



1. Project Data

Project ID P084302	Project Name PK: Sindh Water Sector Improvement Proj	
Country Pakistan	Practice Area(Lead) Water	
L/C/TF Number(s) IDA-43580,IDA-55560	Closing Date (Original) 30-Apr-2013	Total Project Cost (USD) 259,343,087.56
Bank Approval Date 18-Sep-2007	Closing Date (Actual) 31-Oct-2020	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	150,200,000.00	0.00
Revised Commitment	268,004,704.06	0.00
Actual	259,343,087.56	0.00

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) of the Sindh Water Sector Improvement Project (SWSIP) as articulated in the Project Appraisal Document (PAD, paragraph 16) was to: ***"improve the efficiency and effectiveness of irrigation water distribution in three Area Water Boards (AWBs) (Ghotki, Nara and Left Bank), particularly with respect to measures of reliability, equity and user satisfaction."***

The PDO as articulated in the Financing Agreement (FA, page 4) was formulated slightly differently but with no material difference compared with the formulation in the PAD. The FA stated that the objective was to



:"improve the efficiency and effectiveness of irrigation water distribution in Ghotki AWB, Nara AWB and Left Bank AWB, all in the Province of Sindh, particularly with respect to measures of reliability, equity and user satisfaction."

Parsing of the Objective: For the purpose of this review the PDO will be parsed into two sub-objectives which will be referred to as Objective 1 and Objective 2 as follows:

Objective 1: To improve the efficiency of irrigation water distribution in Ghotki AWB, Nara AWB and Left Bank AWB, all in the Province of Sindh.

Objective 2: To improve the effectiveness of irrigation water distribution in Ghotki AWB, Nara AWB and Left Bank AWB, all in the Province of Sindh.

b. Were the project objectives/key associated outcome targets revised during implementation?
Yes

Did the Board approve the revised objectives/key associated outcome targets?
No

c. Will a split evaluation be undertaken?
No

d. Components

The project contained the following five components to achieve the PDO:

1. Community Development and Capacity Building (appraisal cost: US\$10.00 million, additional financing (AF): US\$6.60 million, actual cost: US\$11.98 million). The Project would provide support for the rehabilitation of the Sindh Irrigation and Drainage Authority (SIDA) offices, developing capacity to transform irrigation and drainage (I&D) services from the traditional system to a new structure of the farmers organizations (FOs) and Area Water Boards (AWBs), by providing staff with expertise in social mobilization, capacity building of FOs, training, legal advisors, and by establishing an Environmental Management Unit (EMU) to strengthen its capacity for integrating environment considerations in planning, development and use of water resources.

2. Rehabilitation and Improvement of Irrigation and Drainage System (appraisal cost: US\$139.80 million, additional financing (AF): US\$123.20 million, actual cost: US\$248.07 million). A systematic approach would be adopted in improving the irrigation network off-takes from the barrage to users in the three AWBs included in the project. The project would cover all main and branch canals and distributerries/minors while major watercourses were being improved under the national program and the Sindh On-farm Water Management (SOFWM) Project. The necessary works comprised of four sub-components:

2.1. Main and Branch Canals. This sub-component would include the main and branch canals of the Ghotki, Nara and the Fuleli canal systems. The Government was starting a study for the enlargement of the



Akram Wah canal system in the Left Bank AWB. The project would provide assistance in preparation of detailed feasibility and designs for the Akram Wah system. In addition to rehabilitation and improvement to canals, a system of water measurements and accounting would be introduced throughout the main and branch canal systems and at the distributaries and minors.

2.2. Distributaries and Minors. Of 369 distributaries and minors in the project area, 173 would be rehabilitated and improved under the project. About 100 distributaries were to be covered under the ongoing Sindh OFWM and remaining 96 under the national program. Rigorous monitoring would be carried out by the Government of Sindh to avoid any duplication of work under different projects. The FOs would be involved in all stages of work on the distributaries/minor canals including identification, planning, and prioritizing, designing and construction of rehabilitation/improvement works. The FOs would carry out the distributary works under community based contracts (CBCs). The rehabilitation works would be designed in lots of 5 distributaries adjacent to each other or as close as possible.

2.3. Improvement of the Drainage System. The scope and works to be included in this component would be identified by SINDHAWBs jointly with the FOs.

2.4. Design and Construction Supervision. This component would cover the cost of surveys and investigations, consulting services for consultations with the FOs in identifying and prioritizing the works, preparation of detailed designs, bidding documents, procurement of works, and construction supervision covering all works included in sub-components 2.2, 2.2 and 2.3.

3. Management Plans for Major Irrigation & Drainage (appraisal cost: US\$12.00 million, additional financing (AF): US\$0.50 million, actual cost: US\$9.69 million). This component included the following two sub-components:

3.1. Feasibility Studies for Barrages. This would include feasibility studies and preparation of designs for rehabilitation and remedial works for the Gudu barrage requiring immediate attention due to its dilapidated state; assistance in reviewing the ongoing feasibility studies for rehabilitation of the Sukkur barrage and in proceeding to the detailed design stage; and inspection as well as assessment of the state of the Kotri barrage and studies for carrying out remedial works that may be necessary. This component would also support strengthening of the office of the Secretary, Irrigation and Power Department (IPD).

3.2. Preparation of Master Plan for Left Bank of Indus, Delta and Coastal Zone. This sub-component would support detailed studies and preparation of a regional master plan in consultation with the stakeholders for addressing the flooding issues and providing proper drainage to the area on the left bank of the Indus River considering structural and non-structural measures, including remedial measures for any outstanding deficiencies in the Left Bank Outfall Drainage system, measures for retention and/or safe disposal of storm and flood water, identified by the Inspection Panel Report for the National Drainage Program. A plan would be prepared for rehabilitation and improvement of delta area, wetlands and the coastal zone considering environmental importance of the region and its economic potential drawing upon international experience. Feasibility studies would be completed and detailed designs would be prepared for priority works for implementation under a future investment project that the Government of Sindh may undertake with the assistance of its development partners.



4. Monitoring and Evaluation of the Project Impact and Environmental Management Plan (appraisal cost: US\$4.20 million, additional financing (AF): US\$0.70 million, actual cost: US\$3.73 million). The monitoring and evaluation (M&E) activities would provide continuous feedback to the Government of Sindh (GoSindh), Project Steering Committee (PSC), and implementing agencies on the project's performance and impact of its various components, so that corrective actions could be undertaken in a timely manner. They will also supervise implementation of the overall Environmental Management Plan/Social Impact Management Framework (EMP/SIMF), careful review and monitoring of subproject specific social and environmental management plans and supervision of their implementation. M&E would be carried out using the latest technology such as satellite imagery and GIS systems, where necessary.

5. Project Coordination, Monitoring, Technical Assistance and Training (appraisal cost: US\$9.00 million, additional financing (AF): US\$7.00 million, actual cost: US\$8.87 million). This component would support the Government in implementing the project, coordinating all project related activities and preparing a follow-on project.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost. The total project cost (including additional financing) was estimated at US\$313.00 million. This amount was revised downwards because of reductions in the original credit and the additional financing to US\$292.80 million (see below for details). The actual total project cost according to the ICR data sheet (page 2) and Annex 3 was US\$282.34 million.

Financing. The project was financed through an IDA Credit of US\$150.2 million. In 2014, the project received an Additional IDA credit of US\$138.00 million. The original Credit and the AF were both revised downwards to US\$145.00 million and US\$123.00 million, respectively. The restructuring in March 2020 cancelled US\$15.00 million of the Credit (AF). The actual disbursed amounts according to the ICR data sheet (page 2) were US\$147.58 million for the original IDA Credit and US\$111.76 million for the AF. Therefore, the total disbursed amount was US\$259.34 million.

Borrower Contribution. The Government of Pakistan was expected to provide US\$24.80 million of counterpart funds. The actual amount according to the ICR data sheet (page 2) was US\$23.00 million.

Dates. The project was approved on September 18, 2007 and became effective three months later on December 26, 2007. The Mid-Term Review was conducted on February 3, 2014, which was about 42 months later than the proposed date on July 31, 2010. The project closed on October 31, 2020 compared to the original closing date on April 30, 2013. The reasons for the full seven-year extension were not explicitly reported in the ICR (see the restructuring discussion below for more details).

The project underwent five restructurings, all Level 2, and one AF as follows:

1. On September 3, 2012, when the amount disbursed was US\$64.18 million, in order to extend the closing date from April 30, 2013 to February 28, 2015. According to the ICR (paragraph 17) this extension was necessary to "offset the delays in implementation in the first two years caused by a protracted process of contracting the Food and Agriculture Organization (FAO) as the Project Coordination and Monitoring Unit (PCMU) and delays in the mobilization of the Project Management Consultant/Procurement Agent



(PMCA) due to a fragile security situation in the country," and to accommodate the impact of the 2010-2011 floods that "directly affected a number of project locations." Changes included in this restructuring also included a revision to the implementation schedule.

2. On September 28, 2014, when the amount disbursed was US\$131.72 million. This restructuring amended the Credit Agreement to reallocate the credit proceeds among categories of expenditures, providing more flexibility in the use of the proceeds.

3. On November 10, 2014, when the amount disbursed was US\$131.72 million. An additional IDA credit of US\$138 million was approved with a closing date on December 31, 2018. This AF was necessary to cover cost overruns identified during the Mid-Term Review (MTR) in February 2014. The Results Framework (RF) was also revised.

4. On November 30, 2018, when the amount disbursed was US\$230.35 million. This restructuring extended the closing date of the AF from December 31, 2018 to December 31, 2019 to provide continued support to the GoSindh for institutional reform (ICR, paragraph 17). There were also changes in the implementation schedule.

5. On December 15, 2019, when the amount disbursed was US\$256.98 million. The restructuring extended the closing date of the AF from December 31, 2019 to October 30, 2020 and made minor changes to the RF to continue supporting the preparation of the Sindh Water Policy and provide a vehicle for the preparation of the follow-on project (ICR, paragraph 17).

6. On March 17, 2020, when the amount disbursed was US\$257.63 million. The restructuring cancelled US\$15.00 million in estimated savings under the Credit (AF) and made those funds available for the Government of Pakistan's (GoP's) emergency response efforts to tackle the Coronavirus Disease 2019 (COVID-19) pandemic.

Rationale for the changes. The five formal restructurings did not make significant changes to the nature and scope of project activities. The AF was provided to finance an increase in the project costs, since the cost of civil works turned out to be much higher than originally estimated at appraisal. The AF included some revisions to the RF, which according to the ICR (paragraph 18) had "no impact on the theory of change." Finally, the AF introduced four core PDO level indicators and revised the target values of all indicators to be more realistic.

Split Rating. There was neither a change in the level of ambition or scope of the project, nor a change in the PDO statement resulting from the various restructurings and the additional financing, or changes in the PDO indicators that resulted in a lowering of the project's ambition. Therefore, a split rating of objectives is not called for in this review.

3. Relevance of Objectives

Rationale

Context at Appraisal. Pakistan relies on the largest contiguous irrigation system in the world to provide basic food security (90% of the national food production and 25% of the Gross Domestic Product GDP).



However, this massive infrastructure was deteriorating and in need of rehabilitation along with reforms to improve the allocation of water as well as the efficiency of its use. Moreover, competition for water was growing among the provinces and across the varied needs for irrigation, industrial and domestic use, and the environment. This project aimed to address the major issues of irrigation and drainage sector firstly, by deepening and broadening the reform program underway in Sindh by providing support to Sindh Irrigation and Drainage Authority (SIDA) at the provincial level, Area Water Board (AWBs) at the canal command level and Farmers' Organizations (FOs) at the distributary/minor canal level. This would lead to decentralization and participatory irrigation management. Secondly, the project would make substantial investments in rehabilitation improvement of the irrigation canals and major hydraulic infrastructure in the province.

Consistency with Government Strategies. At appraisal, the PDO was in line with a key priority of Government of Pakistan (GoP) to upgrade the irrigation infrastructure. At project completion, the PDO remained in line with the priorities of the GoP for the water sector. Specifically, pillar IV of the GoP's Vision 2025 "Energy, Water & Food Security," which emphasized the need to adopt efficient and effective methods for water distribution, usage (and re-use), storage and quality to sustain the country's economic and human/social wellbeing. The PDO was also in line with the National Water Policy (NWP) 2018, which presented guiding principles and policy actions for a water-secure Pakistan. The policy prioritized, among other things, ensuring equity of water distribution between head and tail reaches of canal systems, gradual replacement and refurbishing of old irrigation infrastructure in accordance with an adequate asset management plan, and augmentation of available water resources through judicious and equitable utilization, conservation, and efficient use.

Previous Bank Experience. The Bank has a long history of partnership and collaboration with Pakistan in the water sector. As a key partner and principal donor, it has provided support to several major interventions in the development of the IBIS, including: (i) facilitating Indus Water Treaty negotiations between Pakistan and India; (ii) establishment of the Indus Basin Development Fund that supported the construction of Mangla and Tarbela dams and several inter-river link canals and barrages; (iii) formulation of the Salinity Control and Reclamation Program (SCARP-1968); (iv) formulation of the Revised Action Plan for Irrigated Agriculture in 1979; (v) Water Sector Investment Planning Study (WSIPS) in 1991; (vi) the Drainage Sector Environmental Assessment in 1993 to provide perspective for the development of Ninth Five Year Plan; and (vii) most importantly the Irrigation and Drainage Strategy of 1994 (Pakistan: Irrigation and Drainage - Issues and Options) and Pakistan Water CAS (Pakistan's Water Economy Running Dry, 2005 34081-PK) that led to major shift in direction in the I&D sector of Pakistan and the implementation of the current institutional reform agenda.

Consistency with the Bank Strategies. At project appraisal, the PDO was in line with Bank's Country Assistance Strategy for Pakistan (CAS FY06–FY09). The CAS envisioned an expansion in lending in infrastructure (primarily energy, water, and transport) and human development. In irrigation specifically, the Bank aimed to support a combination of institutional reforms and investments throughout the system including major investments in rehabilitation of critical assets and reforms to improve the quality, efficiency, and accountability with which irrigation services were delivered.

At project completion, the PDO remained in line with the Bank's Country Partnership Strategy for Pakistan (CPS, FY15–FY19), which supported improving effectiveness of irrigated agriculture in two Provinces including Sindh. Specifically, the objective aiming to increase productivity of farms, under Results Area 2: Private Sector Development and Outcome 2.2: Increased Productivity in Farms in Selected Irrigation



Schemes. Specific problem areas or challenges addressed under Outcome 2.2 concerns inefficiencies in water delivery systems which was fully consistent with the PDO focus on conveyance efficiency.

The statement of objectives was clear and focused, reflected an adequate level of ambition compared with the Bank's experience in the country, and appropriately pitched to the challenges facing irrigated agriculture in the Sindh. The PDO's focus on improving efficiency and effectiveness of irrigation water distribution was in line with the government priorities as reflected in Vision 2025 and the NWP, and the outcomes of the project continue to contribute to the objectives of both. The PDO was also in line with the current Bank's Country Partnership Strategy (CPS) for Pakistan.

Based on the above-mentioned information, the Relevance of Objectives is rated High.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To improve the efficiency of irrigation water distribution in Ghotki AWB, Nara AWB and Left Bank AWB, all in the Province of Sindh.

Rationale

Theory of Change (ToC). To achieve the stated objective (to improve the efficiency of irrigation water distribution in three AWBs), the project would support rehabilitation and improvement of the irrigation and drainage systems through the modernization of main canals, modernization of main distributaries, and replacement of headworks. These activities would be expected to result in improved water delivery. Improving the efficiency of irrigation water distribution would also benefit from community development and institutional strengthening activities supported by the project. The expected outcome would be improved efficiency of the irrigation water distribution. The anticipated long-term impacts would be: increased agricultural production, increased employment, and increased incomes in the three AWBs covered by the project in Sindh province.

The expected outcome of the achievement of the PDO was underpinned by the following assumption: water management institutions will harmoniously coordinate effectively to implement project activities.

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain and the stated assumption was logical and likely to be achieved.

Outputs



The following outputs were reported in the ICR (Annex 1) unless referenced otherwise:

- The project financed rehabilitation and improved eight main and branch canals measuring 775.49 km and 100 distributaries and minors measuring 1,023.82 km (both targets achieved) (ICR, paragraph 25).
- Improvement was carried out to modernize canal operations and included replacement of 23 cross regulators and 17 head regulators at main and branch canals, and replacement of 50 and rehabilitation of 9 head regulators at distributaries/minors, which enabled AWB officials to better regulate canal flow and FOs to better manage water allocation at the distributary level (ICR, paragraph 25).

Outcome

This PDO was primarily assessed through PDO outcome indicator #1 (Conveyance efficiency of the distributary / minor canals and Water course) defined as increased channel conveyance efficiency of the distributary/minor canals, watercourses, farms, and reduced discharges of drainage water, and PDO outcome indicator #2 (the ratio between actual amounts of water supplied to the project area and the demand/planned water supply for the project area as a measure of reliability). By project completion the overall average conveyance efficiency reached 58% compared to a baseline of 52% and a revised target of 57%. Note that the baseline value for conveyance efficiency adopted at appraisal was 69% and the target value was 71%. However, to the ICR (footnote#10) these values were not based on reliable data. In 2013, the baseline value was re-estimated at 52% based on efficiency data collected for similar canals. The target value for conveyance efficiency was changed from 71% to 57%. The new target was more ambitious considering the incremental increase. Before restructuring, conveyance efficiency was expected to increase from 69% to 71% (2 percentage points increase), after restructuring from 52% to 57% (5 percentage points increase). The revised target value was exceeded with an eventual achievement of 58%. Reliability improved to 60% (against the target of 59%) from a baseline of 53%. The improved conveyance efficiency translated into increased water availability capable of irrigating more lands especially in tail areas (ICR, paragraph 25). Finally, the area provided with new/improved irrigation or drainage services reached 1,837,000 ha (target fully achieved) compared to a baseline of 1,170,000 ha.

On this basis, the efficacy with which Objective 1 was achieved is rated Substantial.

Rating

Substantial

OBJECTIVE 2

Objective

To improve the effectiveness of irrigation water distribution in Ghotki AWB, Nara AWB and Left Bank AWB, all in the Province of Sindh.

Rationale

Theory of Change (ToC). To achieve the stated objective, the project would support community development and institutional strengthening. This would result in improved management practices, and improved water delivery. The expected outcome would be improved effectiveness of irrigation water



distribution. The anticipated long-term impacts would be: increased agricultural production, increased employment, and increased incomes in the three AWBs covered by the project in Sindh province.

Achievement of the PDO was underpinned by the following assumption: communities will take up improved water management practices through participatory irrigation management (PIM).

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain and the stated assumption was logical and likely to be achieved.

Outputs

- 330 staff members of the SIDA and AWB received training to build their capacity and 345 FOs were strengthened (target achieved).
- The project facilitated elections in 256 FOs, trained 2003 members from 234 FOs through 53 customized training programs, and assisted in formal transfer of I&D management to 329 FOs from AWBs through the Irrigation and Drainage Management Transfer Agreement (IDMTA).

Outcome

Improved effectiveness was assessed through PDO outcome indicator #3 (evidence of improvements in water distribution between head and tail watercourses) measured by the Delivery Performance Ratio (DPR) a measure of improved equity, and PDO outcome indicator #4 (user satisfaction: percent of users satisfied with water distribution practices) as shown in sample surveys conducted before and after completion of project activities in each AWB. Equity across distributaries/minors (measured as the DPR ratio between head and tail) increased from a baseline of 51% to 66% (against a target value of 64%), while user satisfaction improved from 51% at baseline to 66% (against a target value of 59%).

Improved equity was a reflection of the project's success in capacity building of Farmer Organizations (FO) and AWBs to develop the skills needed to manage allocations and discharges to ensure equity. Also, the increased empowerment and representation of tail end farmers in FOs enabled them to influence water distribution and demand their due share of irrigation water (ICR, paragraph 27). It is worth noting that improving water management and delivery was a function of successful infrastructure rehabilitation, which enabled the Irrigation Department and SIDA officials to regulate the flow at hydraulic control points at prescribed times and to the prescribed extent.

Despite the afore-mentioned successes, the project fell short on achieving the target on the collection of irrigation water tariffs. The project increased irrigation water tariff collection from a baseline of 46% to 64% against an ambitious target of 80%. While, as the ICR notes, this was a step in the right direction, it was not enough to alleviate concerns related to the financial sustainability of FO-led I&D management. According to the ICR (paragraph 28), 60% of the collected irrigation water tariff was to be deposited in AWB accounts, which would leave FOs with insufficient funds to undertake tasks they agreed to perform under the Irrigation and Drainage Management Transfer Agreements (IDMTA).

On balance, the efficacy with which Objective 2 was achieved is rated Substantial, despite shortcomings. The project exceeded its outcome targets and succeeded in improving water management in the project areas. While the project fell short on achieving its target on the collection of irrigation water tariffs, this Review finds that the target of 80% collection rate was ambitious and not realistic.



Rating
Substantial

OVERALL EFFICACY

Rationale

Overall Efficacy is rated Substantial. The project improved efficiency (PDO Objective 1) and effectiveness (PDO Objective 2) of irrigation water distribution in the three AWBs in terms of reliability, equity and user satisfaction. The project led to improved I&D services to 667,000 ha of irrigated agricultural land; achieved the target of 612,000 beneficiaries; and led to positive impacts on cropping intensities, land utilization, crop yields, and farm incomes. While cropping intensities, land utilization, crop yields, and farm incomes were not part of the PDO, they were derived positive impacts. However, cost-recovery targets fell short, and the envisioned institutional changes that would lead to financial autonomy of key institutions and to a more equitable water distribution system wide did not materialize, despite the extension of the project closing date.

With improved water delivery and more reliable water, farmers were more confident to increase the area under cropping and engage in crop diversification. For example: net land utilization increase in project areas was 41.1% in Kharif and 61.2% in the Rabi season, and net cropping intensity increase in the project area was 11.6% in Kharif and 24.7% in Rabi. Crop yields also increased when comparing non-project to project areas, for example cotton net increase in yield was the highest at 24%, followed by rice at 14% for the khariff crops, while for the Rabi season, wheat yield saw an increase of 17.45% and oil seeds increased by 8.8%. Also, net income per acre almost doubled for both Kharif (91%) and Rabi (95.9%) seasons.

IEG noted that the Project Completion and Impact Assessment Report (pages 54 and 55) mentioned the existence of other other World Bank-financed and Government-financed projects in the same area as WISP. The project team responded to IEG's question about the possibility of whether the results recorded in the Assessment Report and in the ICR were all attributable to the WISP project. The Bank project team explained that the Sindh On Farm Water Management (SOFWM 2009-2014) had almost no overlap in the command areas of the interventions of WISP. Also, the Sindh Irrigated Agricultural Productivity Enhancement Project (SIAPEP 2015 - on going) was approved in March 2015. Activities planned under SIAPEP were just starting when WSIP had almost completed all its key activities and had already delivered substantial benefit to farmers. The interventions of the Sindh Resilience Project (SRP 2016 - on going) were all located outside of the Indus Basin Irrigation System (IBIS) while the interventions of WSIP were in three Area Water Boards inside the IBIS. Therefore, there was no geographical overlap between SRP and WSIP activities. Finally, the World Food Program (WFP) emergency response efforts mainly focused on cash-for-work activities whereby communities were paid to contribute to the repair and cleaning of tertiary and level four drains and irrigation canals. However, the Bank team explained that the intervention of WFP was limited in scope and focused on flood management rather than irrigation development. Irrigation channels rehabilitated under WFP activities were intended to facilitate drainage. In total, WFP rehabilitated 197 km of mostly small irrigation channels (watercourses). In contrast, WSIP rehabilitated the equivalent of 775.5 km of main and branch canals which were a much larger infrastructure and 1,024 km of distributaries / minors which were larger than the watercourses rehabilitated by WFP. Additionally, thanks to the coordination efforts by SIDA,



the activities supported by WFP did not geographically overlap with the interventions of WSIP. Therefore, any influence of WFP on WSIP results were likely to be, at most, indirect.

Overall Efficacy Rating

Substantial

5. Efficiency

Economic and Financial Efficiency

ex ante

- At appraisal, the economic analysis focused on the benefits resulting from increased agricultural production across the project area that was expected to result from more efficient and effective irrigation services. The Economic Rate of Return (ERR) was estimated at 18%. The increase in production was to materialize through increased yield and cropping intensity.
- Farm models were developed representing large (40 ha), medium (8 ha), and small farms (2 ha) and cropping patterns and yields in each AWB. Farm models analysis showed that the project would benefit all categories of farmers, but the potential benefits would be larger for medium farms (8 ha), whose income was expected to increase by about 14%. The estimated increases in farm income for large and small farmers were estimated at 9% and 11%, respectively.
- At the time of the AF, the economic analysis indicated a reduced ERR of 16.5%, reflecting the increased capital costs and longer implementation period, which were offset partially by the increase in agricultural commodity prices over the implementation period of the original credit.

ex post

- The ex post analysis estimated an internal ERR of 23.7% and a Financial Internal Rate of Return (FIRR) of 22.8%. With a 10% discount rate, the economic net present value (ENPV) was US\$1,452 million. With a 10% discount rate, the expected financial net present value (FNPV) was US\$1,434 million.
- The ex-post economic analysis focused on incremental net benefits from the project through increases in net farm income (relative to increase in non-project areas) due to increases in yields, more intensive land use, increased cropping intensity and improved cropping pattern.
- The sensitivity analysis showed that if benefits are reduced by up to 50%, the FIRR will be decreased to 15.8% and the EIRR to 16.6%.
- The analysis could have benefited from a comparison of costs of similar projects to reflect the cost effectiveness of this project, specifically, the cost per ha for improved I&D.
- While the project experienced cost overruns that stemmed from poor estimation of costs at appraisal, the estimated ERR at completion exceeded the ERR at appraisal (23.7% compared to 18%).

Administrative Efficiency



The project required 90 additional months (7.5 years) from the original closing date to the actual closing to implement the project. This additional time was necessary to execute activities under the additional financing and to ensure achievement of project outcomes. At appraisal the project was designed to be executed with an estimated fund of US\$150.2 million. At completion, the project had spent US\$269 million representing approximately 179% of original loan. The project experienced implementation delays in the first two years after project effectiveness. This stemmed mainly from delays in contracting and mobilization of the Project Management Consultant/Procurement Agent (ICR, paragraph 38). Also, the intense floods in 2011 impacted project locations and diverted SIDA staff toward priority flood relief and drainage work. The extension of the closing date negatively impacted the EIRR due to the delay in the expected benefit streams from the project investments. For example, according to the ICR (Annex 4, Table 8) the economic analysis showed that the EIRR would have been 26% if project investments were completed one year earlier and 28.8% if they were completed two years earlier. Using the data in Annex 3, the total administrative costs (components C, D and E) as a percentage of total costs at appraisal and at completion declined from 14.2% to 7.9%.

Summary Assessment of Efficiency

The ex post EIRR at 23.7% exceeded the estimated value of 18% at the time of appraisal and the reassessed value of 16.5% at the time of the AF. Also, the sensitivity analysis showed that even by a reduction of 50% in benefits the EIRR was still at 16.6%.

Therefore, the overall Efficiency is rated Substantial, despite the extended delay.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	18.00	0 <input checked="" type="checkbox"/> Not Applicable
ICR Estimate	✓	23.70	0 <input checked="" type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of Objectives was rated High. Overall Efficacy was rated Substantial. The project improved efficiency (PDO Objective1) and effectiveness (PDO Objective 2) of irrigation water distribution in the three AWBs in terms of reliability, equity and user satisfaction. The project led to improved I&D services to 1,837,000 ha of irrigated agricultural land; achieved the target of 612,000 beneficiaries; and led to positive impacts on cropping intensities, land utilization, crop yields, and farm incomes. While cropping intensities, land utilization, crop yields, and farm incomes were not part of the PDO, they were associated positive outcomes. Despite the lengthy



implementation period, Efficiency was rated Substantial because the estimated ERR at completion was estimated to be 23.7% and robust in the face of lower returns, and administrative costs were 7.9% of actual total project costs.

This review has rated the Relevance of Objectives as High and Overall Efficacy and Efficiency as Substantial. Therefore, given the minor shortcomings in the project's Efficacy and Efficiency the Overall Outcome of this project is rated Satisfactory.

a. Outcome Rating
Satisfactory

7. Risk to Development Outcome

The following issues were discussed by the ICR (paragraphs 75, 76 and 77) as potential risks to the development outcome:

1. The risk related to financial sustainability. Financial sustainability remains the single most significant risk to the development outcome to support the participatory irrigation management structure comprising Sindh Irrigation and Drainage Authority, Area Water Boards (AWBs), and Farmers Organizations (FOs). While collection of the irrigation water tariff increased under the project, it fell significantly short of the expected levels. This underperformance despite over a decade of support by WSIP (following on from support to FOs by Sindh Irrigated Agriculture Productivity Enhancement Project, Sindh On-farm Water Management Project and the National Drainage Program) suggests that the objective to make AWBs and FOs autonomous irrigation managers and gradually reduce the burden for budgetary support on Government of Sindh will not be achieved.
2. The risk related to operation and maintenance (O&M). The low collection rates of the irrigation water tariff undermines financial sustainability. This will directly impact the ability to operate and maintain irrigation infrastructure, and thus the sustainability of the observed outcomes. The disrepair of I&D infrastructure addressed by this project was due to decades of deferred maintenance, driven by the gap between O&M requirements and public financial transfers. If this gap persists, the increase in conveyance efficiency, reliability, and equity resulting from infrastructure works under Component 2 might not be sustainable despite the substantial investments and capacity building under the project.
3. The risk related to the sustainability of institutional reforms supported by the project. Resistance from the Irrigation Department was identified as a key threat to the reform process. To secure SIDA's independence from the Sindh Irrigation Department further steps need to be taken including: changing the reporting department of SIDA from Irrigation Department to Planning and Development (P&D) Department; and transferring the operational control of barrages from the Irrigation Department to SIDA. The Bank will prepare a follow-up operation designed to consolidate participatory irrigation management (PIM) achievements. The new operation is expected to push the agenda to improve the Sindh Irrigation and Drainage Authority's role toward becoming an autonomous provincial I&D authority, as envisioned by the reforms. According to the ICR (paragraph 77), the current trajectory of the reform agenda no longer directly threatens the role and mandate of the Irrigation Department.



8. Assessment of Bank Performance

a. Quality-at-Entry

The Government of Pakistan sought support from the Bank for its knowledge, expertise and experience in the water/irrigation sector, in addition to its financing (PAD, paragraph 13). This project supported key priorities of Pakistan's upgrading of the water infrastructure and supported the Bank's CAS (see section 3 for details). Project preparation was lengthy and lasted over three years between May 2004 and September 2007. According to the ICR the project design featured an optimal mix of institutional strengthening, capacity building and investments in rehabilitation/improvement of the irrigation canals and major hydraulic infrastructure. The project design reflected lessons learned from the Bank's involvement in Pakistan's irrigation and drainage sector in Sindh and Punjab (National Drainage Program, On Farm Water Management Project, Punjab Groundwater Development Project, among others), most notable: featuring participatory irrigation management as a central element to the project design; adequately supporting capacity building of FOs; and adopting a systematic approach to improve the water distribution system from barrage to the users including major hydraulic structures. The project's design included a PMCA to ensure transparency and increase efficiency in procurement and contract management.

A notable design shortcoming was the lack of a robust assessment of the infrastructure cost. The underestimation of costs subsequently led to delays during implementation and the need for additional financing. Six different risks to the achievement of PDO were identified at appraisal. Only the risk for lack of transparency and accountability in procurement of contracts, and their implementation was rated High. According to the ICR (paragraph 49) the "proposed mitigation measures namely the role of PMCA in project implementation was adequate." However, the risk related to cost overruns during implementation was underestimated and was rated negligible. This risk should have been better assessed and in light of such assessment better mitigation measures could have been adopted.

Finally, M&E design included relevant PDO indicators that were directly linked to the PDO. However, the Results Framework (RF) was vague on the baselines and target values for outcome indicators which were expressed only in terms of percentages (ICR, paragraph 50). The RF was revised during the AF to improve its clarity.

Based on the above-mentioned assessment, Quality at Entry is rated Moderately Unsatisfactory. This rating reflects significant shortcomings during appraisal related to underestimation of both the cost of rehabilitation/improvement of irrigation infrastructure and the risk of cost overruns during implementation. The poor assessment of the works needed in the irrigation system had massive implications for project costs and necessitated additional years of implementation.

Quality-at-Entry Rating
Moderately Unsatisfactory



b. Quality of supervision

Project implementation faced a challenging security situation in Karachi and in rural Sindh which delayed mobilization (ICR, paragraph 51). Also, the project experienced bottlenecks during the first three years of implementation that stemmed from delayed contracting and mobilization of the Project Management Consultant/Procurement Agent (PMCA) coupled with implementation delays caused by extreme floods in 2010 and 2011.

The Bank devoted 231 staff weeks and US\$1.57 million to WSIP supervision, and a total of 26 ISRs were filed during the implementation period. Implementation Support Missions (ISMs) were undertaken regularly with technical visits in-between. The Bank missions included multidisciplinary teams with skills in civil engineering, institutional development, environmental management, social development, FM, and procurement (ICR, paragraph 71).

In 2011, the Bank task team brought the need for additional funds to the attention of the Government of Pakistan. However, the AF was not approved until November 2014 after a formal assessment was conducted at the MTR. The AF was also used as an opportunity to: rectify initial shortcomings in RF design and enhance M&E to track all project outcomes, strengthen the coordination among FOs, improve collaboration between the SIDA and FOs to develop O&M plans, and improve financial management (FM) at the SIDA (ICR, paragraph 53).

Based on the above-mentioned information, Quality of Supervision is rated Satisfactory.

Overall Bank Performance is rated Moderately Satisfactory. This rating reflects significant shortcomings in the Quality at Entry and considerable efforts by the Bank's supervision to eventually successfully achieve the project's objectives.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The PAD did not include a Theory of Change as it was not mandated at appraisal. Nonetheless, the ICR (page 7, figure 1) included one which reflected the relation between the planned project activities, its outputs, outcomes and long-term impacts. M&E activities were coordinated and supervised under the Project Coordination and Monitoring Unit (PCMU), established under the Planning and Development Department of the Sindh Irrigation and Drainage Authority.

The achievement of the PDO was to be assessed through four PDO level results indicators: 1. Efficiency: Evidence of increased channel conveyance efficiency of the distributary / minor canals, watercourses,



farms, and reduced discharges of drainage water; 2. Reliability: Ratio between actual amounts of water supplied to the project area and the demand/planned water supply for the project area on a ten-day, monthly, seasonal and annual basis. Also decrease in the incidence of canal breaches; 3. Equity: Evidence of improvements in water distribution between head and tail watercourses measured by the DPR; and 4. User Satisfaction: Improved user satisfaction with respect to water distribution practices, as shown in sample surveys conducted before and project activities in each AWB. While these indicators were directly linked to the PDO, the Results Framework (RF) lacked clear information on baseline data, targets and methodology to measure these parameters. The (RF) only provided only a list of outcome and output indicators against the Project Development Objective (PDO) and each component.

The RF included 16 intermediate outcome indicators that were used to assess the different project activities under each component. Most of these were relevant, measurable, and linked to the stated activities.

Overall, M&E design included relevant indicators, but could have benefited from their better description and clarity to facilitate implementation of project monitoring.

b. M&E Implementation

According to the ICR (paragraph 56) "Project M&E was regular, and reports were submitted on time." M&E implementation was outsourced successively to two consultancy firms. The first firm undertook baseline surveys enabling determination of baseline agro-socioeconomic, environmental, and I&D data of the project. The second firm conducted the completion survey of the project and contributed to the Borrower's PCR.

M&E implementation was successful. However, the transition between the two consultancy firms was weak. This was addressed through intense "handholding and capacity strengthening of the second consultancy firm.

Restructuring and Revision of indicators. At the time of the preparation of the AF in 2014, four corporate indicators were added to strengthen the RF. Additionally, the target and baseline of one outcome indicator, "Increased channel conveyance efficiency of the distributary/minor canals," were adjusted during the fourth restructuring. Although the target of conveyance efficiency of the distributary changed from 71% to 57%, the incremental change brought about by the project increased from two percentage points to five percentage points.

These changes rendered the target values of all indicators more precise with no impact on the theory of change.

c. M&E Utilization

According to the ICR (paragraph 57) the borrower's completion report utilized the quantitative and qualitative data gathered through the project's M&E. The M&E system was also used by the Bank to track and monitor progress against the RF. Environmental and social monitoring allowed timely identification of non-compliance issues such as: unauthorized tree cutting, improper disposal of excavated silt/debris from distributaries, delays in rehabilitation/restoration of diversion channels, and delays in appointment of environmental personnel at site, among others. This also ensured



timely implementation of EMPs and Resettlement Action Plans (RAPs). The M&E system provided useful information that enabled critical restructuring decisions such as the first project closing date extension from 2012 to 2015, the AF, and operational decisions for civil works (ICR, paragraph 57).

Summary. Overall, the Quality of M&E is rated Substantial. M&E design shortcomings were remedied during implementation, which allowed adequate and timely data collection. M&E implementation benefited from the recruitment of specialized M&E firms. The M&E system produced useful information that facilitated the project's management and enabled critical management decisions.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was screened and classified Category A project requiring a full assessment, because the implementation of the civil works under Component 2 was expected to cause limited negative environmental impacts that required a rigorous process of review to ensure implementation of mitigation measures. Five safeguard policies were triggered: Environmental Assessment (OP/BP 4.01), Pest Management (OP 4.09), Natural Habitats (OP/BP 4.04), Involuntary Resettlement (OP/BP 4.12), and Projects on International Waterways (OP/BP 7.50). The project fell within the exception to the notification requirements of OP 7.50, set forth in paragraph 7(a) of OP 7.50, and according to the ICR (paragraph 64) "OP 7.50 was complied with."

According to the ICR (paragraph 59): "SIDA complied with the legal covenant pertaining to the environmental and social safeguards."

Compliance with Environmental Safeguards. According to the ICR (paragraph 60) an Integrated Social and Environmental Assessment (ISEA) was prepared, and adequate institutional arrangements were put in place to manage environmental aspects after some initial delays by contractors. The ICR (paragraph 60) stated that "At completion, OP/BP 4.01 was fully adhered to." (OP 4.09) was triggered because WSIP outcomes on irrigation water allocation could impact land utilization, crop yield, and crop intensity, which could increase pesticide and insecticide use. According to the ICR (paragraph 63) "OP 4.09 was complied with." The policy on Natural Habitats (OP/BP 4.04) was triggered due to the proximity of project civil works to protected and ecologically significant areas. According to the ICR (paragraph 62) "OP 4.04 was complied with."

Compliance with social safeguards. A Social Impact Management Framework (SIMF) was prepared by SIDA and cleared by the Bank in 2006. In total, 96 households were identified, resettled and duly compensated. Also 37,08 acres of land were acquired, and landowners were compensated. According to the ICR (paragraph 61) "the tracking and compensation of all project-affected households was completed in 2020 and OP 4.12 was complied with."



b. Fiduciary Compliance

Financial Management (FM). During the period from 2009 up to 2013, FM was weak and suffered from "long delays in submission of audit reports, prolonged vacancies of key FM staff, errors in Interim Unaudited Financial Reports, and issues with counterpart funding allocation and spending (ICR, paragraph 65)." FM performance gradually improved as it benefitted from capacity building and strengthening activities. The status of the final audit report was not reported in the ICR.

Procurement. Procurement arrangements were deemed adequate by the Bank. Arrangements to mitigate procurement risk were successful in reducing the risk to the project by building the capacity of the Implementing Agency (ICR, paragraph 67). There was no incidence of mis-procurement reported (ICR, paragraph 67).

c. Unintended impacts (Positive or Negative)

d. Other

According to the ICR (paragraph 45) "Due to conveyance efficiency improvements in the Nara Canal system, the most downstream reaches of the main/branch canal system started receiving reliable water supply before the project closed. Based on this reliable availability of surface water, the Sindh Irrigation Department developed two rural water supply schemes serving 105,000 people and 225,000 livestock in remote desert areas of Achro Thar (99 villages) and Chachro (65 villages)."

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Satisfactory	This Review rated Efficiency Substantial while the ICR rated Efficiency as Modest.
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The ICR included five lesson. The following three are emphasized with some adaptation of language:



1. To ensure the success of reforming a vast and complex irrigation system, such as the Indus Basin Irrigation System in Sindh, a long-term strategic process that includes a series of complementary investments is needed. A long-term sectoral roadmap with strong ownership from the GoSindh was paramount to overcome the politically sensitive issues impeding the realization of necessary institutional changes in irrigation and more broadly in water resources management. Establishing institutions capable of undertaking the various functions of irrigation modernization and management necessitated a long-term vision with a shared understanding of the steps toward the sector's reform. The implementation of such an approach will require a series of strategic and complementary investments, of which this project was one, rather than through a single operation.

2. Accurate and realistic cost estimates for large civil works sub-projects at appraisal are critical elements of the design to ensure smooth implementation within the estimated project budget. Cost estimates need to be robust and reflect current market prices at the time of appraisal. Specific analytical activities should be dedicated to identifying the true cost of major contracts as part of the preparation process. WSIP implementation during the initial years of project approval was affected by, among other things, considerable under-estimates of the cost of major civil works. This situation led to the relaunch of several contracts, leading to procurement delays and increasing the risk of governance concerns. It also led to some administrative inefficiencies in terms of both staff and other costs. Adequate project preparation time needs to be dedicated to conducting robust studies that provide accurate data for cost estimation, taking into account potential risks that may be associated with the context especially when dealing with fragile and/or conflict situations.

3. Continuity, competence, independence, and tenure security of project leadership are essential elements to ensure implementation success. WSIP directors were all recruited from the skilled manpower market based on merit (as opposed to civil servants appointments) and served for comparatively long periods. Across the 13 years of implementation, there were only three Project Directors and the last Project Director had earlier served as Deputy Project Director, so continuity and institutional memory were very strong. Generally, Project Directors were able to take independent decisions following project implementation arrangements. One Project Director and a former project coordinator of the PCMU commented that the FAO and World Bank played a crucial role in ensuring this independence as the international agencies supported the Project Directors and “took stands” at critical points in the project to empower the Project Directors.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

Quality of Evidence. The project benefited from a robust M&E system. The ICR used the M&E data to assess the project outcomes. Further, the ICR reported on parameters outside of the RF to demonstrate the impact of the project.



Quality of Analysis. The ICR provided clear linking between evidence and findings and used the evidence base to serve the arguments under the different sections, in particular the discussion on outcomes. However, the evidence provided on efficiency did not justify the assigned rating in the ICR.

Lessons. Lessons reflected the project experience and were based on evidence and analysis in the ICR.

Results Orientation. The ICR included a focused discussion on the achievement of the two PDOs. However, the discussion was skewed towards reporting on the achievement of the PDO through reporting on the PDO outcome indicators. The discussion could have benefited from a balance between reporting on the achievement of the PDO in relation to the outcome indicators and what the project actually achieved on the ground.

Internal Consistency. Various parts of the ICR were internally consistent and logically linked and integrated.

Consistency with guidelines. The ICR successfully used the available data to justify the assigned ratings. Discussion of outcomes was adequate. Also, the efficiency analysis reflected the challenges experienced during implementation.

Conciseness. The ICR provided thorough coverage of the implementation experience and candidly reported on shortcomings. The reporting on safeguards was detailed and included an explicit statement on compliance for each policy. However, the outputs in Annex 1 lacked targets and the ICR did not report on the status of the final audit reports for the project. Finally, the ICR did not explicitly explain the reason(s) for the seven years extension beyond the original closing date.

Overall, the Quality of the ICR is rated Substantial despite some minor shortcomings.

a. Quality of ICR Rating
Substantial