plateau. To date, a total of 50 dams from 11 to 40 meters (m) high and with reservoir storage of from 600,000 to 54 million cubic meters (m³) have been commissioned by the Small Dams Organization (SDO) under the Punjab Irrigation and Power Department (PIPD), with a total canal command area of around 24,500 ha. This storage represents 12% of the estimated 2,320 million m³ total runoff generated in the plateau and only a small portion of the many potential dam sites that have already been identified. Traditionally, the major beneficiaries of the dams are the communities having irrigable land in the vicinity of the dams and the population located close enough to be provided with potable water for their own consumption, their livestock use, or to support their nonfarm activities. While these projects have improved agricultural production and ensured drinking water supplies, it is believed that their full potential has not been realized and, as of today, their economic performance remains below expectations.

B. Analysis of Key Problems, Lessons Learned, and Opportunities

8. **Key Problems and Lessons Learned.** Without secured water sources for irrigation, farming in barani areas is both a low-productivity and high-risk venture that often cannot sustain the current population's need. Although some progress has been made in improving rain-fed agriculture productivity, the risk of crop failure remains too high for farmers to adopt more costly input packages necessary to substantially intensify agricultural activities. Reliable water sources provide the best factor for agricultural intensification as well as improved domestic water supply in the Pothowar plateau. Due to topography and existing water demand, the transfer of water from the Indus River is not possible. The only option available is to use local water sources. As groundwater resources are extremely limited and can only contribute marginally to water supply, surface water resources are of critical importance. With a mean annual rainfall of 600–800 millimeters—of which 60% occurs from mid-July to the end of August—and a suitable topography and geology, water storage is the most promising option. Available technical options include the development of mini dams, ponds, water tanks, and the construction of dams. The last option has the highest potential as dams are less sensitive to evaporation losses and sedimentation than are shallow smaller storages.

9. The performance of dams in Pothowar and adoption of irrigated agriculture in the dam command areas have been constrained by (i) lack of a fully integrated approach incorporating effective command area development and watershed management, (ii) little effective community participation in selecting and developing projects, and (iii) the need to strengthen the institutional framework for the management, and operation and maintenance (O&M) of dams.

10. Agricultural benefits have not materialized due to the failure to support the development of the irrigation distribution system and to engage and empower the future water users. In the development of most dams, the emphasis was on the construction of the dam and the feeder canal to the command area. There was little support for (i) developing an efficient irrigation distribution network (including lined watercourses or pressurized systems); (ii) establishing a water rotation schedule; (iii) organizing and training water users, and (iv) providing agricultural extension services necessary to support the transition from rain-fed agriculture to irrigated agriculture. This lack of support contributed to the slow development of the command area and the limited adoption by farmers of more productive practices and high-value crops.

11. Inadequate attention was given to sedimentation in previous dam projects. Sample surveys have indicated that sediment inflow can be high and while there is considerable variability from site to site, water storage capacity loss in the region can be as high as 4.2% per year, which means full siltation of some existing dam dead storage after 24 years. Empirical evidence has demonstrated that for a few dams, the sedimentation rate is higher. The impact that premature siltation of these dams has on their beneficiary communities, even beyond the dam's economic life, calls for attention. In particular, the watershed condition and the need for a management plan should be studied at the feasibility stage and a monitoring and erosion control program established in the dam watershed after construction.

12. Most of the dams are built following a supply-driven approach. Sites are identified through reconnaissance exercises conducted by SDO staff that give cursory consideration to hydrology, topography, and geology and focus mainly on the availability of a good geographic site for dam construction. The demand and interest of the future beneficiaries are not factored into the decision to build a dam and consultation with the community at large is considered potentially disruptive of the dam construction process. The result is little community interest, ownership, or readiness to participate in developing the command areas.

13. The necessity to adopt an integrated approach to dam development in Pothowar and to promote devolution of the irrigation schemes to farmers' organizations was already suggested in a previous Asian Development Bank (ADB)-financed project (Loan 0750-PAK[SF]).³ To ensure the necessary integration, the project design opted to allocate a budget to the various technical departments (agriculture, irrigation, forestry, and livestock). This approach failed to deliver the intended results due to the reluctance of the departments to coordinate their activities. Another lesson learned from that project is that forming farmer organizations and devolving functions to them will not happen if no specific assistance is included in the project design. A detailed discussion of lessons learned is presented in Supplementary Appendix A.

14. **Institutional Issues.** While the Punjab Irrigation and Drainage Authority (PIDA) Act (1997) and the accompanying farmer organization rules and regulations of 1999 provide an institutional framework for decentralization and devolution of irrigation management to farmer organizations, new dam irrigation networks continue to be managed by SDO. SDO controls both water releases and distribution and is in charge of the maintenance of the dam and the irrigation scheme. In most cases, the failure to develop the water rotation schedule has led to inequitable water allocations and water wastage, preventing the development of the full command area. Similarly, lack of O&M has caused substantial deferred maintenance, which, combined with initially poor command area development, has resulted in severely degraded physical conditions

³ ADB. 1985. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Small Dams Project*. Manila (Loan 0750-PAK[SF]), approved in the amount of \$39 million and completed on 14 March 1996.

of the irrigation distribution systems. Several degraded systems have water losses as high as 50%, which significantly affects tail-end farmers.⁴

15. Although the number of dams supplying domestic water has increased substantially during the past 5 years, this water supply function remains underdeveloped. SDO institutionally gives priority to agricultural development rather than domestic water supply, as the latter mandate belongs to the TMAs. PIPD acknowledges the need to articulate policies for entitlement, management, and pricing of dam water resources to ensure equitable access to the various end users. However, due to budget constraints, rural communities residing in the vicinity of the dam, which may have an entitlement, will still have difficulty in getting their rural water supply financed by TMA.

16. In adopting an improved dam development approach, a number of subsector institutional issues will need to be addressed. Among them are (i) creating a dam safety and sedimentation monitoring unit in PIPD to ensure regular safety inspection and sedimentation controls;⁵ and (ii) limiting SDO's responsibilities to dam planning, commissioning, and O&M only, and their capacity reinforced in those aspects. Feasibility studies, traditionally undertaken by SDO, should be contracted out to the private sector as SDO has limited qualified personnel available for this purpose. A more detailed sector and institutional analysis is presented in Appendix 2.

17. **Opportunities.** The recent prolonged drought from 2001 to 2003 has revived the government of Punjab's interest in enhancing agricultural productivity and economic development in barani areas through the development of dams. It is a clear strategy and investment priority in both the 2003 Water Sector Strategy and the 2005 Medium-Term Development Framework,⁶ and has led to the commissioning of 20 new dams to be completed by 2008. In the new 2007–2010 Medium-Term Investment Plan, the government of Punjab includes a new budget allocation of \$83 million for developing new dam projects in the Pothowar plateau. No external assistance has been provided to dam development projects, except for a \$500,000 grant from the Austrian Government to finance watershed management pilot initiatives (Appendix 3).

18. PIPD acknowledges the need for an integrated approach to dam project development looking simultaneously at social mobilization, construction of a dam and irrigation distribution network, watershed management, water management, agriculture extension support services as well as water supply and other uses. PIPD has already launched a 3-year pilot initiative of \$2.7 million financed by the Government of Pakistan to improve the dam command area of four operating dams. A number of dams recently built or already operating need similar investment to develop or rehabilitate their distribution system, organize their farmers, and develop more intensive farming systems. Watershed management has been included recently in a few dam development projects financed by PIPD, and assistance needs to be extended to some existing dam watersheds that require immediate attention.

19. Following promulgation of the PIDA Act, institutional reform efforts languished for nearly a decade and few farmer organizations were formed in Punjab. However, PIPD has made

⁴ Farmers who have their land located at the tail end of the irrigation network.

⁵ In 2003, the Water and Power Development Authority (WAPDA) stopped undertaking safety inspection on small dams.

⁶ Government of Punjab. 2005. *Medium Term Development Framework*. Punjab (pages 254, 256, and 402); Ministry of Water and Power, Office of the Chief Engineering Advisor, Chairman Federal Flood Commission. 2003. *Water Sector Strategy*. Punjab (Volume II, page 68). Ministry of Water and Power, Office of the Chief Engineering Advisor, Chairman Federal Flood Commission. 2002. *Medium Term Investment Plan*. Punjab (Volume III, pages 74–76 and 153–156).

substantial progress in the last 3 years in mobilizing and establishing over 100 farmer organizations, which demonstrates that PIPD is implementing this act.⁷ In late 2005, with the assistance of the World Bank, PIPD also initiated the Punjab Irrigation Sector Reform Program (PISRP) that lays out a comprehensive reform program for irrigation service delivery, and provides further evidence of the commitment to these reforms.

III. THE PROPOSED PROJECT

A. Sector Investment Approach

20. The Project supports the Government's and the government of Punjab's plans for water resources development. The water sector strategy, developed by the Ministry of Water and Power with the support of ADB,⁸ was adopted in 2003. It calls for the development of water resources outside the Indus canal system and identifies small storages as priority options (vol. II, page 68). The 2005 water sector's medium-term investment plan supporting this strategy allocates a budget to construct 20 "small dams" in both North-West Frontier Province (NWFP) and Punjab. The government of Punjab further supports this strategy through its 2007–2010 medium-term investment plan by allocating an additional \$83 million for the development of new "small dams" projects. Similarly, the 2005–2010 Medium-Term Development Framework developed by the Federal Planning Commission in coordination with sector ministries and provincial governments supports the 2003 water sector strategy. The framework calls for the development of additional water storage throughout the country for irrigation and domestic water supply, improved water efficiency, and integrated water resources management. Water storage is highlighted as a key priority for water resources development outside the Indus canal system.

21. An analysis of the PIPD was conducted to assess its willingness and ability to take the lead in implementing the Project and its capacities for project management, financial management, procurement, and safeguard issues. The overall assessment is positive although redefinition of SDO roles was suggested as part of the sector institutions improvement, and additional support will be required through a project management unit (PMU) to strengthen overall capacity and avoid implementation delays.⁹ In 2006, a Social and Environment Monitoring Unit (SEMU) was established in PIPD to provide a center of excellence for safeguard issues. SEMU's primary responsibility is to ensure that social and environmental issues arising from irrigation and drainage projects are properly addressed. SEMU has adequate capacity to ensure oversight of the implementation of the environmental and social safeguards of the Project.

B. Impact and Outcome

22. The impact of the proposed Barani Integrated Water Resources Sector Project is improved household income and health in the districts of Attock, Rawalpindi, Jhelum, and Chakwal in the barani areas of Punjab province. The four districts were selected for their high percentage of barani agriculture compared with other districts, and their high potential for water storage development. The Project's outcome is to increase crops and livestock productivity and households' access to domestic water supply by converting 11,500 ha of rain-fed agricultural

⁷ ADB. 2006. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Punjab Irrigated Agriculture Investment Program* (Multitranchise Financing Facility, Loan 2300-PAK). Manila. The loan will support establishment of farmer organizations in about 25% of the entire irrigated area of Punjab.

⁸ ADB. 1998. *Water Resources Strategy Study*. Manila. (TA 3130-PAK, approved by the President on 15 December 1998 and completed on 15 December 2002).

⁹ More details are provided in paras. 16 and 57 as well as in Appendix 2.

land into irrigated land and improving irrigation on 10,000 ha in existing systems. Two representative subprojects (“core subprojects”) were selected to assess the Project’s feasibility based on technical, social, financial, and economic aspects as well as its social and environmental safeguards.¹⁰

C. Outputs

23. The project outcome will be achieved through the following outputs: (i) increased sustainable water storage capacity; (ii) sustainable and profitable command areas and domestic water supply developed; and (iii) enhanced dam planning, management, and implementation capacity. The third output reflects sector institutional changes and capacity development needs for successful project implementation and sustainability.

1. Increased Sustainable Water Storage Capacity

24. The Project will increase water storage capacity by undertaking the construction of dams¹¹ and the associated structures required, identified based on agreed-upon selection criteria. Sediment control measures in the dam watershed will also be implemented to prolong the dam’s life and improve the sustainability of the water storage capacity of new dams and existing dams that need urgent attention. Once a site is identified and pre-feasibility studies are undertaken, the main activities in dam construction will consist of (i) selecting candidate subprojects for a feasibility study; (ii) contracting out the feasibility studies, environment impact assessments, detailed design and construction supervision to the private sector; and (iii) mobilizing communities during feasibility studies to ensure full consultation and participation. The selection of the candidate subproject will result from three screenings that will take place after (i) identification, (ii) pre-feasibility study, and (iii) feasibility study. Mandatory associated activities will include: (i) preparing the land acquisition and resettlement plans and implementing them; (ii) mobilizing a panel of experts for approval of the proposed dam designs; (iii) contracting out the construction of the dam; and (iv) supervising the dam impoundment. The dam construction and watershed management activities account for 70% of the total project costs.

25. The main activities in watershed management will consist of (i) training the soil conservation and range officers; (ii) mobilizing the community and registering the Citizen Community Board (CCB); (iii) preparing a watershed development plan and implementing it by (a) constructing silt trap structures, (b) covering major erosion spots with vegetation, and (c) controlling erosion in farmers’ fields.

2. Sustainable and Profitable Command Areas and Developed Domestic Water Supply

26. The Project will develop sustainable and profitable command areas and increase domestic water supply through three interventions: (i) developing sustainable rural water supplies and sanitation and increasing small towns’ domestic water entitlements; (ii) establishing efficient community managed irrigation schemes; and (iii) improving farmers’ access to production support and market services.

¹⁰ One subproject located in NWFP was dropped due to economic non-feasibility. Due to lower average rainfall and lower potential for agriculture, developing dams for irrigation purposes in NWFP barani areas appears less promising than in Punjab.

¹¹ The dams will range from approximately 12 to 45 meters high, with gross storage capacity from 500,000 to 50 million cm³.

27. The establishment of efficient community managed irrigation schemes will apply to both new dam projects and existing dam projects. It will require the following activities: (i) train SDO staff and the NGO social mobilizers to form and register water users organizations; (ii) mobilize and train water users and register them as farmers' organizations under the PIDA Act; (iii) carry out participatory planning of the water scheduling plans; (iv) carry out participatory design and construction (through private contractors) of the irrigation scheme including watercourses and/or pressurized systems; and (v) level the land for farmers.

28. At the level of the water users, capacity building and institutional strengthening will focus on user groups that will be organized during the Project to participate in building or rehabilitating water distribution systems, and maintaining and operating them on a sustained basis. Given the very limited experience in developing farmer organizations for dams, these organizations will need a comprehensive package of measures for them to become functioning sustainable institutions. The project activities will enhance the capability of dam-related farmer organizations to operate and maintain their distribution network; to exhibit transparency in decision making, procurement, hiring, and contracting; and to maintain simple accounting systems. Further, the farming communities will be empowered to define their water requirements and monitor the performance of SDO with respect to reservoir operations.

29. To ensure that farmers are able to fully optimize their current farming systems and eventually diversify toward high-value crops, the Project will support on-farm production improvement and improved access to market services for both new irrigation schemes and rehabilitated ones. The key project activities will consist of (i) organizing producers groups; (ii) undertaking barani farming systems studies; (iii) establishing farmer field schools; (iv) establishing participatory on-farm research and demonstration; and (v) linking farmers with credit institutions, inputs suppliers, and markets.

3. Enhanced Dam Planning, Management, and Implementation Capacity

30. The institutional and project implementation support output is designed to support PIPD, SDO, and the communities in implementing the various activities under the Project. The activities to set up the PMU would consist of (i) recruiting individual consultants to fill the PMU manager posts, (ii) procuring all required equipment, (iii) selecting government staff to be seconded to the PMU field offices, (iv) recruiting the social mobilization NGO, and (v) selecting and procuring the domestic and international advisory consultants.

31. On the institutional support side, the activities to support SDO in dam planning and O&M would consist of (i) strengthening participatory planning capacity to include beneficiaries and prospective affected persons during initial site identification; (ii) enhancing SDO staff technical capacity to supervise and review feasibility studies contracted out to the private sector; (iii) developing standard operating procedures for dam O&M, in particular due diligence for dam safety aspects, coordination of watershed management and watershed hydrology monitoring, and principles for demand-responsive reservoir operations; and (iv) providing capacity building to support the transfer of management of water conveyance and distribution infrastructure to farmer organizations on existing and new dams.

32. At PIPD level, institutional support will focus on the establishment of a dam safety and sedimentation monitoring unit within PIPD. The activities will consist of (i) preparing terms of reference and engaging the consultants, (ii) developing the unit's staff curriculum, (iii) recruiting staff, and (iv) providing training and equipment.

D. Special Features

33. The Project will support PIPD's efforts to transform its implementation approach to development of dams in Pothowar, strengthen the institutional framework, and help ensure that PIPD's further investments in dams yield better returns. The Project will adopt an integrated approach to management and use of barani water resources by addressing both watershed conservation upstream of the dam and sustainable development of the command area downstream. As interagency coordination failed to achieve this integration under Loan 0750-PAK(SF) (footnote 3), multidisciplinary competencies will instead be built in the PMU and put under the responsibility of a single executing agency. A key element will be to foster a demand-driven approach through beneficiary consultation and participation in identifying and selecting subprojects and to support the devolution of the irrigation schemes to organized water users. This will require substantial inputs in social mobilization and farmer organizations that will be provided by a local NGO with support from PIDA trainers and a water management consultant.

34. The Project will also adopt a comprehensive approach to barani farming systems by supporting farmers to optimize their current farming strategies and production on the scale of their farm, and not only their newly irrigated field. Although, farmers will be provided with opportunities to adopt high-value crops, they will also be supported in improving the production and marketing of the main barani production activities including livestock. The performance of public institutions in delivering extension services is too weak to successfully deliver on this aspect and has deteriorated with decentralization. The Project cannot rely on devolved district agriculture and livestock services and will build its own team from seconded civil servants who will be trained by the Commonwealth Assistance Bureau International (CABI), an organization with expertise in agricultural research and extension, and supported by consultants. At the end of the Project, these trained officers will return to their respective departments.

E. Project Investment Plan

35. The project investment cost is estimated at \$104.5 million equivalent, including taxes and duties of \$14.4 million equivalent. Financial charges during implementation (comprising interest during implementation and commitment charges) are estimated at \$7.5 million. Cost estimates by project output are summarized in Table 1, and the summary financing plan is presented in Table 2. Detailed cost estimates are in Appendix 4.

F. Financing Plan

36. The Government has requested a loan of \$75 million with \$55 million from ADB's ordinary capital resources (OCR) and \$20 million equivalent from the Asian Development Fund (ADF) to help finance the Project. The loans will finance 71.8% of the project cost. The OCR loan will have a 25-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility and a commitment charge of 0.15% per annum, and such other terms and conditions to be set forth in the draft OCR Loan Agreement. The Government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB. The ADF loan will have a 32-year term, including a grace period of 8 years; an interest rate of 1% per annum during the grace period and 1.5% per annum thereafter; and such other terms and conditions as set forth in the Loan Agreement. The Government will relend the proceeds of the loans to the Punjab government upon terms and conditions satisfactory to ADB and will cause the Punjab government to apply such proceeds to the financing of expenditures on the Project in accordance with the provisions of the Loan

Agreements and the Project Agreement. The OCR loan will be used to finance the dam and main canal construction, the dam safety and dam operation building, the studies, the equipment, project management consultants and the recurrent cost associated with the O&M of the PMU field offices vehicles. The ADF loan will be used to finance watershed management, irrigation network and land leveling, training and extension activities, water supply and sanitation, the technical assistance capacity development advisory services and recurrent costs associated with the O&M of the PMU main office vehicles. The Government will provide counterpart funds amounting to \$27.3 million, which will be used for financing the taxes, the PMU staff costs, and the entire cost of land acquisition and resettlement. The beneficiaries will contribute 8.9% of the watershed management costs, 17% for the watercourses and land leveling, and 1.6% of the domestic water supply schemes. The financing plan is shown in Table 2.

Table 1: Project Investment Plan
(\$ million)

Item	Amount ^a
A. Base Cost	
1. Increased Sustainable Water Storage Capacity	49.2
2. Sustainable and Profitable Command Areas and Water Supplies	12.4
3. Enhanced Dam Planning, Management and Implementation Capacity	10.8
Subtotal (A)	72.4
B. Contingencies ^b	
1. Physical Contingencies	7.2
2. Price Contingencies	17.4
Subtotal (B)	24.6
C. Financing Charges during Implementation	7.5 ^c
Total (A+B+C)	104.5

^a Includes taxes and duties of \$14.4 million.

^b Physical contingencies computed at 10%.

^c Includes interest, during construction calculated based on the US dollar 5-year swap rate of 20 December 2007 (4.30%) plus the lending spread of 0.20% per annum.

Source: Asian Development Bank estimates.

Table 2: Financing Plan
(\$ million)

Source	Total	%
A. Asian Development Bank		
OCR	55.0	52.6
ADF	20.0	19.1
Subtotal (A)	75.0	71.8
B. Government	27.3	26.1
Beneficiaries	2.2	2.1
Subtotal (B)	29.5	28.2
Total (A+B)	104.5	100.0

ADF = Asian Development Fund, OCR = ordinary capital resources.

Source: Asian Development Bank estimates.

G. Implementation Arrangements

1. Project Management

37. PIPD will be the EA for the Project, with responsibility for overall project management and implementation. To carry out this responsibility effectively, PIPD will establish a PMU with the following roles: (i) overall interagency and district coordination; (ii) recruitment of consultants

and NGOs and awarding of procurement and consulting contracts, (iii) project financial management; (iv) consolidation, review, and submission of regular progress and financial reports to the project steering committee (PSC) and ADB; and (v) monitoring and evaluation of project outputs and results. The PMU will also be directly responsible for implementing the watershed management activities under the first output, the second output except rehabilitation of the main channels, and the third outputs. SDO will be responsible for implementing (i) the dam planning and construction for the first output, and (ii) the main channel rehabilitation for the second output. In implementing item (i), SDO will receive specific advisory support in safeguard and technical matters from the PMU. For each subproject under its responsibility, SDO will appoint a subdivisional officer who will supervise the dam feasibility study, detailed design studies, and the engineering construction supervision consultants. In implementing the water supply-related activities, the PMU will involve the relevant TMAs in (i) assessing the demand for water supplies, (ii) organizing the future water supply users, and (iii) supervising the overall execution of works and services related to water supply activities.¹²

38. The PMU will be headed by the project director who will be appointed through an open and competitive process by PIPD and will be acceptable to ADB. The project director will have (i) qualification in either engineering, agro-economics or social sciences and relevant project managerial experience; and (ii) will report to the PIPD secretary. The PMU will be staffed by full-time managers for (i) watershed conservation, (ii) farming systems and marketing, (iii) on-farm water management, (iv) finance,¹³ (v) social mobilization,¹⁴ (vi) water supply and sanitation, and (vi) project benefit monitoring. The PMU will also include livestock and agriculture extension advisors¹⁵ as well as appropriate support staff. The managers and advisors will be recruited from the market through an open and competitive process. In addition, SDO will assign its deputy director for planning and technical monitoring (DDPTM) to the PMU to serve as the full-time civil works coordinator. As the civil works coordinator, the DDPTM will report to the project director.

39. Three PMU field offices will be established, one each for (i) Attock and Rawalpindi districts, (ii) Chakwal district, and (iii) Jhelum district. Each office will be staffed with a full-time specialist seconded from the following institutions: (i) agriculture extension, on-farm water management, and soil and field engineering directorates of the Punjab Department of Agriculture; (ii) livestock extension directorate of the Punjab Department of Livestock; and (iii) Punjab Forest Department. The specialists will report directly to their respective technical manager in the PMU. The NGO social mobilizers will also be posted in the field offices and will report to the PMU social mobilization manager. In addition, one trainer from CABI, a specialized international NGO, will be posted in each field office.

40. The government of Punjab will establish a PSC to provide broad project oversight and project-related policy guidance. This committee will be chaired by the Chairman of the Planning and Development Board with the following as members: the secretaries of Punjab Irrigation and Power, Punjab Agriculture, Punjab Livestock, and Punjab Local Government departments; a member of the Provincial Board of Revenue; the Director General of Environment Protection Agency (EPA); the managing director of PIDA; representatives of the concerned district governments; two representatives of the civil society; and the project director who will also serve as secretary. The PSC will meet as required but at least once every year to (i) review project

¹² Feasibility studies, detailed design, construction and engineering supervision of the water supplies will be undertaken by the firms engaged for the dam construction.

¹³ Together with two accountants: one accountant's assistant and one procurement assistant.

¹⁴ To be recruited from the NGO selected under the Project to undertake the social mobilization consulting services.

¹⁵ The agriculture extension advisor is to be recruited through the firm recruited under the Project to undertake agriculture extension services.

progress and (ii) act on any issues in need of resolution at the provincial level.

41. Three months after loan effectiveness, PIPD will establish a subproject selection and planning committee (SSPC) to monitor and advise on the planning process and to address subproject selection issues at identification, pre-feasibility, and feasibility screening phases. The SSPC will be chaired by the PIPD Chief Engineer Development Zone (CEDZ) with the project director, PMU as secretary-member. The members will comprise the SDO project director; director, Engineering Strategic Cell PIPD; director, Social and Environment Monitoring Unit; the DDPTM; one or more PMU project managers; and the concerned executive engineers. On the basis of SSPC's recommendation, ADB and the EA will give the final approval for the subprojects.¹⁶

42. For each dam construction-related subproject, PIPD will establish a subproject design and construction committee during the dam design and construction phases to (i) ensure effective coordination between the social mobilization, construction, and resettlement processes; (ii) resolve issues arising between the communities, the contractors, and other parties; (iii) review progress against the target and report difficulties to the PMU and SDO project directors; and (iv) inform district administration on progress made. The committee will be chaired by the SDO executive engineer and will comprise the subdivisional officer of the SDO as secretary, the resident engineer of the engineering design and supervision consultants, a representative of the affected persons (APs), a representative of the social mobilizers, and a representative of the executive district office (EDO) in which the subproject is located. The chair will determine and nominate any other members as necessary.

43. Upon completion of dam construction, PIPD will establish a subproject development and operation committee to (i) ensure the effective coordination between the activities related to the subprojects; (ii) resolve issues arising between communities, project teams, contractors, and other parties; (iii) review progress against the target; and (iv) inform district administration on progress made. The committee will be chaired by one of the PMU managers and will consist of the social mobilizer as secretary; the responsible SDO subdivisional officer; the agriculture extension, livestock extension, on-farm water management, soil conservation, and forest technical officers based in the PMU field offices; representative of the farmers' organizations; and a representative of the EDO. The chair will determine and nominate any other members as necessary to be included in the committee. The proposed project organization structure is shown in Appendix 5.

2. Subproject Preparation and Selection

44. **Subproject Preparation.** Each subproject involving the construction of a dam will go through stepwise preparation that starts at identification and ends at the detailed design stage. Screening will take place at the end of the identification, pre-feasibility, and feasibility stages. Identification and pre-feasibility studies will be undertaken by SDO with the support of the project social mobilizers. The feasibility studies will be tendered to private contractors who will work jointly with the social mobilizers. The studies will include technical and economic feasibility of the dam and associated structures, the water supplies, the watershed development plans including a geographic information system (GIS) mapping and environmental impact assessments. Social mobilizers will (i) provide detailed descriptions of the potential beneficiaries, (ii) verify the demand expressed by the communities at pre-feasibility stage, (iii) survey land ownership in the future command areas, and (iv) assess issues of poverty and

¹⁶ ADB's approval will only be necessary for the first five subprojects of each category unless ADB is not satisfied with the proposed selection process during the initial stage.

gender. A panel of experts will be mobilized to review the integrity and safety standards of the dam designs before starting the detailed design. The subproject involving only rehabilitation and/or upgrading of the command area and main feeder canal will be selected out of the list of existing dams provided by SDO. The proposed candidate subproject will go through a screening process. The social mobilizers will review (i) the social demand and (ii) the social organization capacity of the water users. Dam sedimentation survey and safety inspection will be necessary to determine the remaining water storage capacity and the safety status of the candidate subproject.

45. **Selection Criteria.** Selection criteria for subprojects involving construction of a dam are aimed at selecting subprojects that are technically, economically, and environmentally feasible and have the best potential from the social point of view (demand-driven and equitable). Based on the same principles, criteria have been produced for the selection of subprojects involving the rehabilitation and/or upgrading of the command area and main channels of an existing dam and for the selection of water supply. The subproject selection criteria and process are presented in Appendix 6.

3. Subproject Safeguard Plan Approvals

46. ADB does not have a formal policy on environmental categorization of dams and reservoir projects. On occasion, environmental category A has been assigned to reservoir projects that have involved the construction of a dam higher than 15 m or with a reservoir capacity greater than 3 million m³. This approach to categorization simply adopts a set of criteria developed for technical design and dam safety requirements, but does not take environmental issues into account. Therefore the application of a set of triggers and thresholds developed for dam safety and technical design has a significant weakness in that it does not take into account the physical, environmental, and social effects of a particular project. The environmental assessment and review procedure (EARP) for this Project has been developed to provide a procedure that focuses on the physical, environmental, and social characteristics of each subproject. SEMU in PIPD Lahore, after being trained by an international environmental safeguard specialist, will undertake environmental categorization of the subproject. SDO and the PMU will then be responsible for coordinating the implementation of the environmental safeguard requirements during planning and construction. A more detailed description of the assessment process is in the EARP in Supplementary Appendix B.

47. The PMU will prepare and implement the land acquisition and resettlement plans (LARPs) via the land acquisition and resettlement section (LARS) where personnel seconded from the revenue department and a team of resettlement specialists are located. SDO will support LARS by reviewing the alignments and supervising the cadastral survey of the affected land. LARPs will be submitted to ADB for clearance. The summary of the land acquisition and resettlement framework (LARF) is in Appendix 7.

4. Implementation Plan

48. To expedite the project implementation period, the subprojects will be prepared in batches equivalent to 2,000 ha of irrigated agriculture development (between 1 and 4 subprojects). There will be a total of four batches in addition to the core subproject. All subprojects in each batch will be prepared simultaneously by SDO and the contract awarded by the PMU to only two contractors. One contract will be awarded for implementing the feasibility study, detailed design, and construction supervision, and another one will be awarded for construction of the dams, the main channel, and the water supplies. Implementation of both contracts will be supervised by SDO. Watersheds and command area-related works will be

tendered after organization of the farmer organizations and participatory planning. The PMU will prepare the technical specification and award the works to ideally one single contractor per batch.¹⁷ Contract implementation will be supervised by the PMU. The timing between batches will be minimized. As soon as the PMU and SDO finishes identification and the pre-feasibility studies for the first batch, preparation of the second batch will start. Preparation of the first batch will start before loan effectiveness, and the social mobilizers will be recruited in advance through retroactive financing to ensure that the demand-driven approach is carried out. The implementation plan is in Appendix 9.

H. Implementation Period

49. The Project will be implemented over a period of 6 years from 1 July 2008. The estimated project completion date is 30 June 2014. The estimated loan closing date is 31 December 2014. The implementation schedule is in Appendix 8 and a detailed schedule is in Supplementary Appendix C.

I. Procurement

50. Equipment, materials, goods, and services for ADB-financed contracts will be procured following ADB's *Procurement Guidelines* (2007, as amended from time to time). Civil works contracts will be split between (i) dam and associated construction works, and (ii) command area development level works. For each subproject, the procurement of civil works worth \$10 million or less will be awarded to suitable prequalified contractors, following national competitive bidding (NCB) procedures acceptable to ADB, as national contracting capacity to successfully undertake such works exists. Civil works contracts costing more than \$10 million will be awarded under international competitive bidding (ICB) to suitable prequalified contractors. All works contracts related to the first output will be handled by SDO on behalf of the PMU. ADB will review at least the first three NCB contracts awarded. Equipment and materials worth less than \$100,000 will be procured through the shopping mode. The NCB procedures will be conducted in accordance with the Government's Public Procurement Rules 2004, subject to the clarification of the rules that have been agreed upon with ADB for the purpose of ADB's *Procurement Guidelines*. The procurement plan (Appendix 10) will be updated at least annually covering the next 18 months of procurement activity.

J. Consulting Services

51. The Project will provide 651 person-months of national and 46 person-months of international consulting services through both consulting firms and individual consultants. All consulting services will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). The Project will provide 569 person-months of national project implementation consultants (8 long-term consultants) for the PMU. These include the project director;¹⁸ the head of monitoring and evaluation; the livestock advisor and five technical managers for on-farm water management, farming systems, watershed conservation, finance, water supply and sanitation; and 5 person-months of unallocated national consulting services from individual consultants. The Project will also provide technical advisory services (46 person-months international and 82 person-months national) comprising a panel of experts of international experts in dam design and construction, engineering geology, and hydrology; and a pool of national and international specialists on economics, water

¹⁷ Designing the watershed and command area works requires time for social mobilization and participatory planning and therefore cannot be packaged in the same package as the dam, appurtenant structures, and water supplies.

¹⁸ The project director is preferably to be provided by the Punjab Irrigation and Power Department (PIPD), but if no suitable candidates are available, the project director will be supplied from the open market.

management, dam safety inspection, dam sedimentation, dam operation, irrigation operation, environment assessments, and resettlement. For these advisory services, a firm will be recruited through the quality- and cost-based selection (QCBS) method using the full technical proposal method. The terms of reference are in Supplementary Appendix D.

52. Social mobilization will be provided by (i) individual consultants during the project advance actions¹⁹ and (ii) a qualified local NGO²⁰ to be recruited through the QCBS method using a full technical proposal. The terms of reference (TOR) are in Supplementary Appendix E. The training and mentoring services on participatory extension services (farmers field school) will be provided by CABI²¹ using single source selection. Single source selection is preferred for the following reasons: (i) CABI is more qualified for the assignment than any other locally established organization due to its unique expertise in farmer field schools in Pakistan and demonstrated good track record in delivering that service;²² (ii) CABI is already contracted by PIPD for the 3-year pilot project to improve command area development on small dams and its recruitment in the Project is a natural continuation of this pilot experience; and (iii) the project officer and PIPD could not identify an organization that would be similarly qualified for the assignment.

53. Consulting services will also be required to produce the subproject feasibility studies, the environment impact assessment (EIA) studies, detailed designs, and construction supervision. The TOR for these services will be developed by SDO with support from individual consultants recruited through advance contracting. The feasibility study, detailed design, and work supervision will be packaged in one single contract per subproject and consulting firms recruited through the QCBS method. The EIA will be undertaken by a specialized consulting firm to be recruited through the consultant qualification selection (CQS) method. In both cases, if the selected firms perform well on their first contract, their services will be used in the next subproject and their contract extended.

K. Anticorruption Policy

54. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to and discussed with the Government. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. To support these efforts, relevant provisions of ADB's *Anticorruption Policy* are included in the loan regulations and the bidding documents for the Project. In particular, all contracts financed by ADB in connection with the Project will include provisions specifying the right of ADB to audit and examine the records and accounts of the EA and all contractors, suppliers, consultants, and other service providers as they relate to the Project.

L. Disbursement Arrangements

55. To expedite project implementation through timely release of the loan proceeds, two imprest accounts (one for each loan) will be established for and managed by the PMU in the National Bank of Pakistan. The accounts will be managed, replenished, and liquidated in

¹⁹ Estimated at 4 person-months of social mobilizer manager and 32 person-months of field social mobilizers.

²⁰ Estimated at 66 person-months of social mobilizer manager and 808 person-months of field social mobilizer.

²¹ CABI is an international organization with 40 member countries, with its head office in Wallingford, United Kingdom. The organization has offices in several ADB member countries including Pakistan.

²² Particularly for the Government-financed Punjab Fruit and Vegetable Project and the ADB-financed Malakand Rural Development Project. See ADB. 1999. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Malakand Rural Development Project. Manila.

accordance with ADB's *Loan Disbursement Handbook* (2007, as amended from time to time). The initial amount to be deposited into the imprest accounts will not exceed 10% of the total loan amount or the estimated expenditures for the next 6 months, whichever is lower. The statement of expenditures procedures will be used to reimburse eligible expenditures, or to liquidate and replenish the imprest accounts for individual payments under \$100,000 equivalent. Loan disbursements for goods and services under major civil works and consultants contracts will be made using direct payment methods as outlined in the *Loan Disbursement Handbook*.

M. Retroactive Financing and Advance Action

56. The government of Punjab has requested advance contracting and retroactive financing under the Project to allow for (i) the feasibility and detailed design studies, and (ii) environmental assessment studies, (iii) the numerical modeling study, (iv) the recruitment of the project implementation consultants and NGO social mobilizers. Retroactive financing will take effect for a period not to exceed 12 months from the date of the Loan Agreement. The Government has been informed that the amount of retroactive financing must not exceed 20% of the total ADB loan amount, and that approval of advanced contracting and retroactive financing does not commit ADB to finance the Project. Furthermore, the Government has been informed that compliance with ADB procurement and consulting services guidelines under the advance actions was required.

57. Under the supervision of PIPD, SDO will be responsible for contracting and financial management related to the advance action. The financial management capacity of SDO was assessed under the project preparatory TA²³ through a financial management assessment questionnaire. The result indicated a moderate risk of weakness of the financial management systems. A consultant from an ongoing ADB TA will assist SDO during this interim phase.

N. Accounting, Auditing, and Reporting

58. The government of Punjab will maintain separate accounts and financial statements for funds provided to the Project. These accounts and related financial statements will be audited annually by the auditor general of Pakistan, and will include an audit with a separate opinion on the use of the imprest accounts and statement of expenditures procedures. The government of Punjab will furnish ADB with the audited accounts and statements not later than 6 months after the end of the related fiscal year. Through the PMU, PIPD will submit to ADB (i) diagnostic quarterly reports detailing the project progress to date, (ii) problems encountered, (iii) measures taken to overcome them, (iv) expected progress over the next quarter, (v) safeguards and compliance with them, as well as (vi) any major or serious issues that need to be expeditiously addressed. Three months before project completion, PIPD will submit a project completion report to ADB detailing the utilization of the loan proceeds, project implementation analysis, and the socioeconomic impact of the Project on the subproject beneficiaries.

O. Project Performance Monitoring and Evaluation

59. A project monitoring system will be established within 6 months of loan effectiveness. A specific monitoring and evaluation (M&E) unit reporting directly to the project director will be created in the PMU. It will be headed by a senior M&E specialist (economist) and staffed with three M&E data collectors and one data entry operator. Initial support from an international consultant will be provided to design the M&E system that will be used throughout project

²³ ADB. 2006. *Technical Assistance to Pakistan for Preparing the Community Water Storage and Irrigated Agriculture Development Project*. Manila.

implementation. This will involve the establishment of a project reporting system that will generate trimester reports on project implementation progress. At the beginning of the project and not later than 12 months after loan effectiveness, specific indicators will be identified for the monitoring and evaluation of the Project. A baseline survey will be carried out for each subproject before its commencement and at the end of its implementation. The M&E unit may implement thematic evaluations if requested by the project director, PMU managers, or ADB.

P. Project Review

60. PIPD and ADB will conduct a project review semiannually to (i) ensure that the implementation arrangements are in place and appropriate, (ii) assess implementation progress and identify remedial measures to address bottlenecks, and (iii) ensure that safeguards and other conditions are being met. Within 30 months of the loan Effectiveness date, a midterm review will be undertaken. It will include a comprehensive evaluation of the project implementation arrangements and progress to date; and consultations with the beneficiary communities, line agencies, EPA, NGOs, and district authorities. If necessary, recommendations will be made for adjustments to the project scope, implementation arrangements, and cost estimates.

IV. PROJECT BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS

A. Economic Benefits

61. The economic benefits from subprojects involving the construction of a new dam will come essentially from increased production in agriculture and livestock due to the shift from rain-fed to irrigated agriculture. Irrigation development and extension services will support a substantial increase in crop yields (more than 100% for main crops such as wheat, corn, gram, and groundnuts) and an increase in cropping intensities from an average 60% to at least 120%. Irrigation will stimulate some diversification into high-value crops such as vegetables and orchard fruits that can be sold to local markets. The substantial increase in crop residue and the increase in fodder production will support a 25% increase in livestock numbers as well as an average increase of 20% in production per animal. Benefits will also come from fish production in the dam reservoir and from the development of the water supply in the vicinity of the dam.

62. The main impact resulting from watershed management consists of reduced sediment inflow and extended life of the dam. It will also yield benefits from the reduced soil erosion in private agricultural fields, production of fuel wood through afforestation of the main erosion spots, and planting of drought-resistant fruit trees to retain soil on private farms.

63. The sum of all these benefits in the case of the Kot Fateh Khan core subproject yields an economic internal rate of return (EIRR) of 14.3%. The EIRR of the rural water supply alone is 34% and contributes 1.5% to the overall EIRR of the subproject (see summary economic and financial analysis in Appendix 11).

64. Benefits from the development and rehabilitation of existing schemes will come from increased production in agriculture and livestock. The economic viability of such activities will benefit from the sunk costs of completed dams. Nevertheless, where facilities are being rehabilitated, the economic benefits will be lower than for new irrigation schemes since some of the benefits will have been achieved even without the project interventions. However, the EIRR for most extension and rehabilitation subprojects is expected to be greater than the EIRR for the core subproject.

65. The Project will have additional benefits that have not been translated in economic terms. They include (i) the role that the dam will play in reducing flood intensity and associated damage, (ii) the increased capacity of IPD and SDO for dam safety and sedimentation monitoring as well as dam O&M, (iii) the recreational and environmental value of the dam site, and (iv) the increased availability and recharge of groundwater. Some subprojects will also have other benefits: (i) the provision of bulk water to urban centers or private housing developments, (ii) the generation of electricity, and (iii) the permanent release of water for downstream users on streams that are not currently perennial.

B. Social Dimensions

1. Social Benefits and Poverty Reduction

66. The Project will have positive poverty reduction impacts on the income, employment opportunities, and food security of people in barani areas. The estimated rise in income for the estimated 22,000 beneficiary households (176,000 persons) will vary in the case of the core subproject from \$147 to \$7,274 per annum, depending on land tenure and farm size. The agricultural intensification, particularly diversification to more labor-intensive higher-value irrigated crops, will have a positive indirect impact on the poorest by generating job opportunities. In the project area, agricultural labor is usually provided by landless households and represents a major source of income to sustain their livelihood and eventually meet their needs such as health care and education. The increase in water availability for domestic uses will benefit an estimated 9,050 rural households (72,400 persons). Its main benefit will be to reduce the time spent by women in collecting water and to improve health. Increased domestic water availability will particularly benefit the poor who are the first to be affected by scarcity.

67. The Project will result in decentralized management of new and existing irrigation systems and in the establishment of farmer organizations with full financial autonomy. The formation of farmer organizations responsible for distribution and minor canals as well as better trained staff will lead to the following: (i) greater responsiveness of service to irrigation demands, (ii) more efficient and equitable water distribution, (iii) improved accountability and transparency, and (iv) improved collection of the water fee, allowing higher expenditures on system O&M, thus improving the sustainability and performance of the systems.

68. The participation strategy (Supplementary Appendix F) outlines a social mobilization process that will ensure all stakeholders are involved in decision making.

69. The Project's gender action plan (Supplementary Appendix G) includes measures to ensure that the PMU staff is gender sensitive and the project activities create opportunities for women's development.

70. A poverty and social analysis has been conducted for the Project in accordance with ADB's *Handbook on Poverty and Social Analysis* (2001). A summary poverty reduction social strategy for the Project is summarized in Appendix 12.

2. Land Acquisition and Resettlement

71. The following types of assets may be expected to be affected by land acquisition and resettlement impacts due to the construction of the dam and the feeder canal: (i) agricultural and nonagricultural land, much of which is privately owned and supports the livelihood of rural households; (ii) private and public structures and utilities, including, among others, residential houses, fishponds, wells, water supply schemes, roads and footpaths; and (iii) livelihood

through the loss of crops and trees, businesses and employment, and grazing resources.

72. A LARP was prepared for the core subproject, which is typical of the largest subprojects that can be developed under the Project. A total of 529.72 ha will be acquired, of which 45.56 ha is cultivable and 484.16 ha is uncultivable. The subproject will not cause physical displacement of houses. A total of 68 households (510 persons) will be affected by land losses. Of these, 3 households (28 persons) will lose 10% or more of their cultivable agricultural land but will not be severely affected as the affected land generates no income. The subproject was classified as category B only. The LARF and LARP are in supplementary Appendix H.

3. Indigenous People

73. No impacts on indigenous people are expected because the districts of Attock, Rawalpindi, Jhelum, and Chakwal have no indigenous people as defined by ADB.

C. Environmental Impact

74. The Pothwar plateau is characterized by dry, sparsely vegetated landscapes with few, if any, natural water features. The extensive clearing of the land for fuel wood and rain-fed agriculture means the environmental values of the area are generally low. The environmental assessment studies show that the Project will provide significant environmental benefits due to the presence of permanent water bodies in an otherwise dry environment. The watershed management measures will increase vegetative cover and conserve soils, improving the diversity of habitats and the landscape. Any negative impacts are expected to be temporary, mainly associated with construction work, and will be mitigated through the effective implementation of environmental management plans. The presence of a large body of water will alter the landscape and flood the existing river and gullies; however, these impacts are offset by the considerable benefits of the development of irrigated agriculture. The Project was categorized as a category A sector loan under the ADB *Environmental Assessment Guidelines* (2003). A sector loan EIA has been prepared, along with an EIA for the sample subproject at Kot Fateh Khan that was circulated to the board and posted on the ADB website 120 days prior to board approval (Supplementary Appendix I).

D. Risks

75. **Commitment to Decentralization of Irrigation Schemes.** The government of Punjab has shown its commitment to reform through establishment of farmer organizations, development of the Punjab Irrigation Sector Reform Program (PISRP), and active support for the World Bank's Punjab Irrigation Sector Development Policy Loan. The government is committed to continue decentralized management, and will benefit from the project assistance to extend decentralized management outside the Indus canal system.

76. **Effective Farmer Organizations and Participation.** The participation and ownership proposed under the Project depend on the ability of the water users to (i) develop remunerative farming systems, (ii) work in an inclusive manner on the water distribution system, and (iii) share the water equitably among themselves. To have genuine participation, the elite must not be dominant and women must be involved. The social mobilization teams, staffed with an adequate gender balance and trained by PIDA, will enable the Project to work with organized community groups, maximize positive impact on women, and support the formation of legally autonomous farmer organizations under the PIDA Act.

77. **Design Feature and Phasing.** The demand-driven and integrated approach requires

good coordination between the different activities and precise phasing of the subprojects to ensure synergies and avoid implementation delays. This condition will be ensured by (i) providing a multidisciplinary team of experts under the EA single line of command to avoid interagency coordination problems, and (ii) implementing the Project in batches of four sites to be able to reduce procurement delays and facilitate contract management.

78. **Environmental Safeguards.** Effective implementation of environmental management plans depends on regular independent monitoring of the works. This role is often undertaken by the relevant environment agency. As the Punjab Environment Protection Department has inadequate staff and money and is unable to effectively monitor the construction of the subprojects, SEMU will undertake routine monitoring. Effective controls will be ensured through conditions in the contract that will enable the PMU to issue caution-and-stop-work notices to contractors who underperform.

79. **Political Instability.** Political stability in Pakistan has deteriorated recently and could further deteriorate with the election process. Nevertheless, the project area is a particularly stable area. It has not been affected by the current political turmoil and project implementation and monitoring are not jeopardized.

V. ASSURANCES

A. Specific Assurances

80. In addition to the standard assurances, the Government has given the following specific assurances, which will be incorporated in the legal documents.

81. **Project Management Unit.** Within 1 month of loan effectiveness, the government of Punjab will have appointed the project director, the PMU finance manager and the appropriate support staff. Within 5 months of loan effectiveness, the government of Punjab will have fully staffed the PMU and ensure that the unit will remain fully staffed throughout the project implementation period.

82. **Project Steering Committee.** Within 1 month of loan effectiveness, the government of Punjab will have established the PSC and ensure that it remain fully operational throughout the project implementation period.

83. **Incremental Staff.** Within 3 months of loan effectiveness, the government of Punjab will augment the SDO staffing to include the positions of deputy director, planning and technical monitoring, and three social mobilizers.

84. **Standard Operating Procedures.** Within 24 months of loan effectiveness, the government of Punjab will have developed and adopted operational guidelines on dams, which will specify clearly the roles and duties of various institutions involved in operating dams, including but not limited to SDO and farmer organizations.

85. **Farmer Organizations.** The government of Punjab will ensure the establishment of appropriate arrangements, as stipulated in the prevailing government laws, rules, and regulations, for proper and timely registration of farmer organizations within the project area. Within 36 months of loan effectiveness, the government will ensure that 50% of the farmer organizations required for O&M of the facilities constructed under the Project have been established. To ensure proper O&M of the facilities, the government will allow the farmer organizations within the project area to retain a reasonable portion of the collected abiana or

irrigation water charge proceeds, the amount of which will be agreed upon by the government and ADB.

86. **Dam Development Strategy.** Prior to the completion of the Project, the government of Punjab will have adopted a provincial strategy and an implementation manual for dam development in Pothowar.

87. **Dam Safety and Sedimentation Monitoring Unit.** Prior to the completion of the Project, the government of Punjab will have established a dam safety and sedimentation monitoring unit that will undertake regular dam safety inspections and sediment surveys.

88. **Dam Construction.** The government of Punjab will ensure that during project implementation, any construction of dams within the project area which is outside the scope of the Project will be conducted in accordance with the criteria and approach adopted under the Project. In addition, the government will ensure that in the construction of these dams, additional resources will be provided to the relevant implementing agencies to avoid delay in implementing the Project.

89. **Counterpart Funds.** The Government will, and will cause the government of Punjab to ensure that the required counterpart funds are made, approved, and released in a timely manner to ensure proper implementation of the Project.

90. **Budgetary Allocations.** The government of Punjab will ensure that appropriate allocation will be made in its annual budget to ensure proper O&M of the dams and the main channel carrier.

91. **Bidding Documents.** The government of Punjab will ensure that the bidding documents and contracts for civil works under the Project will include provisions that require (i) prompt and equal pay to men and women for work of equivalent value; (ii) safe working conditions for all the workers; and (iii) compliance with national laws and international treaty obligations in the employment of child labor (child labor will not be used for rehabilitation and maintenance activities). The PMU will monitor compliance and report on the implementation of these activities in its regular progress reports.

92. **Land Acquisition and Resettlement.** The Government will, and will cause the government of Punjab to ensure that all land acquisition and resettlement activities under the subprojects shall be done in accordance with (i) the LARF agreed upon by the Government and ADB; (ii) the relevant laws, regulations, and procedures of the Federal and Punjab governments; and (iii) ADB's *Involuntary Resettlement Policy* (1995). The government will further agree that for a particular subproject, no withdrawals from the works expenditure category will be made until all persons affected by the land acquisition and involuntary resettlement activities under the subproject have been adequately compensated in accordance with the LARF and ADB's *Involuntary Resettlement Policy*.

93. **Environment.** The Government will, and will cause the government of Punjab to ensure that the design, construction, O&M of all the subprojects' facilities are carried out in accordance (i) with the agreed-upon EARP, (ii) ADB's *Environment Policy* (2002), and (iii) the federal and provincial regulations on the environment. The government of Punjab will require that (i) the relevant contractor under the Project will prepare an environmental management plan (EMP) for each subproject to minimize any adverse environmental impacts arising from construction for the subproject; (ii) prior to the release of the land for the subproject, the contractor's EMP will have been approved by SEMU; and (iii) the relevant contractor will appoint an environment

manager with qualifications in environmental science or management to be responsible for implementing the EMP. The government will be responsible for environmental monitoring and management of the subproject once the subproject becomes operational. The government of Punjab will ensure that the works contracts under the Project include provisions to indicate that the works contractors shall be subject to routine monitoring of environmental performance. In the event the contractors fail to comply with the requirements of the EMP, or the contractor's environmental management performance is deemed unsatisfactory by SEMU, the government of Punjab shall cause the PMU to issue a corrective action notice. The government of Punjab shall ensure that the failure by the contractors to fully comply with the corrective action notice shall result in a stop order being issued and the contractors being fully liable for any costs incurred to the Project due to the issuance of such stop order.

94. **Gender and Participation Strategy.** The Government will, and will cause the government of Punjab to actively engage as both project beneficiaries and participants, (i) women in accordance with the agreed upon project gender action plan; and (ii) communities in accordance with the agreed upon participation strategy.

B. Condition for Loan Effectiveness

95. The PC-1 will be duly approved by the competent authority of the Government.

VI. RECOMMENDATION

96. I am satisfied that the proposed loans would comply with the Articles of Agreement of the Asian Development Bank (ADB) and, acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement, I recommend that the Board approve

- (i) the loan of \$55,000,000 to the Islamic Republic of Pakistan for the Barani Integrated Water Resources Sector 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; 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; and
- (ii) the loan in various currencies equivalent to Special Drawing Rights 12,596,000 to the Islamic Republic of Pakistan for the Barani Integrated Water Resources Sector Project from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years, including a grace period of 8 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.

Liqun Jin
Vice President

8 February 2008

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Improved household income and health in four barani area districts of Punjab province	By 2016, in the project area <ul style="list-style-type: none"> Increased beneficiary household incomes of between \$147 and \$7,724 per annum, depending on land tenure and farm size Perceived mortality and morbidity from waterborne diseases in project area has substantially decreased 	Baseline and evaluation reports commissioned under the Project Project completion report, gender disaggregated impact report, and possible project performance audit report Beneficiary perception surveys as part of each subproject baseline and at the end of the project	Assumptions <ul style="list-style-type: none"> Government policies continue to support and stimulate inclusive economic growth in barani areas Road and electricity infrastructure accompanies water resource development Risk <ul style="list-style-type: none"> Political instability and increased insecurity prevent project implementation
Outcome Increased crops and livestock productivity and household access to domestic water and sanitation	By 2013, in the project areas: <ul style="list-style-type: none"> Conversion of 11,500 ha of rain-fed agriculture to irrigated agriculture Improved irrigation of 10,000 ha on existing small dams 100% increase in crop yields and 35% increase in livestock production in 22,000 beneficiary farms 65 metric ton increase in fish production Increased access to domestic water (90 liters per capita per day) for 9,050 rural households At least 3% of the incremental stored water released in bulk to nearby rural towns 	Project completion report Baseline survey at the beginning of subproject implementation and at the end of the Project Approved water entitlement in PC1	Assumptions <ul style="list-style-type: none"> Municipalities are able to invest in urban water supply distribution infrastructure and management Fishery department produces enough fingerlings for fish production TMA's are supervising rural water supply installation efficiently Risks <ul style="list-style-type: none"> The project area is affected by a prolonged drought or livestock epidemic outbreak Competition for limited water between different usages may lead to social discord and strife
Outputs 1. Increased sustainable water storage capacity	By 2013, in the project areas: <ul style="list-style-type: none"> 15% increase in water storage capacity in the Pothwar plateau through construction of new dams^b 30% reduction in sediment inflow in 20 existing dams and all new dams (5–20 	Subproject approval documentation Sedimentation monitoring studies	Assumptions <ul style="list-style-type: none"> Quality of design, construction and supervision is good. Upstream communities and local governments are receptive to watershed management activities SDO and PIPD are committed to community consultation during planning and construction stages

Design Summary	Performance Targets/Indicators (depending on size)	Data Sources/Reporting Mechanisms	Assumptions and Risks
			<ul style="list-style-type: none"> Social mobilization is contracted to a professional institution <p>Risk</p> <ul style="list-style-type: none"> Price escalations in construction continue to rise above economic feasibility
<p>2. Sustainable and profitable command areas and developed domestic water supplies</p> <p>2.1 Developed sustainable rural water supplies and increased small town domestic water entitlement</p>	<ul style="list-style-type: none"> 5–20 water supply schemes (depending on the number of dams built) developed in the vicinity of the dams and successfully managed by the beneficiary communities 	<p>Project implementation monitoring through progress reports, semiannual and annual reports by SDOs</p>	<p>Assumptions</p> <ul style="list-style-type: none"> TMA's collaborate with the Project and provide quality service for rural water supply and sanitation scheme commissioning Urban domestic water needs are given importance during the subproject planning stage <p>Risk</p> <ul style="list-style-type: none"> Government does not pursue the decentralization process
<p>2.2. Developed efficient irrigation schemes with community-based management</p>	<ul style="list-style-type: none"> Water distribution infrastructure including branches and water-courses constructed or rehabilitated and land leveling for 19,000 ha At least 40 WUAs formed and registered under the PIDA Act Annual <i>abiana</i>^a recovery rates from WUAs greater than 80% Rotation schedules between outlets determined by WUAs on the basis of seasonal crop and water availability-based reservoir operation schedules 	<p>Project implementation monitoring through progress reports, semiannual, and annual reports by SDOs</p> <p>PIDA registers</p> <p>WUAs accounting book and project monitoring reports</p> <p>Project implementation monitoring through progress reports, and semiannual and annual reports by SDOs</p>	<p>Assumptions</p> <ul style="list-style-type: none"> SDO is willing to devolve the irrigation schemes to WUAs Water user's members are able and willing to make required cash/in-kind contributions and participate in O&M activities <p>Risk</p> <ul style="list-style-type: none"> Governments do not continue to pursue the irrigation reform agenda, which is based on farmer-managed distribution and maintenance
<p>2.3 Improved farmers access to production support and market service</p>	<ul style="list-style-type: none"> Farmer field schools established for 21,000 irrigated ha and 10,000 rain-fed ha 75% of the cultivators in the command area 	<p>Project implementation monitoring through progress reports, semiannual and annual reports by SDOs</p>	<p>Assumptions</p> <ul style="list-style-type: none"> Agriculture department is able to provide quality staff on deputation to the Project CABI remains interested to provide support to the project Farmers are willing to form

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	are members of an agriculture interest group of their choice working with the Project's farming system enhancement advisory services.	Project implementation monitoring through progress reports, semiannual and annual reports by SDOs	farmer organizations <ul style="list-style-type: none"> Private sector provides necessary quality farm inputs
3. Enhanced dam planning, management, and implementation capacity	<ul style="list-style-type: none"> Reservoir operations and irrigation distribution schedules match crop water requirements in an equitable manner and balance seasonal availability and demand. Dam safety and sedimentation monitoring unit is in place and conducting regular safety and sedimentation inspections. Dam selection is demand-driven and communities are fully involved at all stages of the project development. A planning and technical monitoring division is established, with permanent social mobilization staff in the SDO conducting site identifications, pre-feasibility studies, initial environmental and social screening, preparing TORs for feasibility studies, tendering and construction supervision. 	<p>Project implementation monitoring through progress reports, semiannual and annual reports by SDOs</p> <p>Government ordinance approved</p> <p>Project implementation monitoring through progress reports, semiannual and annual reports by SDO NGO mediator reports</p> <p>Government approved ordinance</p> <p>Project implementation monitoring through progress reports, and semiannual and annual reports by SDO</p>	<p>Assumptions</p> <ul style="list-style-type: none"> SDO supports social consultations during the planning stage Land acquisition and revenue administration follow ADB social safeguard requirements PIPD/Civil service commission supports the increase in SDO staff <p>Risk</p> <ul style="list-style-type: none"> Political interference from local leaders derails the local consultation process during planning stage

Activities with Milestones	Inputs
<p>Output 1. Increased Sustainable Water Storage Capacity</p> <p>Dam Construction</p> <p>1.1 Select candidate subproject for feasibility study (January 2008 to April 2009)</p> <p>1.2 Contract out and implement feasibility studies, detailed design, contract award, for construction (August 2008 to September 2010)</p> <p>1.3 Prepare the land acquisition and resettlement plans and implement them (January 2008 to November 2010)</p> <p>1.4 Construct dams (June 2008 to December 2011)</p> <p>1.5 Supervise dam impoundment (June 2009 to December 2012)</p>	<p>Project preparation: ADB TA: \$450,000 Government: \$100,000</p> <p>Project implementation: ADB loans: \$75 million Government: \$27.3 million Beneficiaries: \$2.2 million ADB reviews: 25 person-days per annum</p>

<p>Watershed Management</p> <ul style="list-style-type: none"> 1.6 Train soil conservation and range officers (July 2008 to February 2010) 1.7 Mobilize community and register community-based organizations (June 2008 to December 2013) 1.8 Prepare watershed development plan and implement it (September 2008 to December 2013) <p>Output 2. Sustainable and Profitable Command Areas and Domestic Water Supplies Are Developed</p> <p>1st Sub-output: Developed sustainable rural water supplies and increased small town's domestic water entitlement</p> <ul style="list-style-type: none"> 2.1 Identify rural and urban water supply needs from the new dam (June 2008 to December 2010) 2.2 Contract out detailed designs and construction works (September 2008 to December 2011) 2.3 Assist TMAs and the communities in supervising the works and organizing O&M (April 2009 to June 2011) <p>2nd Sub-output: Developed efficient irrigation schemes with community-based management</p> <ul style="list-style-type: none"> 2.4 Select subproject for command area rehabilitation (July 2008 to April 2009) 2.5 Mobilize, train and register water users association (January 2009 to December 2013) 2.6 Construct irrigation system, perform land leveling (January 2009 to December 2013) <p>3rd Sub-output: Improved farmers' access to production and marketing services</p> <ul style="list-style-type: none"> 2.7 Organize producers groups (January 2009 to June 2012) 2.8 Establish farmer field schools (June 2009 to December 2012) 2.9 Establish participatory on-farm applied research and demonstration (December 2009 to December 2013) 	
<p>Output 3: Enhanced Dam Planning, Management, and Implementation Capacity</p> <p>Project Implementation Support</p> <ul style="list-style-type: none"> 3.1 Appoint project director (by May 2008) 3.2 Recruit individual consultants, select seconded staff to fill the PMU manager posts (by June 2008) 3.3 Procure all required equipment (by June 2008) 3.4 Recruit social mobilization NGO (by March 2008) 3.5 Recruit national and international consultants (by September 2008) <p>Institutional Support</p> <ul style="list-style-type: none"> 3.6 Develop standard operating procedures to support performance for the operation and maintenance of the dam, in particular due diligence for dam safety aspects, coordination of watershed management and watershed hydrology monitoring, and principles for demand-responsive reservoir operations (by June 2010) 3.7 Establish a dam safety and sedimentation monitoring unit in PIPD (by December 2011) 	

ADB = Asian Development Bank, BARI = Bangladesh Agricultural Research Institute, CABI = Commonwealth Assistance Bureau International, ha = hectare, LRDI = Local Resource Development Initiative, NGO = nongovernment organization, PIDA = Punjab Irrigation and Drainage Authority, PIPD = Irrigation and Power Department, PMU = project management unit, SDO = small dams organization, TA = technical assistance, TMA = tehsil municipal administration, WUA = water users association.

^a *abiana* - irrigation water charge

^b Current total gross storage capacity is: 2.7 billion cubic meters.

SECTOR AND SUBSECTOR ANALYSIS

A. Barani Farming Context

1. **Irrigated and Barani Areas in Punjab.** Pakistan is noteworthy for its significant development of water resources, in particular the Indus River irrigation system, the largest contiguous irrigation system in the world. The system supplies irrigation water to over 14.9 million hectares (ha) and has permanently transformed agriculture and the livelihood of tens of millions of Pakistanis for the better. In Punjab, 8.4 million ha is irrigated by the Indus River system and irrigated agriculture (i) accounts for 28% of Punjab's gross domestic product (GDP) output, (ii) employs 54% of the labor force, (iii) produces 90% of agricultural output, and (iv) uses over 95% of the water resources. Punjab provides about 58% of the national GDP, and 66% of the national agricultural GDP. However, about one quarter of Pakistan's cultivable area remains outside this system and suffers from chronically low agricultural productivity. In Punjab, about 19% of cultivable lands lie in barani¹ areas, mainly in the Pothowar plateau between the Indus and Jhelum rivers. The plateau covers an area of 2.2 million ha, of which 1.0 million ha is under rain-fed agriculture. Around 2,600 villages have a population of 4.2 million, and these people generally have far more limited opportunities for productive agriculture and the livelihood it supports than farmers in the irrigated areas.

2. **Barani Agriculture.** Agriculture and livestock have been the traditional sources of revenue for people in barani areas, and still account for 40% of their income in Punjab. Improvement in livelihood for barani residents, especially for a large majority of small landholders and tenants, will depend to a large extent on gains in agriculture and livestock productivity and growth in the local nonfarm sector. Improvement in both on-farm and nonfarm sectors is constrained by several factors common to rural areas of Pakistan. Among the constraints are (i) impeded access to markets, inputs, and services due to inadequate or nonexistent transportation infrastructure; (ii) lack of access to electricity, with negative consequences for the productive potential of both the agriculture and nonfarm sectors; (iii) productivity constraints arising from the lack of access to and inadequate social services; (iv) lack of access to finance and business development services; and (v) poor access to agriculture and livestock advisory and support services. The Government with external support is currently giving considerable emphasis and committing significant resources to address those constraints.

3. The constraint that most significantly affects barani areas and agricultural and livestock productivity is shortage of water. With no or limited secure water sources, farming depends on rainfall, which is irregular in both annual and seasonal amounts as well as intensity in any given storm event. Farmers have developed farming systems with very low input requirements to keep the financial risk of crop failures manageable. This practice results in low productivity. The primary crops grown and their average yields are wheat (0.5 tons/ha [t/ha]), maize (0.7 t/ha), and groundnuts (0.4 t/ha). In contrast, irrigated yields are as follows: wheat (3.1 t/ha), maize (1.7 t/ha), and groundnuts (1.5 t/ha). In addition to lower average yields, barani areas are highly susceptible to prolonged drought and associated poverty shocks due to the absence of reliable surface or ground water sources. The most recent 2001–2003 drought had a devastating effect, especially on the more arid parts of barani areas, and forced many families to migrate to urban areas, sell off productive assets, and face serious indebtedness.

¹ Barani traditionally refers to rain-fed agriculture. However, the percentages given here cover also pockets of irrigated agriculture developed out of limited sources of water. The Project will focus on areas dependent on rain-fed agriculture.

4. The scarcity of reliable perennial water sources, including groundwater, also poses serious challenges to the provision of municipal water to the quickly growing rural communities and small towns in barani areas. It constitutes a serious impediment to the sustainable development of local industrial and service activities, and represents a tremendous burden and loss of productive potential on families, mainly women, who may spend hours collecting water on a daily basis.

B. Small Dams

5. **Small Dams in Punjab.** In response to the chronic need for reliable water supply and development in barani areas, the Government of Pakistan started a program to construct small dams in 1961. The federal Government established the Agricultural Development Corporation (ADC), which constructed 10 dams. The Water and Power Development Authority (WAPDA) constructed the Rawal dam in 1962. Following the ADC program, the Small Dams Organization (SDO) was established in 1973 in the Punjab Irrigation and Power Department (PIPD). SDO assumed control of the ADC and WAPDA dams. In addition to constructing small dams with government funds, ADB approved the Small Dams Project² that supported the development of small dams (1986–1995) along with measures for command area development, fisheries development, and institutional strengthening. Development of small dams is part of Pakistan and Punjab's overall water resources development strategy and is reflected as an investment priority in both the 2003 Ministry of Water and Power's Water Sector Strategy³ and the Federal Planning Commission's 2005 Medium-Term Development Framework. In the 2007–2010 medium-term investment, the government of Punjab included a new budget allocation of \$83 million for the development of new dam projects in the Pothohar plateau.

6. To date, 50 small dams have been commissioned in Punjab with a total canal command area of around 24,500 ha. SDO is headed by a project director (equivalent to a superintending engineer) and consists of three divisions based on geographic distribution: Islamabad, Chakwal, and Jhelum. Each division is headed by an executive engineer and three to four assistant engineers. In addition, SDO has a design section located at the SDO office in Islamabad, which is headed by an executive engineer, but its functions are carried out by a full-time assistant engineer. At each small dam location in Punjab, there is a permanent staff including a gauge reader and three to four low-level maintenance personnel. Although SDO has the technical capacity to have already constructed numerous small dams and conduct prefeasibility and feasibility studies for additional small dams, the performance and development impact of small dams in Pakistan and in Punjab have not achieved their full potential.

7. **Poor Performance of Small Dams.** The performance of small dams and adoption of irrigated agriculture in the small dam command areas have been limited primarily because of (i) the lack of a fully integrated approach incorporating effective command area development and watershed management, (ii) little effective participation by the communities in project

² ADB. 1985. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Small Dams Project*. Manila (Loan 750-PAK[SF], approved for the amount of \$39 million and completed in 1997). The term "small dams" used in this context relates to projects undertaken by the Small Dams Organization of Punjab that generally range from 15 to 30 meters (m) high. More recently, projects in the order of 50 m have been constructed. The Project will follow the convention of the International Commission on Large Dams (ICOLD) and the World Bank, in which large dams are defined as those higher than 15 m or with storage capacity greater than 3 million cubic meters.

³ This was supported by ADB. 1998. *Water Resources Strategy Study*. Manila (TA 3130-PAK), approved by the President on 15 December 1998 and completed on 15 December 2002.

development, and (iii) the need to strengthen the institutional framework for the management, and operation and maintenance (O&M) of small dams.

8. **Water Management Constraints.** The agricultural benefits anticipated to be generated by small dams have not materialized due to both the failure to adequately prepare the irrigation distribution system in the command area, but, more importantly, the failure to prepare farmers to take full advantage of the new water supply. In general, SDO puts much of its technical emphasis on construction of the larger structures, the dam and feeder canal to the command area. In the development of most dams, the distribution network has received limited or no development. Given the small size of the distribution systems and the proximity of the water supply, improved design and operating procedures that are more demand-responsive may be possible and could improve yields as well as increase water use efficiency.

9. Watercourse development below the *mogha* (outlet) is left to the discretion of farmers since this activity traditionally falls under the purview of the Directorate of Command Area Development (DCAD) within the Department of Agriculture. In the larger Indus River irrigation systems, DCAD is generally quite active and engaged; however, it is generally not involved in the development of small dams, and watercourse and field channels are inadequately developed.⁴ This presents a significant problem since due to the small size of the small dam irrigation systems, watercourses and field channels are often the primary distribution features of their command areas. In addition, adequate land preparation for irrigation is generally absent, and small dam command areas are often in undulating terrain. Another reason for slow development of irrigated agriculture in small dams is that farmers do not generally practice *warabandi* (rotating water distribution at the field level where farmers are allocated specific time duration for drawing irrigation water for their fields). The warabandi turn is essentially the farmer's water entitlement as specified in the Punjab Irrigation and Drainage Act of 1873, which is still the overarching policy document for irrigation in Punjab. The lack of rotation and the resulting often inequitable distribution may be due to inadequate attention given to warabandi development during construction of the dam or due to weak institutions for irrigation management with no irrigation rules for O&M that could be followed. The above factors, combined with the reality that most farmers have no history of managing irrigation, warrant considerably more resources to be devoted to effective system design, and farmer guidance and capacity development with regard to watercourses, field channels, and on-farm water management activities.

10. **Agricultural Constraints.** In addition to water management and land preparation constraints, the development of the command area of small dams has not effectively involved human resources or provided support for farmers who are supposed to make the transition from barani to irrigated agriculture. Barani farmers have had success in cultivation despite substantial barriers and exposure to risks; however, they need assistance in adapting to new higher-value or more intensive cropping patterns that are appropriate for their soil and climatic conditions. Orchard, vegetable, and other crops that were not feasible under barani conditions can significantly improve farmer livelihood, but farmers must have the capacity and confidence to grow such crops. Improved water supply may necessitate changes to existing cropping practices such as rotation to maximize yield gains. Due to the unreliability of water supply, barani farmers are often reluctant to risk significant investment in inputs; with improved water supply, they often need guidance in developing the most productive input regime. Changed cropping and agricultural practices may also require new and unfamiliar post-harvest

⁴ The federal Government is funding a special initiative for lining the watercourses, and to date, none of these funds have been channeled to development of the command area of small dams.

techniques. New crops may require new marketing channels and offer new value-added activities for farm communities, but assistance is needed to fully exploit these opportunities. Increased production intensity can also create employment opportunities and allow for fuller employment of landless laborers.

11. Due to the unreliability of farming in barani areas, livestock plays a vital role in the productivity, livelihood, and wealth maintenance of barani communities and accounts for nearly one third of the average household income. Irrigation from small dams can increase fodder yields and correspondingly significantly increase livestock production. Increased production of milk and meat will result in livelihood and nutritional benefits to barani communities. Farmers may require assistance in adapting to more stall- and fodder- versus range-oriented production and to greater intensification. The Directorate of Agricultural Extension and the Directorate of Livestock in the Department of Agriculture (DA) is responsible for agricultural extension activities; however, extension activities to farmers in the command area of small dams have been limited and DA capacity is generally weak. Support to farmers for improved livestock productivity is needed if small dams are to achieve their full potential.

12. PIPD has recognized that, for small dams to achieve their full potential, more effective command area development needs to be put in place. In 2005, PIPD initiated the pilot project—Command Area Development of Small Dams in Rawalpindi Division. This project covers the command area of four existing small dams and provides funds for agricultural extension, research, and the formation of village organizations for farmer support. The approach of the program recognizes that it is vital to work in partnership with communities if farming practices are to change; ideally, however, strong community participation must start at the very beginning and continue throughout the dam development process so as to generate ownership and expedite productivity gains. The PIPD program primarily focuses on agricultural support services, SDO is supposed to repair the irrigation system and strengthen warabandi practices in the dams, yet their capacity and incentives to do that are limited. In addition, this pilot project does not form farmer organizations for ongoing management and O&M of the command area. While initial results have been positive, the approach still needs to be reflected in general policy and mainstreamed into regular practice for the development of small dams under SDO.

13. **Watershed Management Constraints.** Watershed management is critical to sustain the benefits from the development of small storages. Sedimentation surveys of sample dams in the Pothwar region reveal that loss in water storage capacity can be as high as 4.2% per year, which could lead to full siltation of the dam's dead storage only after 24 years. Empirical evidence also demonstrates that a few dams are likely suffering from higher sedimentation rate. The impact that this premature loss of effective storage would have on the dams' beneficiary communities, even beyond the dams' economic life, needs attention. In particular, an assessment of the watershed condition and any needed management plan should be studied at the feasibility stage and monitoring and control of erosion in the dam watershed must be ensured after dam construction. In recent small dam development projects undertaken by PIPD, watershed management components have been included to address the issue of sedimentation. Although long-term studies have not yet been possible, the initial results of watershed management activities on small dams demonstrate the feasibility of the approach and its integration into the development of small dams.

C. The Institutional Framework

14. **Farmer Organizations and System Management.** Strengthening the management and

O&M of small dam command areas is required to improve system performance and productivity, yet to date little has taken place to organize farmers for more effective management. The need to improve management accountability and O&M affects not only small dams but all irrigated areas in Punjab. The Punjab Irrigation and Drainage Authority (PIDA) Act (1997) and the accompanying farmer organization rules and regulations of 1999 provide an institutional framework to create farmer organizations. The PIDA Act and its associated farmer organization rules were mainly intended to empower farmers at the minor and distributary canal level to manage the large Indus River irrigation system.

15. After the promulgation of the PIDA Act, reform efforts languished and few farmer organizations were formed; however, PIPD has made substantial progress in mobilizing and establishing over 100 farmer organizations during the last 3 years.⁵ In late 2005, PIPD initiated the Punjab Irrigation Sector Reform Program (PISRP) with the assistance of the World Bank's Punjab Irrigation Sector Development Policy loan that lays a comprehensive reform program for irrigation service delivery within the Indus irrigation system. Although the PISRP or PIDA Act explicitly addresses small dams as a priority issue, the PIDA rules state that "a farmer organization may be formed at a distributary or dam." Specifically, farmer organization responsibilities include (i) managing and O&M of the irrigation system (specific canals) for which it has been established, (ii) receiving bulk water from PIPD, (iii) ensuring equitable and efficient irrigation supply, (iv) assessing and collecting water rates, and (v) resolving disputes. The farmer organization is expected to become a self-supporting and self-sustaining entity, especially with regard to the recovery of the O&M cost. To date, the experience with farmer organizations in the larger systems in Punjab has been positive. However, the relatively small and self-contained nature of the dam command areas and communities provides conditions conducive to effective farmer organizations in these areas.

16. Each small dam developed by SDO has O&M guidelines and estimated O&M costs prepared as part of its development. In many of the systems under SDO, O&M and O&M resources have been inadequate, yet farmers have never been given responsibility or resources for system O&M or management. This situation has led to substantial deferred maintenance, which, combined with initially poor command area development, has resulted in severely degraded physical conditions of many small dam irrigation systems. System losses in many of the irrigation command areas of small dams are as high as 50%, which significantly affects tail-end farmers of the canal network. Given the small area and the relatively simple irrigation infrastructure, farmer organizations with adequate resources should be able to provide a more effective arrangement to manage systems and execute O&M.

17. The PIDA Act provides a legal framework for organizing farmers for irrigation management in small dams, yet SDO has not yet undertaken this provision of the PIDA Act. Farmer organizations within the command area of a small dam may provide a more natural unit for organization and cooperation than in a network of interconnected canals that may be several hundred thousand hectares. Due to the isolated nature of small dams spread throughout Pothowar, farmer organizations in small dam areas may be able to play a broader role than water management and O&M alone to help address some of the agricultural productivity constraints concerning inputs, production, and marketing. This role would be similar to the one

⁵ ADB. 2006. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Punjab Irrigated Agriculture Investment Program*. Manila (Multitranchise Financing Facility, Loan 2300-PAK). This Project will support establishment of farmer organizations over about 25% of the entire irrigated area of Punjab.

being played by the village organization being formed under PIPD's pilot project—Command Area Development of Small Dams—in Rawalpindi division.

18. **Multipurpose Water Use of Dam Water.** In Punjab, 16 of the 50 existing small dams provide municipal water supply for local villages and towns in the area in addition to irrigation water, which in barani areas is an especially valuable use of the resource. Given Pakistan's burgeoning population, the need for reliable potable water is growing. As a result, this water supply function has become significant. Nine of the 20 dams built between 2003 and 2008 provide municipal water supply in addition to irrigation, compared with only 7 of 30 dams built before that date.⁶ However, SDO institutionally gives priority to agriculture development rather than the domestic water supply as the latter mandate belongs to the tehsil municipality agencies (TMAs). PIPD acknowledges the need to articulate policies for entitlement, management, and pricing of dam water resources to ensure equitable access for the various interested user groups.

19. Currently, entitlements for various uses of dam water are specified in a volumetric manner by SDO during development of the dam project. These quantities and any temporal conditions to deliver the water are enumerated in the project's PC I⁷ that is submitted by SDO through PIPD to the Punjab Planning and Development Board for approval. For smaller projects, the PC I is approved at the provincial level, but for larger projects or projects with foreign funding, the PC I is approved at both the provincial and federal levels. Therefore, the approved PC I serves as the formal entitlement for water that is to be supplied to a village or town. Changes to water allocations for various uses in a small dam are also permitted in Punjab through a petition from PIPD that needs to be approved by the chief minister's office.⁸ While this is not a formal entitlement system, it provides a binding agreement with due process for water allocation and reallocation in small dams.

20. **Dam Safety.** Although the safety record for dam safety in Pothowar is excellent, currently no agency is active and responsible for dam safety and provides regular inspection and technical advice to SDO. WAPDA used to fill this role; however, inspections stopped for small dams in Pothowar in 2003. Dam inspection represents a larger problem in Pakistan that is being addressed under the Ministry of Water and Power (MOWP). MOWP is currently proposing measures for an improved dam safety framework and procedures at the federal level. PIPD has also called for a dam safety unit that would be responsible for inspecting dams under SDO as well as other larger PIPD infrastructure. Currently, there is a recognized problem that is being addressed—regular monitoring, inspection, and technical advice for dam safety—which is also not in compliance with recommended practices of the international commission on large dams (ICOLD) of which Pakistan is a member.

21. **Supply-Driven Planning.** The construction of most of the small dams today has followed a supply-driven approach. During planning and implementation, the SDO proceeds primarily on the basis of technical feasibility and does not consult or include the proposed beneficiaries or would-be-negatively-affected persons in identifying prospective projects. The first formal interaction between SDO and persons in the dam's location often begins with legal notices for land acquisition. Dam sites are usually identified through reconnaissance exercises

⁶ Water allocation for water supply represents between 2.3% and 20.9% of the dams' live storage.

⁷ The PC I (planning commission pro-forma I) is the internal Government of Pakistan planning and budget allocation document that is prepared by the project proponent, in this case PIPD. PC I is reviewed on the basis of various parameters including social, environmental, and economic criteria.

⁸ This has recently taken place in a situation where SDO is raising the height of a dam to provide more water to a local town that will be paying for the cost of raising the height of the dam.

conducted by area SDO staff that give cursory consideration to hydrology, watershed, and geology and focus mainly on the availability of geographic features where a dam or embankment can be placed. To date, the demand and interest of future beneficiaries have not generally been factored into the decision to build a dam. Agency staffs generally do not consult with the community at large since, by some accounts, they perceive consultation to be potentially disruptive of the construction process. These attitudes and procedures have led to the selection of dam sites where the bulk of the future beneficiaries may have limited interest in developing irrigation and undertaking the transition to irrigated agriculture. Even if the communities have interest in the development of the dam, they have little ownership and trust in the project and may be cautious in developing the command area. As a result, the materialization of project benefits may be seriously delayed.

22. **Dam Operation.** Operation of the dams' reservoirs has also generally been undertaken by SDO according to prescribed rules developed at the beginning of the project. Unlike larger command areas of the Indus Basin system far from their source, the command area of small dams are close to the water supply and can allow for more flexible and responsive reservoir operation based on farmers' real-time needs for irrigation. However, farmers in the command area have little interaction or modalities to communicate their irrigation needs for more effective irrigation. Decentralization of irrigation management in the case of small dams provides the opportunity for greater farmer involvement in the reservoir operation that can be facilitated through the formation of farmer organizations. The participation of farmers can improve (i) scheduling to meet farmers' needs, (ii) transparency, (iii) equity of water allocation, (iv) efficiency of water use, and (v) agricultural productivity.

EXTERNAL ASSISTANCE TO THE SECTOR

Table A3.1: ADB Lending to Water Sector

Loan No.	Project	Amount (\$ million)	Date Approved
2300-PAK	Punjab Irrigated Agriculture Investment Program—Punjab Irrigated Project Preparation Facility	900.0	13 Dec 2006
800-PAK	Punjab Community Water Supply and Sanitation Sector	50.0	28 Nov 2002
1679-PAK	Punjab Farmer-Managed Irrigation	7.8	25 Mar 1999
1578-PAK	Second Flood Protection (Sector)	100.0	13 Nov 1997
874-PAK	Korangi Wastewater Management	70.0	18 Sep 1997
1413-PAK	National Drainage (Sector)	140.0	12 Dec 1995
837-PAK	Punjab Rural Water Supply and Sanitation (Sector)	46.0	31 Jan 1995
1297-PAK	Third Punjab On-Farm Water Management	62.1	8 Mar 1994
1294-PAK	Pehur High-Level Canal	127.6	22 Dec 1993
901-PAK	Urban Water Supply and Sanitation	72.0	4 Nov 1993
Total		1,575.5	

ADB = Asian Development Bank, PAK = Pakistan.

Source: Asian Development Bank.

Table A3.2: Other Agency Lending to Water Sector

Project	Institution	Amount (\$ million)	Date Approved
Punjab Irrigation Sector Development Policy Loan	WB	100.0	1 Jun 2006
Sindh On-Farm Water Management Project	WB	61.1	20 May 2004
AJK Community Infrastructure	WB	20.0	9 Jul 2002
NWFP On-Farm Water Management Project	WB	21.4	12 Jun 2001
Biodiversity Conservation Project	WB	10.1	24 Apr 2001
Drought Eradication and Relief Program	WB	7.8	1999
National Drainage Program Project	WB	285.0	4 Nov 1997
Punjab Private Sector Groundwater Development Project	WB	56.0	1996
Punjab Private Sector Groundwater Development Project	WB	56.0	11 Jul 1996
2 nd Karachi Water Supply	WB	91.9	9 Feb 1993
Total		709.3	

AJK = Azad Jammu and Kashmir, NWFP = North-West Frontier Province, WB = World Bank.

Source: World Bank estimates.

Table A3.3: ADB and Other Donors Lending to Rural Livelihoods and Agriculture
Federal and Punjab

Loan No.	Project	Amount (\$ million)	Date Approved
2134-PAK	Sustainable Livelihoods in Barani Areas Project (ADB)	58.6	14 Dec 2004
2171-PAK	Agribusiness Development (ADB)	31.0	19 May 2005
	Strengthening of Livestock Services (EC)	22.9	2003
1877/1878/1879-PAK	Agriculture Sector Program II (ADB)	350.0	13 Dec 2001
1531-PAK	Dera Ghazi Khan Rural Development (ADB)	36.0	4 Sep 1997
1467-PAK	Bahawalpur Rural Development Project (ADB)	38.0	26 Sep 1996
Total		536.5	

ADB = Asian Development Bank, EC = European Commission, PAK = Pakistan.

Source: Asian Development Bank estimates.

DETAILED COST ESTIMATES

Table A4.1 Detailed Cost Estimates by Expenditure Category

Item	Total Cost (\$ million)	Percentage of Total Base Cost (%)
A. Investment Costs		
1. Civil Works	48.7	67.3
2. Equipment	1.0	1.4
3. Environment and Social Mitigates	8.8	12.2
4. Consultants	4.9	6.8
5. Training and Extension Services	0.8	1.1
6. Studies	2.9	4.0
Subtotal (A)	67.1	92.7
B. Recurrent Costs		
1. Salaries and allowances for PMU Seconded Staff	3.3	4.5
2. Accommodation	0.1	0.1
3. Equipment Operation and Maintenance	1.9	2.7
Subtotal (B)	5.3	7.3
Total Base Cost (A + B)	72.4	100.0
C. Contingencies		
1. Physical	7.2	9.9
2. Price	17.4	24
Subtotal (C)	24.6	33.9
D. Financing Charges During Implementation		
1. Interest During Implementation	7.2	10.0
2. Commitment Charges	0.3	0.4
Subtotal (D)	7.5	10.4
Total Project Cost (A+B+C+D)	104.5	144.3

PMU = project management unit.

Source: Asian Development Bank estimates.

Table A4.2 Detailed Cost Estimates by Financier^a
(\$ million)

Item	ADB (OCR)		ADB (ADF)		Government ^b		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
A. Investment Costs										
1 Civil Works	37.0	61.1	12.4	20.5	9.1	15.0	2.0	3.4	60.6	100.0
2 Equipment	0.9	85.0	0.0	0.0	0.2	15.0	0.0	0.0	1.1	100.0
3 Environment Monitoring	0.5	85.0	0.0	0.0	0.1	15.0	0.0	0.0	0.6	100.0
4 Land Acquisition	0.0	0.0	0.0	0.0	9.1	100.0	0.0	0.0	9.1	100.0
5 Consultants	0.8	13.9	3.9	66.1	1.2	20.0	0.0	0.0	5.9	100.0
6 Training and Extension Activities	0.0	0.0	0.8	85.0	0.1	15.0	0.0	0.0	1.0	100.0
7 Studies	3.0	85.0	0.0	0.0	0.5	15.0	0.0	0.0	3.5	100.0
Subtotal (A)	42.3	51.7	17.1	21.0	20.3	24.8	2.0	2.5	81.8	100.0
B. Recurrent Costs	1.3	20.6	0.6	9.1	4.6	70.3	0.0	0.0	6.5	100.0
Total Base Cost (A+B)	43.7	49.5	17.7	20.1	24.8	28.2	2.0	2.3	88.3	100.0
C. Financing Charges During Implementation	7.0	92.6	0.6	7.4	0.0	0.0	0.0	0.0	7.5	100.0
D. Contingencies^c	4.4	50.1	1.7	19.7	2.4	28.0	0.2	2.2	8.7	100.0
Total Project Cost (A+B+C+D)	55.0	52.6	20.0	19.1	27.3	26.1	2.2	2.1	104.5	100.0

ADF = Asian Development Fund, OCR = ordinary capital resources.

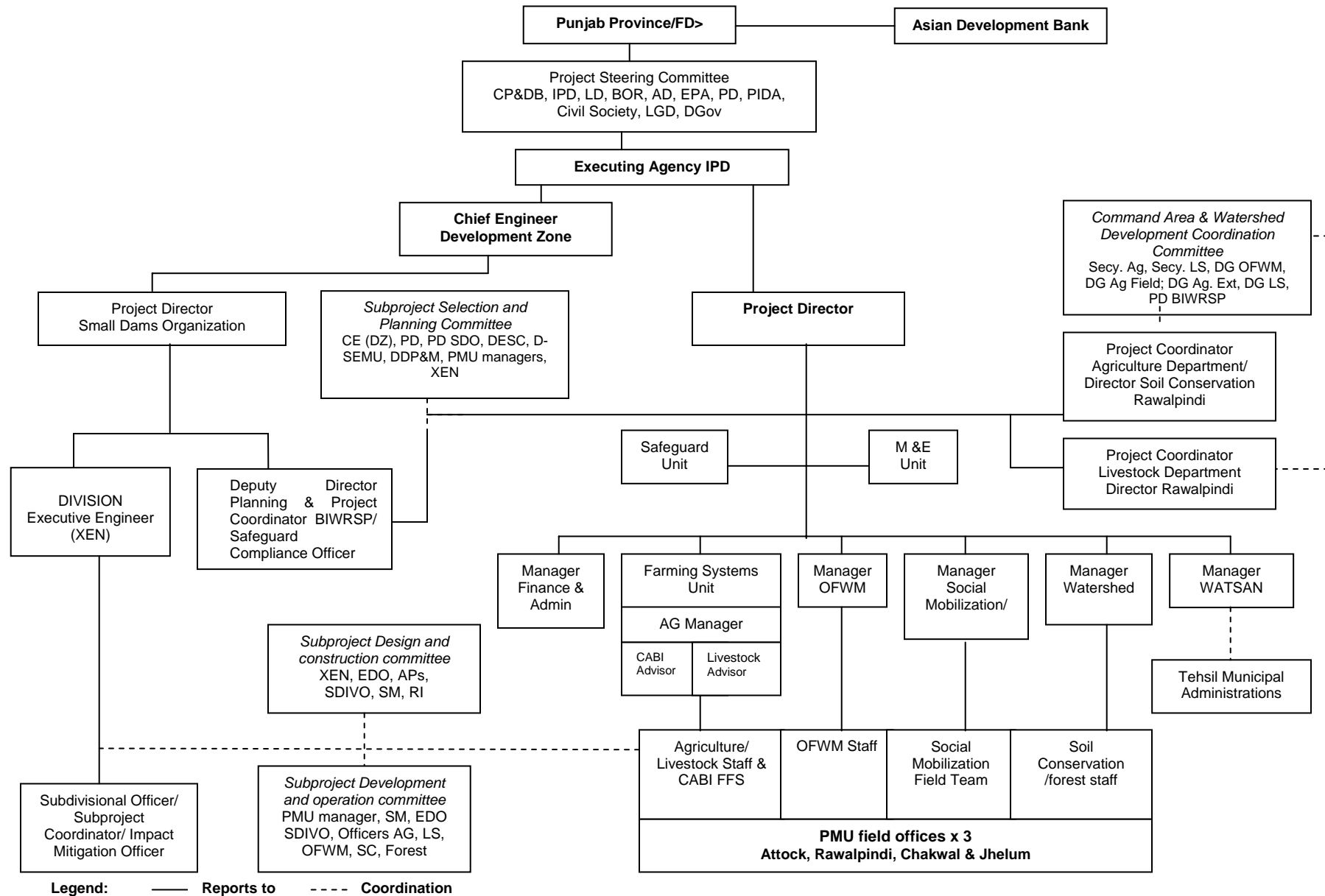
^a Totals may not add up due to rounding.

^b 15% civil works financed by the Government are all taxes.

^c Includes physical contingencies and price contingencies on physical contingencies only.

Source: Asian Development Bank estimates.

PROJECT ORGANIZATION AND IMPLEMENTATION STRUCTURE



AD = Agriculture Department, AG = Agriculture, APs = Affected People, BOR = Board of Revenue, CABI = Commonwealth Assistance Bureau International, CE (DZ) = Chief Engineer Development Zone, CP & DB = Chairman Planning and Development Board, DDP&M = Deputy Director Planning and Monitoring, D = Director, DESC = Director, Engineering IPD Strategic Cell, DG = director general, DGov = District Government, D-SEMU = Director, Social and Environment Monitoring Unit, EDO = executive district office, EPA = Environmental Protection Agency, FFS = farmer field school, FD = Finance Department, IPD = Irrigation and Power Department, LD = Livestock Department, LGD = Local Government Department, LS = Livestock, M&E = monitoring and evaluation, OFWM = On Farm Water Management, PD = project director, PIDA = Provincial Irrigation and Drainage Authority, PMU = project management unit, RI = Resident Engineer, SC = Soil and Conservation, SDO = small dams organization, SDIVO = Subdivisional Officer, SM, Social Mobilizers, WATSAN = water supply and sanitation, XEN = executive engineer. Source: Asian Development Bank.

SUBPROJECT CRITERIA AND APPROVAL PROCESS

1. The selection criteria and the approval process for the subprojects to be financed under the Project are summarized below. A more detailed subproject selection process and criteria guidelines will be provided in the project administration manual (PAM).

A. Criteria

2. All subprojects must meet the following general criteria.

- (i) **Economic feasibility.** A subproject must generally have an economic internal rate of return (EIRR) of at least 12%. However, where substantial nontangible social benefits can be demonstrated, then an EIRR of 10% may be permitted.
- (ii) **Resettlement.** The resettlement plan for the subproject must be (a) finalized according to the project land acquisition and resettlement framework and core subproject land acquisition and resettlement plan (LARP), and (b) approved by the Asian Development Bank (ADB).
- (iii) **Environment.** The subproject must prepare an initial environment examination (IEE) or an environment impact assessment (EIA) in accordance with the project environment assessment and review procedure (EARP).

1. Subproject Involving the Construction of a New Dam (Output 1)

3. The subprojects involving the construction of a new dam must meet the following specific criteria.

- (i) **Sustainability and safety standards.** The subproject must be technically feasible with detailed feasibility studies prepared. Proposed design and safety standards must be approved by the panel of experts recruited under the Project.
- (ii) **Social demand.** Subproject implementation must be driven by local demand. Future beneficiaries must have clearly expressed their consensus on the usefulness of the project and their readiness to operate and maintain the future irrigation scheme. They must have expressed their commitment to contribute to at least 20% of the cost of the distribution network (exclusive of the main canal).
- (iii) **Social equity.** The subproject must have 70% of its command area owned by more than 30% of the total number of landowners, and each landowner must not own more than 15% of the command area unless the primary function of the dam is the provision of domestic water.

2. Subproject for Upgrading and/or Rehabilitation of Command Areas (Outputs 1 and 2)

4. The subprojects for the rehabilitation/upgrading of the command area and the main channel carrier must meet the following specific criteria:

- (i) **Sustainability.** The subproject must have a dam siltation rate of less than 60% of the dead storage. The subproject must submit technical reports to substantiate this.
- (ii) **Safety standards.** The subproject must conduct dam safety inspection for dams older than 5 years, and the inspection report must conclude that the dam is safe.

- (iii) **Social demand.** The subproject must demonstrate that the water users are ready to finance at least 20% of the cost of rehabilitating the watercourses, land leveling, or developing other irrigation techniques.
- (iv) **Social organization.** The subproject must demonstrate that the water users are organized prior to implementation of the civil works and are committed to register as a farmer organization¹ under the PIDA Act.
- (v) **Maintenance plan.** The subproject must prepare maintenance plan and equitable water rotational systems designed prior to physical rehabilitation.

3. Subprojects for Rural Water Supply and Sanitation (Output 2)

5. The priority for a subproject of this category will be given for the development of water supplies related to a subproject involving the construction of new dams. The subproject must meet the following specific criteria.

- (i) **Technical feasibility.** The subproject must be technically feasible and a detailed feasibility study must have been prepared.
- (ii) **Local demand.** The subproject must demonstrate that at least 60% of the villagers that demand water supplies and the beneficiaries must be ready to support 2% of the construction cost.
- (iii) **Organization and sustainability.** The annual operation and maintenance (O&M) costs must have been estimated and tariffs must be able to recover the costs established. The community must be willing to (a) accept responsibility for O&M, and (b) pay for O&M requirements.

4. Watershed Conservation

6. The implementation of watershed conservation measures will be mandatory for any subproject selected for dam construction and rehabilitation under the Project. No subproject will be selected exclusively for watershed conservation activities.

B. Subproject Approval Process

7. PIPD will establish a subproject selection and planning committee (SSPC) within 3 months of the loan effectiveness date, to monitor and advise on the planning process and to address subproject selection issues. The SSPC will be chaired by the PIPD chief engineer, Development Zone, with the project director as secretary. The members will comprise the project director, Small Dams Organization; director, Engineering Strategic Cell PIPD; director, Social and Environment Monitoring Unit (SEMU); project management unit project managers; and the concerned executive engineers. Based on the recommendation of the SSPC, ADB and PIPD will make final approval of the subprojects. ADB's approval will only be necessary for the first five subprojects of each category unless ADB is not satisfied with the proposed selection process during the initial stage.

¹ Letter of commitment signed by the majority of the future farmer organization members.

SUMMARY RESETTLEMENT FRAMEWORK AND PLAN

A. Background

1. The Islamic Republic of Pakistan has requested a \$75 million sector loan from the Asian Development Bank (ADB) to undertake the Barani Integrated Water Resources Sector Project. The Project, with the Punjab Irrigation and Power Department (PIPD) as Executing Agency (EA), will include several subprojects across the Pothowar plateau in Punjab involving the construction of small to medium-sized irrigation reservoirs and ancillary irrigation canals as well as water supplies, watershed conservation, and agricultural extension services. The construction of the dam and main channel will require land acquisition and may cause variable degrees of livelihood losses due to reservoir impoundment and excavation and construction works. The land affected by secondary waterways (watercourses) will be provided voluntarily by project beneficiaries whose interest in the Project and their willingness to contribute to the project costs would have been verified during the planning stage as part of the demand-driven approach followed by the Project. Resettlement impacts are expected to be minimal as reservoirs will be built in the open countryside in areas far from settlements. No adverse impacts are expected to be caused by watershed management and extension services, while limited impacts might be associated with the provision of water supply systems and will need to be assessed on a case-by-case basis. No impacts on indigenous peoples are expected as there are no indigenous people communities in the Project's targeted areas.

2. One core subproject has been fully prepared. Other potential subprojects have been identified, but so far none has been finally selected for preparation and implementation. This summary is based on (i) the initial poverty and social analysis (ii) the core subproject feasibility study, and (iii) the project land acquisition and resettlement framework (LARF).

B. Land Acquisition and Resettlement

3. Project land acquisition and resettlement (LAR), and income rehabilitation will be handled based on Pakistani laws and ADB's *Involuntary Resettlement Policy* (1995) and *Operations Manual* (2007, as amended from time to time). Loan appraisal and subproject processing will follow the following social safeguards-related conditionalities.

- (i) Loan appraisal: (a) preparation of a LARF valid for the whole loan, and (b) preparation of a land acquisition and resettlement plan (LARP) fitting the appropriate level of impact severity¹ for all core subprojects.
- (ii) Approval of subproject contract awards: preparation of a final LARP for the relevant subproject based on detailed design, and acceptable to ADB.
- (iii) Subproject implementation: completion of the compensation and/or rehabilitation program detailed in the relevant subproject LARP in a way acceptable to ADB.

4. To satisfy the above requirements, the EA has prepared a LARF for the whole loan and a LARP for the only core subproject, namely the Kot Fateh Khan subproject.

¹ As noted in *ADB Operations Manual* Section F2/OP & BP (2006), a resettlement plan's complexity rests on impact severity. If impacts are severe (>200 people resettled or with >10% income losses), a subproject is classified as category A and a full resettlement plan is prepared. If impacts are not severe (<200 people resettled or with <10% income losses), a subproject is classified as category B and only a short plan is prepared.

C. Land Acquisition and Resettlement Framework (LARF)

5. The LARF principles are as follows: (i) LAR will be avoided or at least minimized; (ii) compensation will ensure maintenance of the affected people's (APs) pre-project living standards; (iii) the APs will be fully informed and consulted on compensation options; (iv) their socio-cultural institutions will be supported and used; (v) LAR provisions will equally apply to women and men; (vi) lack of a formal title will not be a bar to compensation or rehabilitation; (vii) special attention will be paid to female-headed households and to vulnerable groups; (viii) LAR will be planned and executed as an integral part of the Project and costs included in the project budgets; (ix) compensation will be fully provided prior to ground leveling and demolition; and (x) compensation for impacts will be provided at full replacement cost and will include allowances for relocation and income restoration.

6. The LARF also covers all issues relevant for effectively implementing LAR in compliance with ADB policy, and sets the eligibility and entitlement provisions listed in Table A7.1.

Table A7.1: Entitlement Matrix

Assets Lost	Specification	Eligible AP	Compensation Entitlements
Agricultural land (property or use rights) incl. cultivable land (<i>maira</i>) and uncultivable land (<i>Ghair Mumkin</i>)	All land losses irrespective of impact severity	Owner (titled and non-titled) incl. individuals, groups and communities with common property resources (<i>shamilat</i>)	Permanent: (i) Cash compensation for lost land at replacement cost based on market value + 15% compulsory land acquisition surcharge free of taxes and transfer costs; or (ii) land x land compensation through plots of equal value/productivity as lost asset Temporary: Cash compensation equal to market value of lost harvest for the duration of impact and restoration of land to original condition
		Sharecrop tenant	Permanent: Cash compensation equal to market value of share of 2 lost harvests Temporary: Cash compensation equal to market value of the share of 1 lost harvest
		Lease tenant	Cash equivalent of market value of gross yield of lost land for the remaining lease years (up to maximum of 3 years)
		Those with neither legal or customary rights but in occupation of the land	Rehabilitation allowance equal to market value of harvest of lost land for 1 year (<i>rabi</i> and <i>khariif</i>) additional to standard crop compensation
	Additional severe impact provision (> 10% of land loss)	Owner (titled and non-titled) and lease tenant	1 severe impact allowance equal to market value of harvest in lost land for 1 year (<i>rabi</i> and <i>khariif</i>) in addition to standard crop compensation
		Sharecrop tenant	1 severe impact allowance equal to market value of share of 1 harvest
		Those with neither legal or customary rights but in occupation of the land	1 severe impact allowance equal to the market value of gross harvest of the lost land for 1 year (<i>rabi</i> and <i>khariif</i>)
Residential and commercial land		Owner (titled and non-titled)	Cash for lost land at replacement cost based on market value + a 15% compulsory land acquisition surcharge free of taxes, as well as of registration and transfer costs; or land x land through provision of plots of comparable value and location as lost assets
1.1.		Renter or leaseholder of bare land	Cash compensation equivalent to 4 months rent or value proportionate to duration of remaining lease

Assets Lost	Specification	Eligible AP	Compensation Entitlements
Residential, agricultural, and commercial, including houses, business premises, wells, and ponds		Owner (titled/nontitled)	Complete loss: Cash compensation at replacement cost for affected structure/other fixed assets free of salvaged materials, depreciation or transaction cost Partial loss: Cash compensation at replacement value of lost portion of structure and full cash assistance to restore remaining structure
1.2.		Renter or leaseholder of house or structure	Cash compensation equivalent to 4 months rent or value proportionate to duration of remaining lease
Communal, public and cultural		Community, relevant public or civil society institution	Rehabilitation and/or reconstruction of affected structure and/or utility, or cash at replacement value to restore affected structures and/or utilities
Crops	All standing crops affected	Cultivator of crop	Crop compensation in cash at full market rate for 1 harvest (either <i>rabi</i> or <i>kharif</i>); in case of sharecrop tenancy, shareholders are compensated according to their respective customary shares
Trees	All trees affected	Owner of tree (disregarding title status)	Compensation for loss of fruit trees for average production of fruit during the next 15 years computed at current market value Compensation for loss of wood trees at current market value of wood (timber or firewood, as applicable)
Grazing resources	Loss of access to grazing	Owner or user of pasture	Appropriate rehabilitation measure will be established based on specificity of each subproject (cash compensation, pasture relocation, alternative feeding techniques)
Businesses and income		All relevant APs (irrespective of title status)	Permanent: Cash compensation equal to 1 year of income Temporary: Cash compensation for income lost during business interruption
Employment		Affected workers/ employees	Agricultural workers: Cash compensation equal to the average value of wages or in-kind remuneration for 1 year typical for the crops harvested and location at current rates Nonagricultural workers and employees: Indemnity for lost wages for the period of business interruption up to a maximum of 6 months
Relocation	Transport/ transitional livelihood costs	All APs to be relocated	Provision of allowances to cover transport and livelihood expenses for 1 month on actual cost basis or at current market rates
Impact on vulnerable APs	Livelihood restoration and enhancement	Households below the poverty level or headed by women	Needs-based special assistance in cash and/or in kind (e.g., training, microcredit facilities, and preferential employment in the project)

AP = affected people.

Source: Asian Development Bank estimates.

7. Specific Arrangements for Voluntary Land Contributions. While land acquisition due to main canal and reservoir construction constitutes a negative impact affecting people that are not necessarily project beneficiaries, land losses due to secondary watercourses construction in the irrigation perimeter are directly related to a net benefit to landowners who have voluntarily elected to participate in the irrigation development program. As part of the demand-driven approach developed by the Project, the demand of the potential beneficiaries is assessed during the dam planning stage and constitutes a criterion for selecting a given dam site. This demand is confirmed among others by the future beneficiaries' agreeing to contribute to the cost

of the land leveling and the watercourses. For this reason, the main canal and reservoir impacts will be compensated in accordance with the above policy framework, but impacts of the secondary watercourses will not be compensated and land will be acquired as a voluntary contribution. It is to be noted anyway that due to the small size of the perimeters (500–2,000 ha), the secondary canals directly channeling the water from the main canal to the field are very small and technically simple enough to be dug by the users themselves. This process will be undertaken by the beneficiaries themselves with support from the Project's social mobilizers.

8. To verify that the process is fair and supported by all beneficiaries' landowners, the Project will provide due diligence documentation for each irrigation perimeter. The documentation in the form of a report for each perimeter will indicate (i) the names of the beneficiary landowners, (ii) location of land plots, (iii) area of watercourses to be constructed in each plot, and (iv) proof of a signed agreement between the users and the EA. The report will also (i) detail the participatory planning process on which the development of the perimeter has been based, (ii) discuss major issues dealt with and agreed to by the beneficiaries and the EA, and (iii) provide a schedule for executing the needed works and the funds involved.

9. These reports will be included in the general design of each perimeter and will be a condition for starting construction activities in each perimeter. Preparation of the design and the due diligence report will be facilitated from the beginning of the planning exercise to the full completion of the irrigation facilities by a social mobilization team, Small Dams Organization (SDO), and the resettlement consultant specialist. The process will be monitored by an independent third party.

10. **Institutional Responsibilities.** PIPD as the EA has overall responsibility for the Project including preparing, implementing, and financing the LAR. PIPD will carry out its functions via a project management unit (PMU). Specific resettlement capacity for the Project is located in the Land Acquisition and Resettlement Section (LARS) of the safeguard unit of the PMU. LARS is staffed with a team of male and female resettlement specialists and seconded staff from the revenue department. The seconded staff will include a dedicated land acquisition collector (LAC), a revenue officer, two *kanungo* (head of *patwaris*), and four *patwaris* (land record keeper). LARS will ensure LAR preparation and implementation together with the PIPD's SDO, which is responsible for the actual infrastructure construction for each subproject. Compensation for items and APs eligible under Pakistani law will be the responsibility of the dedicated LAC, while compensation or income rehabilitation not covered in the Pakistani legal framework will be directly paid by the project director.

11. **Task Coordination and LAR Approval Process.** To ensure effective coordination with local governments and other agencies, PIPD will establish a LAR steering committee (LSC) at the provincial level. ADB will provide clearance for all LARPs. A nongovernment organization local partner will be engaged for community liaison, for the social preparation process of projects, and for direct liaison with APs. All concerned staff among the relevant institutional actors will be provided with intensive training on the ADB policy, LARF principles, and LAR preparation and implementation procedures. The training will be provided by the resettlement specialists of the project implementation consultant's team during the preparation phase for each subproject.

12. **Disclosure and Public Consultation.** LAR tasks will require intensive consultations with APs and the results will be fully documented in the LARPs. As an appraisal condition, the LARF and LARPs in English will be disclosed on the ADB website while the LARF and LARPs in the local language will be disclosed locally. In each subproject with LAR impacts, an affected

people's committee (APC) inclusive of elected representatives of the APs will be formed during the census survey. The APC will represent the interest of the APs and provide continuous liaison between the EA and the affected communities during the finalization of alignment and layout of the physical infrastructure and during planning, implementation, and monitoring of all LAR-related activities including complaints and grievances.

13. **Grievance Procedures.** To assist AP to appeal against any unacceptable LAR-related decision, practice, or activity, a grievance redress mechanism will be instituted. As finances will move differently for land and other items compensation or rehabilitation (in the first case, funds will move from PIPD through the dedicated project LAC to the APs, while in the second funds will go directly from PIPD to the APs), complaints and grievances will be addressed through two different processes as described in Table A7.2.

Table A7.2: Grievance Resolution Process

Land and/or Crops Compensation Issues under the LAC	Project and/or Other Items Compensation Issues under the EA
1. Initially, complaints will be lodged verbally or in writing with APC assistance to the PMU field office. Resolution is sought within 10 days at the village level. 2. If still unsettled, a grievance can be lodged with the dedicated LAC, which has 30 days to decide on the case. 3. If the complaint still remains unsolved, the AP can raise it to the head of the PMU office in Rawalpindi within 1 month of the original complaint to the LAC. The PMU will review and rule on the issue(s) within 21 days. 4. Should the grievance redress system fail to satisfy the AP, the AP can further submit the case to the appropriate court of law.	1. Initially, complaints will be lodged verbally or in writing with APC assistance to the PMU field office. Resolution is sought within 10 days at the village level. 2. If still unsettled, a grievance can be lodged with the head of LARS, who has 30 days to respond. 3. If the complaint still remains unsolved, the AP can raise it to the head of the PMU office in Rawalpindi within 1 month of the original complaint to the head of LARS, who will review and rule on the issue(s) within 21 days. 4. Should the grievance redress system fail to satisfy the AP, the AP can further submit the case to the appropriate court of law.
AP = affected people, APC = affected people's committee, LAC = land acquisition collector, LARS = Land Acquisition and Resettlement Section, PMU = project management unit. Source: Asian Development Bank estimates.	

14. **Monitoring and Evaluation.** The PMU will internally monitor and report to the EA on LAR implementation. The EA will submit a quarterly report to ADB. External monitoring will be carried out in the case of full LARPs and will be assigned to an independent agency by the EA. External monitoring reports will be submitted to ADB twice a year. At the end of project implementation, the independent monitoring agency will carry out a general evaluation of LAR implementation.

15. **Finances and Schedules.** The LARF prescribes that each LARP include detailed LAR budgets and provide clear schedules linking LAR tasks with the initiation of civil works.

D. Specific Resettlement Plans Impacts

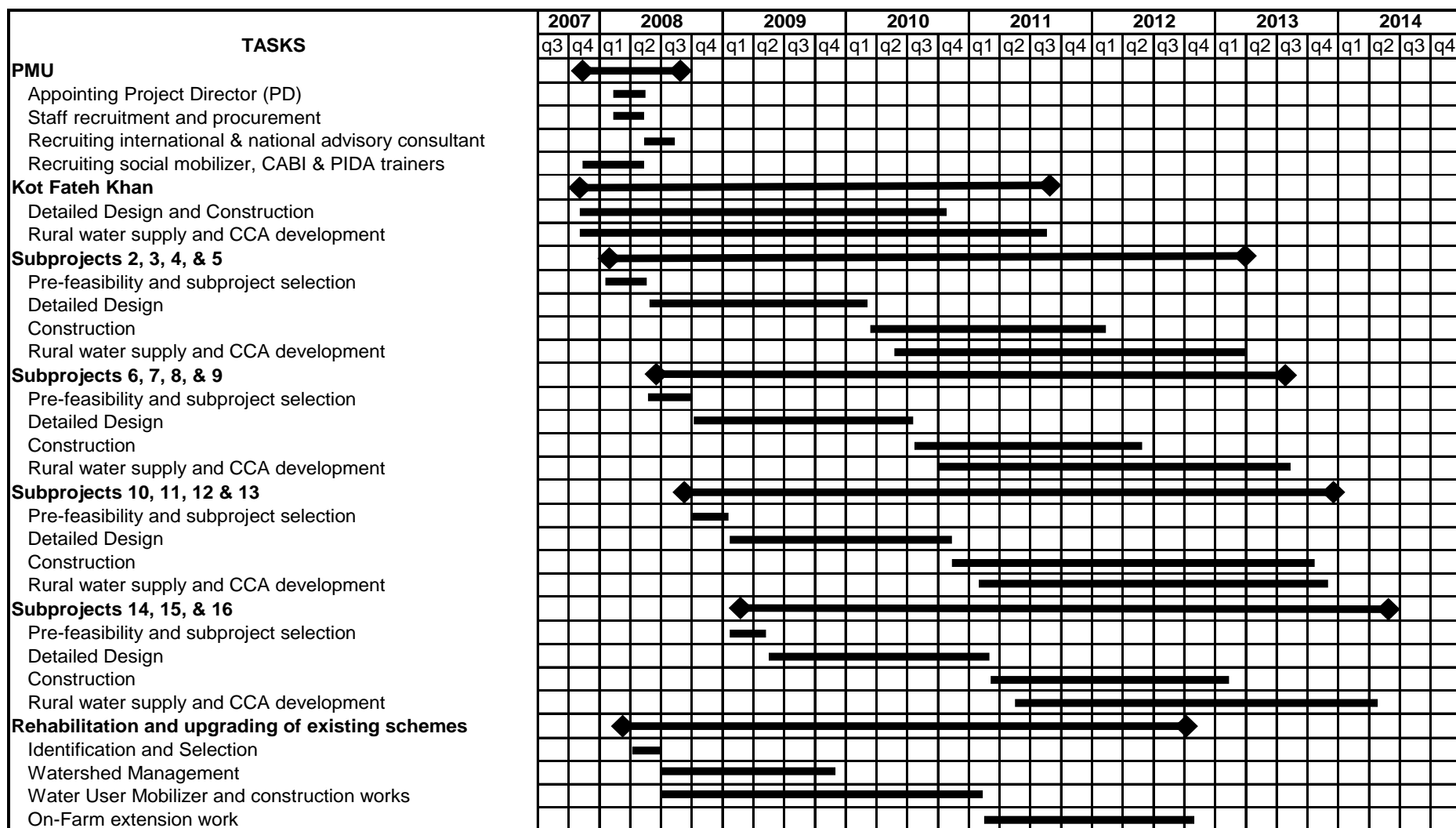
16. One core subproject has been selected, namely the Kot Fateh Khan subproject, involving the construction of a 513 ha reservoir with two main canals and a secondary water distribution system. The subproject will require the acquisition of 529.72 ha of land, of which 45.56 ha is cultivable and 484.16 ha is uncultivable. Of this land, 513.31 ha will be affected by

the reservoir and, whether classified as cultivable or not, has been uncultivated for several years. The remaining 16.41 ha will be acquired for the construction of both left and right bank canals. Of these, 9.2 ha is cultivable, 0.27 ha is cultivable and irrigable, and 6.94 ha is wasteland.

17. The subproject will not cause physical displacement of houses. A total of 68 households (510 persons) will be affected by land loss. Of these, 3 households (28 persons) to be affected by the reservoir will lose 10% or more of their cultivable agricultural land (18.4%, 21.5%, and 11.7%, respectively) but will not be severely affected as no income is generated from the affected land (which has remained uncultivated for several years). Similarly, two vulnerable households will be affected by the main canal. As they will benefit from irrigation, their need for livelihood enhancement is already substantially addressed by the project benefits. However, an additional compensation in cash, equivalent to 3 months labor wages, will be provided to each. Other losses are one private fishpond and a public water supply scheme.

18. The total compensation and rehabilitation budget for the Kot Fateh Khan subproject is PRs107,313,127 or \$1,767,270. It includes compensation for land losses, livelihood losses (crops, trees and fish), and affected structures and utilities, administration and implementation costs, and 10% contingencies.

IMPLEMENTATION SCHEDULE



CABI = Commonwealth Assistance Bureau International, CCA = cultivable command area, PIDA = Provincial Irrigation and Drainage Authority, PD = project director, q = quarter

Source: Asian Development Bank estimates.

PROCUREMENT PLAN^{a b}**A. Project Information**

Country	Pakistan
Name of Borrower	Islamic Republic of Pakistan
Project Name	Barani Integrated Water Resources Sector Project
Loan Reference/Grant Reference	(to be assigned after approval)
Date of Effectiveness	(to be indicated after the loan becomes effective)
Amount in US\$	Loan: \$75 million
Of which committed, US\$	Nil
Executing Agency	Irrigation and Power Department, Government of Punjab
Approval Date of Original Procurement Plan	(to be indicated later)
Approval of Most Recent Procurement Plan	Not yet applicable
Publication for Local Advertisements	(to be indicated later)
Period Covered by Plan	First 18 months of the procurement activities

B. Procurement Thresholds, Goods and Related Services, Works and Supply, and Installation

Procurement Method	To Be Used for Contract Valued at
International Competitive Bidding (ICB)	
Goods and Services	Over \$1 million
Civil Works	Over \$10 million
National Competitive Bidding (NCB),	
Goods and Services	Between \$0.1 and \$1.0 million
Civil Works	Up to \$10.0 million
Shopping, Goods and Services	Not more than \$100,000

C. Procurement Thresholds, Consultant Services

Procurement Method	To Be Used for Contract Valued at
Quality Cost Based Selection (QCBS) ^c	>\$1,000,000 by Full Technical Proposal </\$1,000,000 by Simplified Technical Proposal </\$600,000 by Biodata Technical Proposal
Consultants Qualifications Selection (CQS)	</\$200,000 (ex. External auditors)
Other Methods	Purpose
Individual Consultants	As part of the provision of national project implementation consultants, individual national consultants of about 5 person-months may be engaged on an ad-hoc basis to meet the demand during the advance action period and peak period (in the areas of, but not limited to procurement, resettlement, civil engineering).
Single Source Selection	CABI, UK (paragraph 52 of the main text)

D. List of Contract Packages in Excess of \$100,000, Goods, Works, and Consulting Services

Ref	Contract Description	Estimated Cost	Procurement Method	Expected Date of Advertisement	Prior Review Y/N	Comments
1	Consulting services for project technical advisory services (46 International and 82 National person-months)	\$1.952 million	QCBS Full technical proposal	To be posted in ADBBO (December 2007)	Y	International bidding

D. List of Contract Packages in Excess of \$100,000, Goods, Works, and Consulting Services

Ref	Contract Description	Estimated Cost	Procurement Method	Expected Date of Advertisement	Prior Review Y/N	Comments
2	National Project Implementation Consultants (569) person-months for 8 long term consultants	\$1.639 million	Individual consultants	February 2008	Y	Will be recruited as staff for the PMU through recruitment notices published in national dailies.
3	Contract for Social Mobilization	\$1.94 million	QCBS Full technical proposal	(retro-financing) January 2008	Y	For national NGOs and non-profit making domestic institutions. Estimated cost includes cost of 4X4vehicle procurement.
4	Contract for Agricultural Advisory and Farmer School services with Commonwealth Assistance Bureau International (CABI)	\$846,087	Single source selection	May 2008	Y	CABI is a non-profit international organization with 40 members states. It has unique competencies in FFS and extension in Pakistan and already has experience with CCA development of dams in Pothowar.
5	Feasibility Studies, Detailed Designs, and Engineering Supervision	\$300,000 or less	QCBS Contract extension to next subproject if firm is performing	February 2008 (retro-financing)	N	All three type of services packaged in one contract.
6	Contract for Advance Action social mobilizers	Less than \$ 100,000	Individual consultant	December 2007 Retro-financing	N	

D. List of Contract Packages in Excess of \$100,000, Goods, Works, and Consulting Services

7	Environment Impact Assessment studies	Less than \$ 100,000	CQS Contract extension to next subproject if firm is performing	April 2008	N	
8	Construction Contracts for Civil Works for Dam and Allied structures	\$10 million and less	NCB	Variable during implementation starting May 2008	Y	Adequate national contracting capacity exists to successfully undertake these works at reasonable cost by suitably pre-qualified local contractors
9	Motor Vehicles 4x4 3 Door	\$257,000	Shopping	February 2008	N	Several lots
10	Motor Vehicles 4x4 twin cabin pick ups	\$190,000	Shopping	February 2008	N	Several lots
11	Motor Vehicles 2x4 4 doors sedan	\$47,134	Shopping	February 2008	N	

ADBBO = Asian Development Bank Business Opportunities, ICB = international competitive bidding, NCB = national competitive bidding, NGO = non-government organization, OCR = ordinary capital resources, PMU = project implementation unit, QCBS = quality- and cost-based selection.

^a Contract packages will be reviewed and finalized during implementation. This procurement plan will be revised when the contract packages have been finalized.

^b General procurement notice, invitations to pre-qualify and to bid, and calls for expressions of interest.

^c Recommended ratio quality/cost of 80/20.

Source: Asian Development Bank estimates.

SUMMARY ECONOMIC AND FINANCIAL ANALYSES

A. Economic Analysis

1. Economic internal rates of return (EIRRs) have been calculated for the Kot Fateh Khan (KFK) core subproject on the basis of the capital cost estimates, estimated future maintenance costs, and estimated future benefits.

2. The economic analysis is undertaken in constant 2007 prices using world prices as the numeraire. The economic prices for internationally traded commodities (fertilizers [urea, di-ammonium phosphate, and potassium chloride], maize, milk, and wheat) are calculated using World Bank Global Prospects commodity price forecasts for international commodity prices and price projections.¹ For the other farm inputs and outputs, which are not internationally traded, domestic farm-gate prices were used in the analysis. A standard conversion factor of 0.9 was applied to local costs and benefits, while for rural labor this was combined with a shadow price factor of 0.78,² implying a combined factor of 0.7, which reduces the current financial price for farm labor from PRs150 per person-day to an economic price of PRs105 per person-day.

3. An exchange rate of \$1 = PRs60.73 has been used.³

4. The other data and assumptions are used in calculating the EIRRs, and the results of the analysis are described below.

1. Project Implementation Period and Period of Analysis

5. For the KFK core subproject, major capital works are to be implemented over a 3-year period (2008–2010) inclusive, with ongoing project costs in 2011–2013 relating only to minor water supply connection costs. After the 3-year construction period, the benefits of the capital works are assessed over the next 25 years, giving an analysis period of 28 years. However, given that the economic life of the dam is expected to be in excess of 50 years due to watershed management and the sediment flushing facility, a residual value equal to 60% of the dam's cost is included as a residual value of the core subproject.⁴

6. First benefits from the investment are expected from the first year of water availability in year 4 (2011), but full benefits are not assumed to be achieved until 2016. Adoption of irrigated agriculture, including new practices and technique, is assumed to start from the first year of water availability (after 3 years of design, construction, and impoundment) on a staggered basis. Benefits will therefore materialize as follows over the first 6 years of water availability: 5%, 15%, 35%, 65%, 90%, and 100%.

2. Economic Costs

7. The economic investment costs for the KFK core subproject have been based on the financial cost estimates contained in Appendix 4 covering three components: (i) component 1,

¹ In the case of milk, World Bank price forecasts are not available and data from the Food and Agriculture Policy Research Institute (FAPRI) has been used.

² Source: TA consultants' draft final report, Supplementary Appendix M. The shadow wage rate factor is to account for unemployment and underemployment within the project area.

³ Source: Identified in the TA consultants' report as the rate in March 2007. During the Review Mission in May/June 2007 the exchange rate was at a similar level.

⁴ The watershed conservation measures undertaken as part of the subproject are expected to lift the residual value of the dam from 50% to 60% of its total economic cost at time of construction. (See economic analysis of watershed conservation and management measures later in this appendix.)

which covers land acquisition and resettlement, dam construction, main and branch canals, watershed conservation and management, and environmental management and monitoring; (ii) component 2, which includes watercourse construction, field layout and leveling, services of the Commonwealth Assistance Bureau International (CABI), agriculture and livestock extension services, and water supply and sanitation; and (iii) component 3, which includes project implementation and capacity building.

8. For components 1 and 2, the detailed cost estimates prepared by the TA consultants are used as a basis and adjusted as refinements to the subproject are made. For component 3, a detailed cost budget for project implementation and capacity building was prepared for the overall project and 11.2% of this budget was estimated as the share of the KFK subproject. This apportionment was based on KFK's 2,024 ha of cultivable command area (CCA) developed under the subproject, 9,900 ha of new CCA to be developed by the overall Project, 10,000 ha of CCA improved as a consequence of irrigation system rehabilitation works under the project, 1,000 ha of CCA improved as a consequence of irrigation system extension under the project, and each rehabilitated and extension hectare requiring 75% of project management unit (PMU) time compared with the new CCA hectare developed under the Project.⁵

9. Taxes and duties have been omitted together with price contingencies, since the economic analysis is undertaken in constant 2007 price terms. Physical contingencies have been included.

10. Ongoing maintenance costs for the KFK subproject (2011–2035) have been estimated at \$74,033 per annum, based on 2.5% of the main and branch canal and watercourse investment economic costs, \$18,000⁶ for ongoing environmental monitoring, and \$5,271⁷ for annual electricity and maintenance costs for the pumps installed as part of the KFK subproject.

3. Project Benefits

11. The KFK core subproject benefits come from agricultural crops, livestock, electricity supply, domestic water supply, fuel wood, and fishing. These have been estimated on the basis of data and information in the TA consultants' draft final report, augmented with additional information and data from the field and government offices during the Asian Development Bank review mission.

a. Agricultural Crop Benefits

12. The sources of the agricultural crop benefits for the KFK core subproject will be the greater availability of water, more efficient use of already available water,⁸ and the farmer training and extension services provided under the Project. The subproject enables cropping intensity within the CCA of 2,024 ha to rise from 60% to 120%. This increase in cropping intensity incorporates the introduction of new more valuable crops—vegetables (including onions and cauliflowers), fruit (guava), and oilseeds (sunflower)—as well as an increase in the cultivated areas of traditional crops such as fodder, gram, maize, and wheat. For the 2,000 ha⁹ cultivated outside the CCA, no increase in cropping intensity is assumed.

⁵ This 11.2% apportionment for the KFK subproject was also used to determine the subproject's share of the CABI contract under component 2.

⁶ \$20,000 x 0.9 (the conversion factor).

⁷ \$96,575 @ \$0.042/kWh + \$1,800 (= 15% value of pumps) for maintenance all times the conversion factor.

⁸ In the case of existing dams.

⁹ The 2,000 ha of the area improved outside the CCA will be assisted by the watershed conservation and management component of the Project in conjunction with improved training and extension services. The economic benefits of this are considered later in this appendix.

13. Within the CCA, significant increases in yield are expected as a consequence of the subproject. Especially significant is the increases for wheat (from 0.5 t/ha to 3.16 t/ha). Outside the CCA, smaller increases in yield are expected as a consequence of the training and extension services components of the subproject. The changes in cropping pattern and yields with and without the Project within the CCA are summarized in Table A11.1.

Table A11.1: With and Without Project Crop Production

	Cropping Pattern (%)		Yields (t/ha)	
	Without Project	With Project	Without Project	With Project
Wheat	33.0	45.0	0.50	3.16
Rapeseed	2.0	5.0	0.79	1.80
Onion	—	5.0	—	18.79
Gram	0.5	5.0	0.35	0.90
Cauliflower	—	5.0	—	13.49
Rabi fodder	1.0	5.0	11.68	19.00
Guava	—	5.0	—	12.35
Maize	2.0	5.0	0.71	1.79
Groundnut	12.0	5.0	0.42	1.49
Sorghum	3.5	—	0.21	0.80
Millet	1.5	—	0.40	0.80
Mash	3.5	5.0	0.40	0.90
Sunflower	—	10.0	—	2.47
Kharif fodder	1.0	5.0	9.90	25.02
Vegetable	—	10.0	—	16.00
Guava	—	5.0	—	12.35
Total	60.0	120.0		

t/ha = ton per hectare

Source: Asian Development Bank estimates.

14. For each crop, financial and economic gross margins without and with the subproject are determined. These determinations combine data on yields, input requirements, and economic farm-gate prices for outputs and inputs.

15. The cropped areas and the gross margins are then combined to determine the level of agricultural crop economic benefits at full subproject impact. This is estimated to be \$953,031 per annum, consisting of \$931,046 within the CCA and \$21,985 outside the CCA, or \$460/ha inside the CCA and \$22/ha outside the CCA.¹⁰

b. Livestock Benefits

16. The number of households in the KFK subproject area is estimated at 1,345, and estimates of the number of each type of livestock and yields with and without the Project are in Table A11.2.

¹⁰ The increase in economic benefits outside the CCA is relatively modest because, while some increases in yields are expected, they will require increased inputs (fertilizers, agricultural chemicals, and labor).

Table A11.2: With and Without Project Livestock Production

Type	Without Project (no.)	With Project (no.)	Without Project (liters of milk per annum)	With Project (liters of milk per annum)	Without Project (offspring per annum)	With Project (offspring per annum)
Buffaloes	551	689	1512	2016	0.7	0.7
Cows	1,184	1,480	675	810	1.0	1.0
Sheep	4,829	6,036	26	45	0.8	1.1
Goats	10,464	13,080	63	94	0.8	1.1
Poultry	7,949	9,936	100(eggs)	130(eggs)	1(carass)	1(carass)

Source: Asian Development Bank estimates.

17. These data are combined with gross margins per animal, and the assumption is that the subproject, in addition to increasing livestock gross margins per animal, will lead to an increase of 25% in livestock numbers in the subproject area to give livestock economic benefits of \$1,185,250, or \$881 per household, at full subproject impact.¹¹ These increases in livestock number and productivity result from the high increase in crops residue and fodder due to the conversion to irrigated agriculture and the adoption of improved practices.

c. Domestic Water Supply Benefits

18. It is estimated¹² that the supply of domestic water by the KFK subproject will reduce by 2 hours per day the time it takes one person in each household to collect water. Combining this with the shadow-priced rural wage rate of PRs105 per day gives annual benefits of \$158 per connected household¹³ per annum. In addition, the improved water supply from the subproject is estimated to halve the average cost per household of costs¹⁴ associated with waterborne diseases and prevent the loss of 10 days of semiskilled labor (valued at PRs300 per day) per annum per connected household. These two benefits have economic values of \$13 and \$35 per connected household per annum, respectively, implying a total benefit per household of \$206 per annum. These benefits would be received as soon as construction of the dams and the related domestic water supply system is complete, assumed to be at the start of year 4, that is, by 2011. These costs need to be deducted from the costs of new connections (\$20.5 per household in economic price terms) and water supply system maintenance costs (\$15,879 per annum in economic price terms).

19. The KFK village water supply system on its own is estimated to yield an EIRR of 35.4%. The net economic benefits of this analysis from 2011 onward¹⁵ are included in the EIRR calculated for the whole KFK subproject.

¹¹ No account is taken of population growth and the consequent increase in the without-project numbers of households and livestock. To the extent that this understates livestock economic benefits, the analysis is conservative.

¹² The TA consultants discounted 1 hour of water collection time as being "otherwise unproductive". However, given that shadow pricing of the daily labor rate has already accounted for unemployment and underemployment, it is incorrect to effectively again shadow price this labor.

¹³ In 2010, it is estimated that there will be 1,451 connected households (80% of total households), growing at 2.2% per annum.

¹⁴ Including transport, doctors' fees, medicine, and laboratory work.

¹⁵ The capital costs for the years 2008–2010 are already included in the KFK total project costs.

d. Fishing Benefits

20. The TA consultants' report gives the annual catch value for the KFK subproject reservoir as PRs7,914,980 (based on a catch of 94,980 kilograms [kg]) per annum and a financial price of PRs90 per kg) less stocking cost (PRs633,198), or \$117,302 applying the standard conversion factor (0.9) and exchange rate (60.72794).¹⁶ This is equivalent to \$742 per ha of water surface area.

e. Watershed Benefits

21. The benefits of forestry activities within the watershed area are based on an estimated 50 donkey loads of fuel wood per annum per ha on 213 ha of land. The value of fuel wood is estimated at PRs120 per load, or PRs108 in economic prices. These benefits are assumed to commence in year 9 (2016) and equal \$18,940 per annum.

22. In addition, there are two other economic benefits from watershed conservation and management. First, the dam's residual value is estimated to increase from 50% to 60% of its total economic cost (\$4,983,317) at the end of the analysis period. Second, the watershed conservation and management subcomponent will provide an additional 2,000 ha of area outside the CCA, which will benefit from the subproject interventions.¹⁷ These additional benefits are included with the firewood benefits and give an estimated EIRR of 5.6% for the watershed subcomponent for these three benefits alone.

f. Electricity Benefits

23. Electricity generated by the KFK subproject is estimated at 372,489 kilowatt-hours (kWh) per annum from 2011 onward. Applying a value of \$0.042 per kWh gives an economic value of \$14,080 per annum.

4. Results

a. Base Case

24. Combining the economic benefits with the project capital and annual maintenance costs gives an estimated base case EIRR of 14.3% for the KFK core subproject.

b. Sensitivity Testing

25. If project investment costs are increased by 20%, the EIRR decreases to 12.4%. If project benefits are decreased by 20% (for instance, if the dam is out of water due to a prolonged drought for at least 5 years), the EIRR decreases to 11.9%. A combination of 20% increase in project costs and 20% decrease in project benefits gives an EIRR of 10.2%. If, when constructed, the Project operates for only 15 years (i.e., until the end of 2025), the EIRR is 12.0%.

26. The analysis has excluded the replacement costs for trees and the watershed sediment trap (after 15 years of project operation) and the watercourses (after 20 years of project operation). However, the inclusion of such costs would have little impact on the EIRR because

¹⁶ The TA consultants also deduct an amount paid by way of an auction every 3 years for the right to use the reservoir for fish production. However, this is just a transfer and not an economic cost.

¹⁷ See TA consultants' draft report.

of the effects of discounting and the small costs of these items relative to the total project cost and benefits.

B. Financial Analysis

27. Financial farm budgets have been prepared utilizing data contained in the project preparatory technical assistance report on average farm sizes, cropping patterns, and livestock ownership for small, medium-sized, and large landowner and tenant farmers, but utilizing the financial crop and livestock gross margins. The results of this financial analysis are summarized in Table A11.3.

Table A11.3: Distribution of Incremental Income Per Farm Type

Farm Size	Land Tenure	Incremental Farmer Income (PRs/annum)	Percentage Increase (%)
Small (0.8 ha)	Owner	30,645	96
Small (0.8 ha)	Tenant	8,846	34
Medium (5.5 ha)	Owner	169,604	158
Medium (4.9 ha)	Tenant	72,942	95
Large (50.6 ha)	Owner	442,037	198
Large (12.7 ha)	Tenant	234,342	111

PR = Pakistan rupee.

Source: Asian Development Bank estimates.

28. The annual incremental farmer incomes shown are those at full project impact—that is, by year 9 of the Project (2016). However, the analysis is conservative in that no account is taken of increases in cropping intensity (from 60% to 120%) and livestock ownership (25% increase).

29. The analysis shows increases in farmer incomes of between \$147 and \$7,274 per annum at full project impact, depending on land tenure and farm size. The range is wide because of the substantial variation in the size of landholdings in the project area. In percentage terms, the increase across the different landholding sizes and land ownership alternatives is 34%–198%.

30. No account has been taken of the project beneficiary contributions, which will be required to partly finance various components of the Project such as (i) the main and branch canals (5%),¹⁸ (ii) watershed conservation and management (10%), (iii) watercourse construction and rehabilitation (20%), (iv) the field layout and leveling (20%), and (v) village water supply and sanitation (2%). This is because these costs will be largely incurred during the 3 years of project construction, whereas the analysis of incremental farm income focuses on full project impact, which will not be achieved until 2016, several years after the Project has been completed.

C. Economic Analysis of the Extension and Rehabilitation of Existing Dam Irrigation Schemes

31. Whereas the KFK subproject involves dam construction together with the provision of irrigation water supply facilities, some of the overall Project's funds will be directed at extending and rehabilitating irrigation water supply facilities associated with existing dams. The economic viability of such activities will benefit from the sunk costs of completed dams. However, where

¹⁸ Proposed beneficiaries' financing share.

facilities are being rehabilitated, the economic benefits will be lower since some of the benefits measured in the case of the KFK subproject will have been achieved even without the project interventions. On balance, it is expected that the reduction in costs will be greater than the reduction in incremental benefits and therefore the EIRRs for extension and rehabilitation components will be greater than those calculated for the KFK subproject.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

A. Linkages to the Country Poverty Analysis

Sector identified as a National Priority in Country Poverty Analysis?	Yes	Sector identified as a National Priority in the Country Poverty Partnership Agreement?	Yes
<p>Contribution of the sector/subsectors to reduce poverty in Pakistan:</p> <p>A comparison of poverty indicators between 2001 and 2005 shows a considerable reduction in the incidence of poverty in Pakistan from 34.5% to 23.9%. Although the reduction of the number of people living below the poverty line has been considerable, the standard of living of those people remains low and their vulnerability to volatile economic, health, and climatic conditions is significant. Insufficient economic growth and employment, vulnerability to drought, gender disparities, and inadequate community participation are observed among the chief causes of poverty. Pro-poor growth in Pakistan therefore requires increased agricultural productivity based on sustainable environment management to protect the resource bases of the poor.</p> <p>The poverty reduction strategy proposes, among others, access to land and water, protection of natural resource bases used by the poor, rural employment and job creation as well as community participation and social mobilization as key development needs and priorities of the poor. Diversification and improved productivity of agriculture, and infrastructure development, as well as improved governance are among the investment priorities of the Poverty Reduction Partnership Agreement between the Government of Pakistan and the Asian Development Bank (ADB).</p> <p>The Barani Integrated Water Resources Sector Project will make a significant contribution to the realization of these goals and strategies in the subproject sites. The stabilization and improved management of water resources for irrigation will permit the introduction of high-yielding cash crop agriculture at the same time increase the reliability and productivity of subsistence agriculture. Furthermore, the establishment of the reservoir and the potential creation of smaller fishponds will facilitate the development of fisheries resources as a source of livelihood. This will improve the incomes of the beneficiary farmers as well as their nutritional status. In addition, wage labor income opportunities in local agriculture will increase due to the labor-intensive and year-round cultivation of cash crops, thus benefiting poor small farmers and landless laborers. The provision of water supply and concomitant health improvements will also spread project benefits among all inhabitants of the project area, including the poor and especially women, for whom water supply for domestic and livestock purposes is among the most important needs.</p>			

B. Poverty Analysis

Targeting Classification: General Intervention

<p>What type of poverty analysis is needed?</p> <p>A social and poverty assessment was carried out in the project areas in compliance with ADB's <i>Guidelines for Incorporation of Social Dimensions in Bank Operations</i> (1993). Apart from the general assessment of poverty and its characteristics, the required poverty analysis has addressed the linkages between the rural poor and irrigated agriculture. It included an assessment of the incidence of poverty, which revealed the nature and perception of its causes: (i) landlessness; (ii) near-landlessness; (iii) temporary low-income jobs in nonagricultural sectors; (iv) inequitable access to infrastructure and facilities; (v) lack of basic services (health, education, nutrition); (vi) lack of alternative livelihood; (vii) low literacy; and (viii) gender bias.</p> <p>The social analysis identified vulnerable groups who would be unable to benefit fully from the project interventions without some preparation. They include (i) female heads of households, (ii) the landless and near-landless, (iii) tenants and sharecroppers, and (iv) marginal farmers.</p> <p>The Project will ensure that services delivered through the field programs of the command area development and domestic water supply component will have programs targeting women, and marginal and landless farmers. The Project requires full community participation, and sensitization and training of staff to ensure that poor and small farmers are not excluded from project activities such as subproject identification, planning and implementation process, and organization for water user associations, conservation action groups, and agriculture interest groups. Community participation is further expected to lead to improved levels of confidence and inclusion for the marginal, and to facilitate efforts to improve the economic welfare of beneficiaries that are beyond the specific scope of the Project.</p> <p>The Project will generate benefits for the poor in terms of access to irrigation water, domestic water supply, right to reservoir fisheries, cultivation in the drawdown area of the reservoir, employment in construction, preferential access to or custodianship of catchment resources for defined exploitation and management purposes, catchment development such as planting fruit trees or reforestation, access to pumped irrigation from the reservoir, income support for vulnerable or needy households; agricultural support services including preferred planting materials and</p>

other inputs; community forests and grazing areas; and access to preferential water and service charges.

C. Participation Process

Is there a stakeholder analysis? Yes

The project design is based on a highly participatory process undertaken during the project preparatory technical assistance beginning with a stakeholder analysis. Wide stakeholder consultations were conducted using a range of participatory tools and methods. The field research activities were carried out by both male and female staff to allow for separate focus group sessions for women who normally do not participate in public events due to strict gender segregation customs. The field activities led to an inventory of the project populations, their key problems and development priorities, dimensions of land and water resource use, social indicators of well-being, and key social institutions in the project communities. Workshops organized with the community synthesized the findings and resulted in the development of a mechanism to institutionalize local community participation in the anticipated interventions. The project team also held consultations with nongovernment organizations (NGOs) to discuss their possible involvement in the Project, particularly for social mobilization activities.

Is there a participatory social development strategy prepared? Yes

Project implementation will be based on a carefully designed community mobilization process, which is essential for successful implementation and, more importantly, to ensure the future sustainability of project investments. The strategy provides a useful frame of reference for processes and the extent people are involved in decision making. The participation strategy prescribes the formation of several committees including a Citizen Community Board and affected people's committees with male and female members, as a mechanism to facilitate community participation in the planning and eventual implementation, to permit the concerned stakeholders to assess and respond to project plans and designs, and to proactively avoid disputes. The proposed sequence of activities for community mobilization includes (i) community awareness campaigns describing the Project, its objectives, scope, procedures, and required assessment of the communities' demand for the Project; (ii) community participation in the pre-feasibility and feasibility studies, development of community irrigation and water supply systems; (iii) community mobilization to form community organizations inclusive of women; (iv) community capacity building; and (v) community monitoring, evaluation, and feedback mechanism for subproject performance.

The Project will build on the expertise and experience of NGOs that have demonstrated their strengths in community mobilization within the project districts and disciplines. The frontline "workers" will be the district project staff that will function as technical advisors, and NGOs will be employed to assist in strengthening communities to enable them to participate in implementing the community portions of subprojects. It is envisaged that the NGOs will provide an interface between the technical staff and the community. The Project will also establish procedures for close coordination among district-level administration, NGOs, and community organizations for effective service delivery.

The participation strategy is presented in Supplementary Appendix F.

D. Gender and Development

Strategy to maximize impacts on women

Gender disparity and female disadvantages are inherent features of the social structure in Pakistan. Despite women's participation in economic activities in Punjab, both as unpaid family farm workers, paid on-farm and domestic laborers, as well as being responsible for livestock and domestic work, their participation in formal community decision making is almost entirely missing.

The gender strategy focuses on enhancing rural female incomes from indirect improvements to the domestic water supply, and from opportunities to participate in their organizations. The organizations will (i) enable women to influence the decision-making process of the irrigator community with regard to domestic, livestock, and watershed development water requirements; (ii) facilitate their participation in overall community decision-making processes, and (iii) strengthen their status at the community household level.

Specific measures will be undertaken to ensure (i) all staff working on the Project are provided training on gender issues; (ii) staff involved in the social mobilization process equally involve women and men; (iii) provision for building the capacity of village women for techniques and practices of irrigated cash crop agriculture, post-harvest management, agro-processing and plant nursery development with microfinance support; (iv) employment opportunities for women in the watershed conservation activities of the Project; and (v) management opportunities for women in domestic water supply and sanitation facilities, including hygiene education.

Has an output been prepared? Yes

The gender action plan is presented in Supplementary Appendix G.

E. Social Safeguards and Other Social Risks

Type	Significance level	Strategy to address issues	Plan required
Resettlement	Significant and non-significant subprojects	<ul style="list-style-type: none"> There will be both significant and non-significant land acquisition and resettlement impacts in the various subprojects due to the community storage dams and reservoirs and, to a lesser degree, the alignment of the main irrigation canal in the command area. The affected land may be privately owned cultivated and uncultivated agricultural land, as well as privately, communally, or government-owned wasteland, which is used for grazing of livestock and growing of firewood resources. Privately owned fishponds and other communal structures may be affected, including pathways through the reservoir area used by the public for travel and movement of livestock and goods, cemeteries, mosques, etc, as well as small water supply schemes located in the proposed reservoir area. Livelihood may be affected by the loss of cultivated crops, trees, and grazing and firewood resources. The need for some livelihood restoration and enhancement or substitution measures is anticipated. 	Full and short
Indigenous People	None	Impact on indigenous people is not anticipated as there are no indigenous people (i.e., tribal groups living outside the socio-cultural mainstream of the country) in the command, reservoir, and watershed areas of the prospective subprojects.	No
Labor	Non-significant	The selection criteria for the contractors for civil works in the subproject will include strict adherence to the applicable labor laws and regulations of the country and province, as well as the willingness to hire local unskilled labor from among the poorer population in the subproject area, with priority for people affected by land acquisition and resettlement.	No
Affordability	Non-significant	<ul style="list-style-type: none"> Command area development for irrigated and diversified agriculture will require new and larger investments, which the majority of the beneficiaries will be able to afford, at least in part with support from agricultural credit facilities required for initial investments, particularly for land leveling, irrigation equipment and other farm inputs, transport of products to markets, etc. Agricultural and commercial banks, the Kushali Bank, and NGOs providing microcredit are operating in the subproject district. Linkages with these organizations will be established, and a plan for agricultural credit facilities is included in the project design. The landowners stressed the need for integrating the tasks of land leveling and watercourse development into the subproject, since in past small dam projects, those aspects were not adequately implemented by the agencies in charge. 	No
Other Risks / Vulnerabilities	Non-significant	The downstream users of the stream in which the dam is built will depend on its subsurface flow for their water supply schemes. A strict safeguard in the form of a legal commitment to maintain an agreed-upon base flow of the stream at all times and store flood flows only will be respected by the Project.	No