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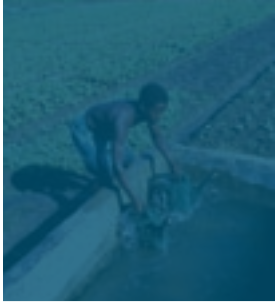

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Poverty Analysis in Agricultural Water Operations of the World Bank

Agricultural water has been seen as a prime mechanism for fostering rural economic growth and reducing rural poverty. But agricultural water has encountered problems of performance, profitability and sustainability. This resulted in a reduction in investments from governments and lending from development organizations like the World Bank up to early 2000s.

Agricultural water development and poverty linkages

Raising the incomes of poor farmers is one of the most important components of poverty reduction strategies—the majority of the world's poor are in rural areas and in agriculture. Empirical evidence on poverty reduction in 14 countries in the 1990s showed five interventions important in raising agricultural earnings of poor households:

- Improving market access and lowering transaction costs
- Strengthening land property rights
- Creating an incentive support system benefiting all farmers
- Expanding technology available to smallholders
- Helping poorer, smaller producers deal with risks

Well-designed agricultural water investment has the potential to contribute to these five aspects. Land and water rights must be specified for water development; incentive frameworks allow higher value production; public investment should provide support for small farms; improved technology includes improved water management and associated improvements in high-yielding varieties and intensive husbandry patterns; investments in irrigation, drainage, and flood control reduce risks for smallholders and allow investment in intensive production strategies.

Until recently, studies were localized and sporadic but recent empirical work (ADB/IWMI study, 2005) provided a body of evidence on the poverty reduction impact of agricultural water. These studies have shown that incidence of poverty is lower in irrigated areas than rainfed, and access to agricultural water reduces incidence and severity of poverty. Indeed, agricultural water enables households to improve crop productivity, grow high-value crops, generate high incomes and employment, and earn a higher implicit wage rate (up to a 50 percent differential in higher employment and wage rates for irrigated areas.)

Agricultural water reduces poverty through three direct effects: increased food output, higher opportunities for employment, and higher real incomes. Indirect effects are even stronger: Agricultural water has a multiplier effect driving an increase in nonfarm rural output and employment as levels of rural spending rise. There is also an "investment multiplier" effect: public sector investments in canal irrigation attract private investment in both irrigated agriculture and in the local economy. Agricultural

Excerpted from *Poverty Analysis in Agricultural Water Operations: A Review of Projects Financed by the World Bank*, by Salah Darghouth, Christopher Ward, Price Gittinger, Julienne Roux and Animesh Srivastava, World Bank Water Working Note 16, May 2008. The full report may be downloaded in PDF format from: www.worldbank.org/water.

water has also been linked to social benefits such as reduced seasonal rural out-migration and girls' attendance at school.

The paradigm for agricultural water development now links improvements in physical infrastructure to institutional development, building social capital of communities and organizations. Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT) have been the focus of many interventions since the early 1990s.

Agricultural water has the most poverty-reducing impact where:

- Schemes are well managed and users are involved in management
- Water allocation and distribution practices are equitable
- Infrastructure and management are designed with the needs of the poor in mind (e.g. equitable governance systems through water user associations – WUAs)
- There is equity in land distribution
- Production technology, cropping patterns and crop diversification are available
- Support services such as input supply, output markets and roads are in place
- Needs of landless and of women are taken into account

Attention to which income classes get what share of net benefits creates higher poverty reducing impacts. Larger poverty impacts can be realized by integrating investments in irrigation infrastructure, management, and service delivery.

Risks and limitations to agricultural water as a poverty reducing investment

Poverty levels impact social groups differently, and are highest in marginal areas, downstream sites, and areas where canal water is in short supply or groundwater quality is poor. Poverty most afflicts the agriculture-dependent landless and households where the sole breadwinner is a woman. In the ADB/IWMI study, 38 percent of households in irrigated agricultural systems were still poor, with levels as high as 65 percent in Pakistan.

Agricultural water can have a direct negative impact on the poor, for example where waterborne diseases (malaria, schistosomiasis) increase due to inadequate drainage. There may also be other anti-poor impacts as higher profitability increases land, rent, and product prices.

Finally, agricultural water may not always be the most efficient poverty reduction strategy (others include roads, education, research and development, and rural finance.)

Poverty analysis in Bank-financed agricultural water projects

As part of this work, analysis of poverty aspects has been made for a sample of Bank funded operations, and thus at the macro and sectoral, project and farm levels. Poverty Reduction Strategy Papers (PRSPs) or Country Assistance Strategies (CAS), Country Water Resources Assistances Strategies (CWRAS) and Economic and Sector Work (ESW) are macro and sectoral-level studies that can be utilized. Also Poverty and Social Impact Analysis (PSIA) and Poverty Assessments can be conducted.

It was found that economic and financial analysis, technical analysis, and social analysis, together with use of the Results Framework, were used for setting poverty reduction results and indicators. Growth impacts and risks, distributional impacts and employment impacts were assessed in many studies. Use of these analyses and indicators varied widely from study to study, as did financial analysis of cost sharing and subsidies.

Social assessments and social analyses were carried out for almost all of the dedicated agricultural water projects reviewed, including discussion of participation and decentralization, targeting the marginalized, reducing conflict, and building social capital.

A Results Framework is now included in World Bank Project Appraisal Documents (PADs) and lists Project Development Objectives and related results indicators, "intermediate results per component" and related results indicators.

Few projects set specific poverty indicators, instead quoting poverty reduction as 'higher level objects' to which the project would contribute. Some projects do set intermediate results and indicators such as income increases, employment increases, equity, and access to land.

Poverty reduction in Bank-financed agricultural water projects

Projects varied in clarity of definition of the nature of poverty problems. In some cases, low productivity of water drives the poverty of irrigated farmers. In some cases, larger farmers benefited more; in others, the landless were expected to benefit most; in others, exact numbers of people expected to emerge from poverty were predicted.

In most cases, social capital from WUAs was expected to have multiplier effects on poverty reduction; other mechanisms mentioned are policy reforms, service delivery, and investment in infrastructure and institutions.

Pro-poor technical design (such as treadle pumps, retention ponds, and small irrigation and drainage infrastructure) and institutional design (administrative and fiscal decentralization, farmer empowerment, and self-financing farmer-managed schemes in contexts of secure property rights and free markets) were important in some cases.

Some projects included specific targeting of the poorest groups: "tail-enders," smaller irrigation units, targeting poorest areas of a country, using appropriate technology, targeting an upper watershed, using ceilings on hectarage and sliding scales of subsidies, and targeting women.

The most common approaches to capturing income and distributional results were socio-economic baseline surveys and impact monitoring; participatory monitoring and evaluation (M&E); institutional audits of, e.g. WUA's; specific gender monitoring; and crop surveys.

The challenge

Despite the poverty-reducing impacts of many projects reviewed, and although quality of pro-poor design and results monitoring has improved, many projects were not clear in their poverty-reducing design and results measurement.

Agricultural water projects were rarely part of a poverty reduction strategy and did not show links to Poverty Assessments. Financial analysis stopped short of distributional analysis. Technical design rarely considered pro-poor options. Social assessment and institutional design and the relationship to poverty reduction were not clear. Risk was not fully considered, and questioning whether agricultural water was the best poverty reducing investment available was not discussed. Poverty targets, intermediate results and monitoring systems were not adequately addressed in the Results Framework. Employment aspects were often not considered.

Four causes of the above problems are suggested:

- Lack of clarity about agricultural water as a means of poverty reduction
- The weak links between country poverty reduction strategy and the agricultural water sector
- The weakness of project appraisal tools in poverty analysis
- The lack of incentives for task teams to integrate poverty reduction into project design and results monitoring.

"Pro-poor" interventions where net benefits accrue more to the poor than to the non-poor could be improved. Designing pro-poor projects requires consideration at the sectoral, scheme, and farm levels, and looking at policies, technology and farming systems, institutions and management, indirect impacts, and externalities (box 1). Intermediate targets and indicators need to be set, related to increasing incomes or improved distribution of benefits. Increased reliability and equitable distribution of water, inclusion of the vulnerable in WUAs, increases in agricultural output and incomes, distribution of income increases, increases in employment opportunities, can all be part of the causal chain leading to poverty reduction.

Poverty reduction impacts in Bank-financed agricultural water projects can be improved through better analysis and design, and can be demonstrated if poverty-related targets and indicators are more systematically included in the Results Framework. Improvements can be made to the poverty reduction performance of agricultural water projects by a clearer understanding of how agricultural water contributes to poverty reduction, by sharper strategic focus, by better analytical techniques, or by better use of existing techniques. These improvements require task teams to have the knowledge and incentives to work in an integrated fashion on pro-poor design.

A sourcebook on improving poverty reduction performance of agricultural water investments should be prepared to help task teams assess the poverty reduction role of agricultural water, to design and implement agricultural water operations maximizing poverty reduction impacts, and to measure results more effectively.

Box 1. A checklist for improving the pro-poor impact of agricultural water projects

Pro-poor policies

- Does the project change land tenure or water rights, and if so does it do so in a pro-poor way?
- Do expected increases in yields, marketable surplus, and incomes accrue fairly to poor farmers?
- Does the project try to minimize displacement and resettlement of poor communities, e.g., by opting for smaller scale infrastructure?
- Are other possible income-generating uses of irrigation water (for example, aquaculture, livestock) enhanced by the project?
- Are domestic water supply and sanitation in rural areas included as specific objectives of the agricultural water project?
- Are complementary services (credit, education, extension, for instance) included in the project and do they particularly target the poor?

Pro-poor technologies

- Do investment and operation costs of the proposed technologies allow access to poor people?
- Have all available technologies for smallholders been considered in the selection process?
- Are there arrangements for pro-poor research and technology transfer?
- Is drainage needed, especially in poorer areas subject to waterlogging and salinity?

Pro-poor water management

- Are the voices of poor men and women adequately heard in water resources allocation decisions—and in selection of the project area, project design, development, and operation?
- Are there in-place mechanisms to help poor farmers strengthen their cooperative negotiation power and make their access to water rights and other complementary services (micro-finance, for example) easier?
- Is adequate technical and administrative support provided to water-users associations, and especially to poor men and women?
- Do cost-recovery arrangements (water pricing) and incentive policies adequately protect the poor (perhaps through block tariffs to protect base water consumption)?
- Are distributional issues, for example, head-ender and tail-ender conflicts, dealt with in an equitable way?

Direct and indirect impacts on the poor

- Does the project generate significant additional employment, both during construction and during subsequent operations?
- Are environmental impacts that may affect the sustainability of the livelihoods of the poor adequately assessed and dealt with?
- Is water quality management adequately considered (by safe disposal of drainage water), especially when water is used for drinking purposes?
- Are health impacts (for example, malaria and bilharzias) considered and mitigated to the extent possible by the project?

Source: Adapted from World Bank 2002 and from Lipton and Litchfield 2003 in World Bank 2006.

The Water Sector Board Practitioner Notes (P-Notes) series is published by the Water Sector Board of the Sustainable Development Network of the World Bank Group. P-Notes are available online at *www.worldbank.org/water*. P-Notes are a synopsis of larger World Bank documents in the water sector.

THE WORLD BANK | 1818 H Street, NW | Washington, DC 20433
www.worldbank.org/water | whelpdesk@worldbank.org