ICR Review

Operations Evaluation Department

Report Number : ICRR11261

1. Project Data:		Date Posted : 08/20/2002		
PROJ ID : P010501			Appraisal	Actual
Project Name : Pvt Sector Ground Wa		Project Costs (US$M)	104.8	33.5
Country : Pakistan		Loan/Credit (US$M)	56	20
Sector(s): Board: RDV - Irrigation and drainage (91%), Sub-national government administration (6%), Law and justice (3%)		Cofinancing (US$M)		
L/C Number : C2901				
		Board Approval (FY)		97
Partners involved :		Closing Date	12/31/2001	12/31/2001

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2. Project Objectives and Components

a. Objectives

The overall objectives of the Pakistan Private Groundwater Development Project were to increase the scope and productivity of Punjab's irrigation and drainage subsector, and increase farmers' incomes . Specific objectives were to:

1. Redefine Government's role in groundwater development and provide assistance to facilitate change .
2. Develop a monitoring program and regulatory framework to ensure sustainable use of the groundwater resources.
3. Develop sustainable farmers' organizations (FOs), which can efficiently operate and maintain groundwater irrigation, improve surface irrigation and establish a base for participation in the management of the canal systems.
4. Increase beneficiaries' incomes and alleviate poverty .
5. Rationalize public expenditure on O&M of the irrigation and drainage systems as well as increase the recovery of public expenditures on irrigation infrastructure .
6. Avoid environmental hazard of saline water intrusion into fresh groundwater aquifers .

b. Components

Total Project Costs of $33.5 million ($104.8 million at appraisal) comprised the following (appraisal/ actual):

1. Tubewell Disinvestment (28.1%/ 33.9%)
2. Development of Groundwater Regulatory Framework - **GRF** (2.9%/ 4.8%)
3. Improvement of Irrigation Facilities (35.5%/ 36.8%)
4. Prevention of Saline Groundwater Intrusion (26.5% / 11.5%)
5. Monitoring and Evaluation - **M&E** (2.7%/ 6.3%)
6. Project Management (1.8%/ 2.4%)
7. Technical Assistance and Training (2.5%/ 4.4%)

Component 1 involved transfer of 4,250 government tubewell (TW) sites to cooperative tubewell (CTW) management. The tubewells provide supplementary supplies to surface water canals, as well as salinity control benefits through reducing the level of the groundwater table . There is not a one to one correspondence of the existing government TW sites with a single community tubewell management group . Sometimes a government tubewell was taken over by several CTW management groups, thus the number of CTWs exceeded the 4,250 disinvested tubewells.

c. Comments on Project Cost, Financing and Dates

The devaluation of the Pakistan Rupee by 50%, combined with modest domestic inflation, increased the real Rupee finance available. There were, however, substantial adjustments to the components, including a reduction in the target for watercourse improvement/lining, and the transfer of proposed drainage cum -salinity control tubewells to the National Drainage Project. Most FOs chose to install new pumpsets using diesel which is cheaper than electric power and requiring a contribution of Rs 30,000 ($1=Rs 33 at appraisal and Rs 61 at completion). The farmer contribution (upfront and loan service), for both TWs and irrigation improvements, would eventually cover 21% of

total project costs

3. Achievement of Relevant Objectives:

1. The redefinition of the Punjab government's role in groundwater development was largely achieved by the end of the project, with all 4,250 SCARP (Saline Control and Reclamation Project) TWs within the project area disinvested, plus an additional 400 other government tubewells.
2. The development of a monitoring and regulatory framework to ensure sustainability of groundwater resources fell far short of overambitious targets because the time needed for consultation and building of stakeholder ownership and acceptance was underestimated.
3. Change was facilitated and the numbers of farmers groups established and trained exceeded targets. Over 6,700 CTWs were set up, and 85%of these judged "successful" through independent monitoring. 2,000 water user associations (WUAs) were established to participate in irrigation works to increase the productivity of existing irrigation systems. Water courses and canals were improved and rehabilitated but the scale of civil works fell well short of that estimated at appraisal. Seepage rates and hence the need for lining had been overestimated. Progress was also slowed by weak demand, attributed to both high requirements for farmer financial contributions to capital cost, and administrative delays.
4. Increases in beneficiary incomes were substantiated by survey data but the impact on poverty per se, was not adequately analyzed and there are statistical limitations to "without project" control. The use of remote sensing for crop surveys did not materialize.
5. The subsidies on private tubewell construction ended. However the scheme to implement severance packages for 5,000 redundant operators was not implemented and $8 million remains unutilized. Transfer of responsibilities for main canal O&M by federations of WUAs has not progressed far; the provincial irrigation department is still responsible. The O&M funds allocated for these canals did however increase from Rs 800 million to Rs 1.5 billion over 1996-2002.
6. Monitoring data are inadequate to determine if saline intrusion was reduced and water quality deteriorated in allegedly affected areas. As a result, 35 drainage tubewells were cancelled because of questionable efficacy. Non-engineering interventions aimed at salinity control were examined, even though engineering solutions may be required in the long-term.
7. The economic returns were re-estimated, based on field surveys and were above SAR projections for both the tubewell disinvestment (EIRR=16%) and irrigation improvements (EIRR=33.5%.) Both results were robust with respect to cost increases but the confidence level for incremental benefits is low -- a 20% increase in costs and a plausible 40% reduction in benefits, would reduce the EIRR to 8.5%.

4. Significant Outcomes/Impacts:

1. There were substantial improvements in irrigation management within the long-term policy framework adopted by the Punjab government.
2. Promising new agricultural technologies have been demonstrated, including resource conservation through zero tillage for wheat on 60,000 ha (over 2800 sites), and laser-guided land-leveling on 22,250 ha.
3. A gender component was added during implementation and has led to formation of 100 organizations whose 6,000 women members have experienced increases in income and become involved in decisions regarding TW location. Although modest, the inclusion of the component set a precedent - past projects have by-passed gender issues in project design.
4. Although modest in relation to targets, the principle of farmer cost-sharing was firmly established with contributions of 42% to CTW, 10% to the cost of canal lining and 55% to the cost of watercourse improvement.

5. Significant Shortcomings (including non-compliance with safeguard policies):

1. The institutional and technical difficulties of managing surface and groundwater sources conjunctively were underestimated, and the GRF remains to be enacted and operationalized. This is surprising given more than 40 years of Bank involvement in Pakistan's irrigation.
2. This project is categorized as a poverty targeted intervention (PTI) but alternative PTIs were not considered. There is no analysis of poverty *per se* and a cut-off land-holding of 5 hectares or less (small farmers) is not an adequate definition of poverty, since there are many landless in far worse circumstances.
3. The saline intrusion control component was poorly conceived on inadequate data.
4. The lack of a uniform sector policy for farmers' contributor to civil works capital investment created implementation problems and required significant redesign.
5. The M&E system for agricultural production impact had only 30 control households, which is a small sample. The 1200 ICR household sample of "with project" households was the basis for calculating with project benefits. The economic returns are the product of small increments in yield and intensity, applied over very large areas assumed to benefit. Increases in farm income were of the order of 5-10%. The small size of the control sample undermines confidence in the estimated EIRRs.
6. The sustainability of benefits from canal rehabilitation and watercourse improvement are not yet established - this requires widespread acceptance by FOs of their responsibility for maintenance and repairs.
7. The Bank's use of conditions of effectiveness rather than insisting on upfront conditions of Board approval, was not justified by past experience. There was insufficient consultation planned with stakeholders.

6. Ratings:	ICR	OED Review	Reason for Disagreement /Comments
Outcome:	Satisfactory	Moderately Satisfactory	While targets were met for CTW disinvestment and establishment of FOs/WUAs, there were significant "quality at entry problems' and failure to meet objectives for the GRF and irrigation improvement components.
Institutional Dev .:	Substantial	Modest	The achievements in establishing new management structures at field level are offset by slow progress in implementing provincial level reforms and GRF.
Sustainability :	Likely	Non-evaluable	There is far too little data available at this early stage to assess how likely the ambitious institutional changes will lead to both improved and sustained irrigation management performance.
Bank Performance :	Satisfactory	Satisfactory	
Borrower Perf .:	Satisfactory	Satisfactory	
Quality of ICR :		Satisfactory	

NOTE: ICR rating values flagged with ' * ' don't comply with OP/BP 13.55, but are listed for completeness.

7. Lessons of Broad Applicability:

1. Establishing a GRF requires coordination of a wide range of institutional changes, affecting the equity of water distribution, ownership by both communities and local government, alternative income sources to compensate for decreased reliance on groundwater, and poverty -targeting of "critical areas."
2. A public awareness program and stakeholder participation must precede introduction of groundwater regulation . Users must be involved in groundwater monitoring and voluntary self -regulation.
3. Women's Organizations can contribute to conflict resolution among members of FOs /CTWs and the optimal siting of TWs.
4. To control salinity, non-engineering solutions, for example saline agriculture and biological drainage, may be effective in controlling groundwater salinity intrusion .

8. Assessment Recommended? ● Yes ○ No

Why? This project should be included in a cluster of other Bank -funded projects in Pakistan, all of which cover major irrigation and drainage management reforms and water quality issues .

9. Comments on Quality of ICR:

While the economic analysis appears comprehensive, it could have been more systematically organized . It is difficult to untangle the different categories of benefit and their relative significance (e.g. benefits attributable to disinvestment and those to irrigation improvements .)