Water Working Notes

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POVERTY ANALYSIS IN AGRICULTURAL WATER OPERATIONS

PHASE 1: REVIEW OF WORLD BANK FINANCED PROJECTS

Salah Darghouth, Christopher Ward, Price Gittinger,
Julienne Roux and Animesh Srivastava

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Disclaimers

Contact Details:

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ACRONYMS

ADB	Asian Development Bank
AFR	Africa Region
CAS	Country Assistance Strategy
CWRAS	Country Water Resources Assistance Strategy
CDD	Community Driven Development
DPL	Development Policy Lending
EAP	East Asia and Pacific Region
ECA	Europe and Central Asia Region
ESW	Economic and Sector Work
FY	Fiscal Year
ICR	Implementation Completion and Results Report
IEG	Independent Evaluation Group
IMT	Irrigation Management Transfer
IRR	Internal Rate of Return
IWMI	International Water Management Institute
LAC	Latin America and Caribbean Region
MDG	Millennium Development Goal
MENA	Middle East and North Africa Region
M&E	Monitoring and Evaluation
NGO	Non Governmental Organization
NPV	Net Present Value
O&M	Operation and Maintenance
PAD	Project Appraisal Document
PIM	Participatory Irrigation Management
PREM	Poverty Reduction and Economic Management Network
PRSP	Poverty Reduction Strategy Paper
PSIA	Poverty and Social Impact Analysis
SAR	South Asia Region
SEMF	Social and Environmental Management Framework
SD	Social Development
WUA	Water Users Association

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EXECUTIVE SUMMARY

Agricultural water[1] has, in the past, been seen as a prime mechanism for fostering economic growth and reducing rural poverty, and agricultural water investments demonstrated particular success during the Green Revolution of the 1960s and 1970s. The 2006 Independent Evaluation Group (IEG) review of agricultural water management projects[2] found that World Bank-financed agricultural water investments over the last decade have, when combined with other factors needed for profitable production, contributed to boosting growth and reducing poverty. However, IEG also found that the projects could have achieved greater poverty reduction impacts if analysis, design and results measurement had been improved. Recent empirical studies reinforce these conclusions, showing that agricultural water investments do reduce poverty, and that attention to pro-poor design of projects can increase poverty reduction impact without straying away from the objective of economic growth and without reducing the efficiency of the investment as a driver of growth.

With this background, a review of the treatment of poverty in recent Bank-financed agricultural water projects was commissioned in order to deepen IEG findings and to operationalize them. It has, of course, to be emphasized that poverty reduction does not necessarily have to be a development objective of agricultural water projects, much less exclusively so. Rather the focus of the review was on whether it is possible to improve the pro-poor impact of agricultural water management projects at the margin, whatever the development objective. With this caveat, the objectives of the review were: (1) to assess the quality and effectiveness of poverty analysis in the most recent Bank-financed agricultural water projects; (2) to evaluate their contribution to poverty reduction and its measurement; and (3) to recommend ways to improve pro-poor results of agricultural water projects and to prepare tools and methodologies that could help achieve this. The review is being conducted in two phases. Phase One, the subject of the present report, was conducted in 2006–7 and covered the first and second objectives. Phase Two, to begin in mid-2007, would be covering the third objective.

The approach followed for Phase One of the review was to carry out an in-depth analysis of a sample of recent projects and of a limited selection of completed projects. This in-depth project review was completed by a review of selected recent empirical studies, by a review of Bank directives, guidelines and analytical material, and by interviews with task managers and with Poverty Reduction and Economic Management Network (PREM) and Social Development (SD) staff.

Agricultural Water Development and Poverty Reduction

A critical priority for the World Bank is promoting broad-based growth, given its proven importance in reducing poverty. Sustainable poverty reduction is achieved by economic growth with a distribution that favors poor people. Poverty reduction strategies therefore focus on policies to achieve two objectives—to boost growth and to increase the participation of poor people in that growth. In addition, other dimensions of poverty, in particular vulnerability and powerlessness, bring to the forefront two other principles for poverty reduction: enhancing security and facilitating empowerment.

Recent empirical work has strengthened the evidence that agricultural water operations reduce poverty. Incidence of poverty is much lower in irrigated than rainfed areas and access to agricultural wa-

[1] Water delivered through irrigation and related water management investments
[2] IEG 2006.

ter reduces the incidence and severity of poverty. Agricultural water enables households to improve crop productivity, grow high-value crops, generate high incomes and employment, and earn a higher implicit wage rate. Income inequality and poverty rates are consistently lower for irrigated areas, and households with access to agricultural water and complementary inputs are less likely to be poor.

Agricultural water reduces poverty through three direct first-round effects: increased food output, higher demand for employment, and higher real incomes. Agricultural water also has longer-run effects on the poor through a multiplier effect that drives an increase in nonfarm rural output and employment as the level of rural spending rises. Risk reduction is also an important poverty-reducing impact of agricultural water: reduced variability of output, employment, and income reduces the poor's vulnerability to risk. Improved opportunities for crop diversification also reduce risk. In turn, reduction in risk allows more productive investments to be made, and lessens the periodic liquidation of capital (e.g., livestock) to tide over times of crisis. Other benefits may also accrue, such as reduced seasonal rural out-migration, and improved girls' attendance at school.

However, despite these poverty-reducing benefits of agricultural water, many irrigated systems are still home to large numbers of poor, and agricultural water can even have direct negative impacts on the poor in situations where adverse social, health and environmental costs of irrigation have not been mitigated and are so high that they outweigh the benefits the poor receive.

The principal factors determining these failures to reduce poverty were found to have been, first, that agricultural water can only reduce poverty if schemes are well managed—poor irrigation performance is associated with higher poverty levels. Secondly, poverty incidence is also generally correlated with position within a scheme—tail-enders are typically poor—and with inequitable land distribution: agricultural water impact on poverty is highest where landholdings—and therefore water—are equitably distributed. Finally, when the poorest groups are the landless, agricultural water may not always be the most efficient poverty reduction strategy.

Based on this evidence, 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 (head- and tail-ender policies, for instance);
- Infrastructure and management are designed with the needs of the poor in mind (for example, equitable governance systems through water user associations);
- There is equity in land distribution;
- Appropriate production technology and crop diversification possibilities are available;
- Support measures such as input supply, output markets and roads are in place; and
- The needs of the landless and of women are understood and taken into account.

Experience has shown that attention to distributional issues in agricultural water projects creates higher poverty reducing impacts without impairing their contribution to growth. There is clearly scope for increasing the poverty-reducing impact of agricultural water investments.

The Challenge of Improving the Poverty Reduction Impact of Bank-financed Agricultural Water Operations

An Opportunity Missed

The analysis of recent projects conducted for the review showed that Bank-financed agricultural water investments can contribute substantially to poverty reduction, even when economic growth is

identified as the main objective rather than poverty reduction. The analysis also showed that projects may achieve more pro-poor impacts if attention is paid to the needs of the poor and to inclusion of pro-poor elements in their design.

In some projects the poverty problem has been analyzed and the project has been designed with the poor in mind. Targets and indicators have been set that illustrate the poverty reduction results, and provision has been made for monitoring of the results. However, many projects are less clear in their poverty-reducing design and results measurement. In most Project Appraisal Documents (PADs) the treatment of poverty is hesitant and scattered. In many cases, even where significant poverty reduction may be achieved, it is not adequately analyzed and measured. In other cases it is likely that changes to project design could have increased poverty reduction effectiveness or mitigated negative impacts on the poor. Sometimes, of course, it may be that poverty impacts have been factored in but the PAD simply does not explain it in those terms.

Despite the likely poverty-reducing impacts of many projects reviewed, and although the quality of pro-poor design and results monitoring has clearly been improving, a number of common characteristics stood out in the review:

- There was rarely a sense of agricultural water projects as part of a coherent *poverty reduction strategy* and many projects did not show links to Poverty Assessments.
- The poverty reduction process supported by the project was often not explicit and the mechanism by which the specific project interventions could reduce poverty was often not clear. The "project logic" in the Results Framework was sometimes not clear and there was generally a loose conception conveyed of what constitutes poverty and poverty reduction.
- *Financial analysis* usually stopped short of distributional analysis, i.e., of saying which income classes, particularly the poor, would get what share of net benefits.
- The *technical design* of projects rarely considered alternative pro-poor options.
- *Social assessment* and *social analysis* addressed some aspects of poverty but without clarity on relationships between social development objectives and poverty reduction. In some cases, the social assessment was inconsistent and not well integrated with other parts of the analysis.
- The relationship of *institutional design* to poverty was not always coherent. Institutional arrangements have a strong impact on the access of the poor and on mitigation of negative impacts, yet the analysis of institutional arrangements often did not explicitly consider the poor.
- *Risks and alternatives* related to poverty were generally not fully considered. The risk that there might be negative impacts on the poor was not addressed in a systematic way, nor was the risk that the poor might not benefit the most. There was virtually no discussion of whether agricultural water was the best poverty reducing investment available.
- The *Results Framework* often did not adequately define poverty targets or intermediate results, and monitoring systems typically did not provide a clear picture of progress against poverty related targets. Employment aspects, important for the landless poor, were often not considered.

Four causes of the characteristics highlighted above are suggested. First, there is a lack of clarity about agricultural water's role in poverty reduction. Despite the evidence that agricultural water can contribute to both growth and poverty reduction, there appears to be an implicit assumption that agricultural water is about growth and that distributional aspects are secondary. Projects tend to be conceived in terms of efficiency leading to increased incomes and employment. The way in which this growth contributes to poverty reduction is often not explicit. Yet these projects no doubt contribute to poverty reduction—and more could probably be done at the margin. The conception of reduction

of non-income poverty is even more vague, scattered among various social development objectives. Because project designers may not consider how agricultural water investment can contribute to the reduction of both income and non-income poverty, projects are not necessarily designed with the poor in mind, and poverty reduction results may not be captured.

Second, there is a lack of strategic focus. At the country level, poverty reduction strategy should drive sectoral investment programs, highlighting the expected contribution of agricultural water investment to growth and poverty reduction and linking irrigation sector reforms and investment to complementary policies in other sectors and to the broad governance and fiscal agendas, all through a pro-poor lens. Strategy should identify the pro-poor entry points for agricultural water, including: equitable distribution of land and water rights, choice of pro-poor technology, pro-poor institutional arrangements, and equitable distribution of subsidies. However, very few poverty reduction strategies place agricultural water within this strategic context. As a result, projects are designed more with chance pro-poor links than as components of a structured approach to poverty reduction.

A third cause appears to be a lack of use of appropriate tools. There does not seem to be any settled methodology for multi-dimensional poverty analysis in projects. There are analytical tools available but their use for poverty analysis is ad hoc. Economic and financial analysis has the information and capacity to do more distributional analysis, to evaluate direct and indirect employment impacts, to assess the impact of financing arrangements on the poor, and to evaluate impacts on poverty in the broader economy beyond the farm level. However, there is no clear methodology for linking the economic and financial analysis to poverty analysis. While aspects of the poverty reduction problem are addressed in social analysis conducted by social development specialists and poverty analysis conducted by PREM, at the project level there is lack of a systematic framework for capturing various poverty-relevant impacts from agricultural water projects. The Results Framework can target and monitor objectives and intermediate results related to poverty reduction, but only if there is a focus on poverty reduction objectives in the project.

Finally, there is a lack of knowledge and incentives to address the poverty issue. Task team leaders have the skills and incentives to deliver well-defined projects with clear, measurable and achievable outputs and growth outcomes. Adding the distributional dimension to such a growth-oriented design and factoring in poverty to an agricultural water project demands knowledge of how to manage multi-dimensional poverty analysis. It calls for effort and creates risks for which the reward in terms of internal incentives is not usually commensurate. In addition, the extra effort will have a budgetary cost (although this can be limited by management of synergy between the analyses).

It is certainly possible to improve poverty reduction impacts in Bank-financed agricultural water projects through better analysis and design, and the poverty reduction impacts 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 a sharper strategic focus, and by better analytical techniques—or by the 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. There are cost implications but these can be limited by better use of existing resources.

Change is not without cost and risk, but in the case of agricultural water projects there are three reasons why change is worthwhile. First, improving and demonstrating poverty reduction impacts would revive and reposition the sector and be a powerful argument for increased investment. Second, improved design and results measurement would add value and contribute further to poverty

reduction. Third, the changes required are more in terms of better linkages and synergy than a wholesale change in the way of doing business, so that although lead time, training requirements and costs are inevitable, they need not be excessive, and results could be expected in the nearer term.

Next Steps and the Proposed Phase Two

A draft of this report was issued on November 8th, 2006. Findings were also presented during Water Week in February 2007. The draft report was then circulated to peer reviewers and to the regions, and a considerable number of comments were received. On the basis of these comments, the report has been finalized, in preparation for the start of Phase Two, which is to recommend ways to improve pro-poor results of agricultural water projects and to prepare tools and methodologies that could help achieve this.

Based on the analysis in this paper and on reviewers' comments and recommendations, it is proposed that Phase Two be devoted to the preparation of a *Sourcebook on Improving Poverty Reduction Performance of Agricultural Water Investments*, comprising guidance notes, case studies and other documentary resources. The objective of the sourcebook would to help task teams in assessing the poverty reduction role of agricultural water and in designing and implementing agricultural water operations to maximize poverty reduction impacts and to measure results more effectively. This proposal is based on two considerations that emerged from the present report and the discussion on it.

Poverty reduction in Bank agricultural water work can be improved by the better use of largely existing knowledge and tools. The findings of the present report confirm that with the right knowledge, tools and organization, task teams could improve the consideration of agricultural water in relation to poverty reduction at the macro and sectoral level, increase poverty reduction impacts in agricultural water projects, and target and measure project poverty reduction impacts better. In addition, the report showed that the conduct and presentation of poverty related analysis could be improved. The rationale for the Phase Two proposal is therefore that an improvement to poverty reduction work in agricultural water can be largely achieved by improving the way in which task teams use what already exists. The next step does not require empirical or analytical work but the documentation of approaches and tools and the design of a dissemination and education plan to equip task teams with the necessary knowledge and skills.

The needed knowledge and tools can be captured in a user-friendly document, which provides the rationale for proposing the sourcebook format. Overall, there was agreement among reviewers of the draft of the present report that a well-structured sourcebook to guide task teams would be the best way to put the required knowledge and skills at the disposal of task teams. More normative approaches such as guidelines were felt to be less appropriate as the objective would be to empower task teams rather than to burden or trammel them. A sourcebook would:

- Capture all aspects of the subject in a comprehensive way;
- Explain the importance of poverty reduction in agricultural water, and the potential for its application across the broad spectrum of the Bank's work, from PRSP to project design and implementation;
- Provide a series of notes on tools and techniques that would provide specific guidance to task teams; and
- Contain a range of documentary resources to assist users in the design and implementation of poverty analysis and its use to enhance poverty reduction outcomes

In pursuing Phase Two, it would be useful also to establish contacts with the broader agricultural water community to gauge interest in collaborating or sharing the work: IWMI, the CGIAR Challenge Program, FAO, IFAD, ADB and other agencies may be interested. BNWPP could be interested in supporting the development of the sourcebook and the piloting of its use.

INTRODUCTION

Agricultural water has, in the past, been seen as a prime mechanism for fostering rural economic growth and reducing rural poverty. Agricultural water investments demonstrated particular success during the Green Revolution of the 1960s and 1970s. However, agricultural water has encountered well-known problems of performance, profitability and sustainability, and investment has been declining. The share of World Bank lending for agricultural water operations that reached 11% of all World Bank commitments in the late 1970s had fallen to less than 2% by 2000. Project monitoring and evaluation has often not made the poverty reducing impact of agricultural water investments clear, and questions have been asked about whether agricultural water is in fact pro-poor.

Since the World Development Report 2000/2001 on "*Attacking Poverty*" (World Bank 2000) and the universal adoption of the Millennium Development Goals (MDGs), the World Bank's focus on poverty reduction has been sharpened. In 2005, the Agriculture and Rural Development Department (ARD) finalized *Agricultural Growth and the Poor: An Agenda for Development* to help focus the Bank's rural lending—including lending for agricultural water—on poverty reduction. IEG also undertook a review of the agricultural water portfolio over the period 1994–2004 (IEG 2006), which, among other things, assessed the extent to which agricultural water projects are contributing to the Bank's focus on poverty reduction. (See box 1)

Box 1 IEG Findings Related to Agricultural Water Management Projects and Poverty Reduction

In 2005/6 IEG undertook a review of the agricultural water portfolio over the period 1994–2004, which, among other things, assessed the extent to which agricultural water projects are contributing to the Bank's focus on poverty reduction. The main findings related to agricultural water management projects and poverty reduction were:

Agricultural water boosts growth and reduces poverty directly and indirectly. Poor farmers benefit from increased incomes and food availability, the landless benefit from increased employment and higher wages, and the poor generally benefit from the economic growth. The poor also benefit from lower food prices and better food availability. However, supplying agricultural water alone is not enough: agricultural water may not reduce poverty unless accompanied by other complementary interventions.

Design of Bank agricultural water management projects for poverty impacts is weak. Most projects lack a results chain that links their interventions to growth and poverty reduction outcomes and impacts. The beneficiaries need to be more clearly characterized, gender needs more attention, targeting needs to be improved, and land and water asset ownership requires more focus.

Targeting and measuring poverty reduction is done for a minority of projects. Only 24% of dedicated agricultural water management projects stated a poverty reduction objective. M&E provides inadequate information on progress towards poverty alleviation and the MDGs: less than one fifth of projects report how many people overall benefit or the distribution of benefits. M&E systems are good at tracking inputs and outputs, but are not good at reporting outcomes and impacts. Only one fifth of projects sampled had good "poverty indicators" and only 11% of projects had the tools for rigorous impact assessment.

Social assessment is not finding out who the poor are nor why they are poor. The social assessment done for many projects fails to identify who are the poor, and projects fail to target the poor or to gauge impacts on incomes and employment. Often there is inadequate information on social impacts such as which beneficiaries are women, who are water user association members etc.

Investment in I&D has declined but relevance can be increased by demonstrating poverty linkages. The relevance of agricultural water management can be increased through better analysis of links to economic growth and more attention to demonstrating social impact and poverty reduction. The assessment of social impacts needs to be improved, particularly the distribution of benefits, and related M&E needs to be improved. Key to all this will be staff skills which need to integrate engineering capability with understanding of institutional issues and social concerns, including poverty.

Adapted from: IEG 2006

IEG found that agricultural water investment, when combined with other factors needed for profitable production, has in fact contributed to boosting growth and reducing poverty, but that agricultural water projects could achieve greater poverty reduction impacts if analysis and design were improved. In particular, the study (Box 1) found that more could have been done to target and measure poverty reduction: only a quarter of agricultural water projects reviewed by IEG set a poverty reduction objective, and less than one fifth reported how many people overall benefited or reported the distribution of benefits between income classes.

Recent empirical studies have confirmed IEG findings on the positive impact of agricultural water investment on poverty. The major 2005 study on *Pro-Poor Intervention Strategies in Irrigated Agriculture in Asia* (ADB/ IWMI 2005) confirmed that agricultural water investment does reduce poverty, and that attention to pro-poor design of agricultural water projects can increase their poverty reduction impact without reducing their efficiency as drivers of growth.

The Review

With this background, a more in-depth review of the treatment of poverty in recent Bank-financed I&D projects was commissioned in 2006. The purpose of the review is to take the IEG findings a step further and to operationalize them: if agricultural water operations have good potential to contribute to poverty reduction but analysis and design have fallen short, what steps are needed to improve project quality and maximize poverty reduction impacts? It must, of course, be emphasized that poverty reduction does not necessarily have to be a development objective of agricultural water projects, much less exclusively so. Rather the focus of the review is on whether it is possible to improve the pro-poor impact of agricultural water management projects at the margin, whatever the development objective. With this caveat, the review has three specific objectives:

1. To assess the quality of the poverty analysis, including the economic and financial analysis, and impact identification and measurement, and the effectiveness of the different analytical tools currently used
2. To evaluate the extent to which the resulting projects contribute to poverty reduction, and to assess the strength of the Monitoring and Evaluation (M&E) systems proposed for tracking the expected pro-poor results; and
3. To recommend ways to improve the design, appraisal, impact analysis and measurement, and M&E processes in order to enhance pro-poor results, and to prepare tools and methodologies that could help achieve this.

The review is being conducted in two phases, with a break point for consultation and decision. Phase One covered the first and second objectives above, and its results are the subject of this report. A draft Phase One report was issued on November 8th, 2006. Findings were presented during Water Week in February 2007. The draft report was then circulated to peer reviewers and to the regions to (a) validate, correct and improve the analysis, conclusions and recommendations of the report; (b) gauge interest in following up on Phase Two; and (c) gather ideas on the ways forward. Considerable comment and guidance was received, on the basis of which the report was finalized and a proposal for Phase Two, covering the third objective, was drawn up (see 4.4 below). Preparation of Phase Two is underway and is expected to be completed by March 2009.

Audience

The audience for this Phase One report includes Bank task teams involved in agricultural water, PREM staff in the center and regions concerned with the effort to improve pro-poor investment performance, and social development staff in the center and regions involved in social assessment and

analysis at both the macro/sectoral level and at project level. The target audience also includes project managers and practitioners from outside the Bank.

Phase One Approach

The approach followed for Phase One of the review was to carry out an in-depth analysis of a sample of recent projects together with a limited selection of completed projects (see Table 1). It was felt that an in-depth analysis of a relatively small sample of projects would provide more significant lessons than a brisker analysis of a large sample. For the present review, 21 representative projects were selected from the FY04 and FY05 cohort of 28 new agricultural water projects, and an additional six completed projects were added, selected on the basis of their stronger ratings on poverty analysis in the IEG study. No consideration of the objectives of these projects was made in this selection; some would have specific poverty reduction objectives, others would not. The idea was to see how poverty is treated in a broad sample of agricultural water projects, and to see if more might have been done.

Of the 27 projects reviewed, 18 were dedicated agricultural water projects, for which irrigation was the primary sector, and nine were non-dedicated, i.e., projects where irrigation was only one among several components, was typically not the institutional focus, and usually accounted for 25% or less of project investment. Non-dedicated projects were typically community driven development (CDD) operations, which generally had: (1 a specific poverty reduction mandate; (2) well developed targeting mechanisms and (3) much less specificity about design and expected outcomes, due to their demand-driven nature. Because of the significant difference in characteristics, dedicated and non-dedicated projects were analyzed separately. This in-depth project review was completed by a review of selected recent empirical studies, by a review of Bank directives, guidelines and analytical material, and by interviews with task managers and with PREM and social development staff.

Organization of This Report

This report is organized in four linked chapters. Chapter 1 reviews findings from the literature about the contribution of agricultural water to poverty reduction. Chapter 2 assesses poverty analysis in recent World Bank-financed agricultural water projects. Chapter 3 examines the extent to which the projects reviewed were in fact likely to contribute to poverty reduction and measurement. Chapter 4 summarizes the analysis and reviews options for improving poverty analysis and poverty reduction impacts and measurement in future agricultural water operations.

Table 1 The projects selected for review

A. Recently appraised projects (FY04–FY05)			
Dedicated Projects			
Region	**FY**	**Project**	**Percentage Agricultural Water**
AFR	05	Ghana Community Based Rural Development	20
AFR	05	Mauritania Integrated Development Program for Irrigated Agriculture II	25
AFR	04	Nigeria Second National Fadama Development	30
EAP	04	Vietnam Water Resources Assistance	80
ECA	04	Albania Water Resources Management	60
ECA	04	Armenia Irrigation Dam Safety II	53
ECA	04	Romania Irrigation Rehabilitation	94
LAC	04	Mexico Integrated Irrigation Modernisation	87
MENA	05	Egypt Integrated Irrigation Improvement and Management	94
MENA	05	Iran Alborz Integrated Land and Water Management	90
MENA	04	Yemen Groundwater and Soil Conservation	68
SAR	05	India Madhya Pradesh Water Sector Restructuring	80
SAR	05	India Maharashtra Water Sector Improvement	84
SAR	04	Pakistan Sindh On-Farm Water Management	80
Non-Dedicated Projects			
AFR	04	Chad Agricultural Services and Producer Organizations	20
EAP	05	Indonesia Initiatives for Local Governance Reform	15
ECA	04	Turkey Anatolia Watershed Rehabilitation	13
LAC	05	Uruguay Integrated Natural Resources and Biodiversity Management	20
SAR	05	Bhutan Decentralized Rural Development	18
SAR	04	Nepal Poverty Alleviation Fund	26
SAR	04	Pakistan Second Poverty Alleviation Fund	5
B. Completed projects			
Dedicated Projects			
Region	**FY**	**Project**	**Percentage Agricultural Water**
AFR	95	Niger Pilot Private Irrigation	85
LAC	97	Peru Sierra Natural Resources Management and Poverty Alleviation	42
SAR	97	India Andhra Pradesh Irrigation III	85
SAR	99	India Uttar Pradesh Sodic Lands Reclamation II	60
Non-Dedicated Projects			
EAP	96	Indonesia Nusa Tengara Agricultural Area Development	20
LAC	95	Brazil Rural Poverty Alleviation – Ceara	22

Note: Throughout this paper, projects are referred to by the country name alone, except where more than one project in one country has been reviewed.

1 AGRICULTURAL WATER DEVELOPMENT AND POVERTY LINKAGES: EMPIRICAL RESEARCH FINDINGS

This chapter reviews findings from the literature about the contribution of agricultural water to poverty reduction. It summarizes the linkages between agricultural water, growth and poverty reduction (Section 1.1), and reviews the empirical evidence that agricultural water reduces poverty and assesses the risk and limitations of agricultural water as a poverty reducing investment (Section 1.2). A final section (Section 1.3) then summarizes from the literature the factors that contribute to maximizing the impact of agricultural water on poverty reduction.

1.1 Growth, Distribution and Poverty Reduction Through Agricultural Water

In the World Development Report 2000/2001, the World Bank defines poverty as "pronounced deprivation in well-being" (World Bank 2000). It recognizes that poverty has many dimensions, including not only material deprivation, as measured by income or consumption, but also low achievements in education and health, vulnerability, exposure to risk, and finally voicelessness and powerlessness. This understanding brings to the fore contributions of different areas of action for the poverty reduction agenda and suggests different measures of poverty reduction. The World Bank identifies three major principles for poverty reduction: (1) promoting opportunity; (2) enhancing security; and (3) facilitating empowerment.

Within this broad framework, a critical priority for the World Bank is promoting broad based growth, given its proven importance in reducing poverty.[3] Sustainable poverty reduction is achieved by economic growth with a distribution that favors poor people. Empirical evidence shows that the speed of poverty reduction is strongly related to the pace of overall economic growth and that greater poverty reduction occurs when poor people have the capacity to participate in growth. Poverty reduction strategies therefore focus on policies to achieve two objectives—to boost growth and to increase the participation of poor people in that growth.

Because the majority of poor people live in rural areas and draw their livelihoods from agriculture, raising the incomes of poor farmers is one of the most important components of poverty reduction strategies. Empirical evidence on poverty reduction in 14 countries in the 1990s (World Bank 2005a)[4] showed that five interventions were important in helping to raise the agricultural earnings of poor households:

- Improving market access and lowering transaction costs
- Strengthening property rights for land
- Creating an incentive framework that benefits all farmers
- Expanding the technology available to smallholders
- Helping poorer and smaller producers to deal with risk

Well-designed agricultural water investment has the potential to contribute to all five of these mechanisms. Indeed, production is generally geographically concentrated with a critical mass of output that, if big enough, can create market channels, drive investment in transport infrastructure and reduce transaction costs through economies of scale and production of higher value produce. Land and water rights typically have to be specified up front for agricultural water development, so that poor farm-

[3] World Bank Operational Procedure 1.00. Operational Manual (World Bank 1994)
[4] This resulted from an AfD, BMZ, DfID and World Bank research program on *Operationalizing Pro-Poor Growth*.

ers participating can benefit from stable property rights. Agricultural water requires an overall agricultural incentive framework that allows higher value production; otherwise farmers will not invest. Public agricultural water development would usually provide for relatively small farms; therefore, if the investment is well-designed and profitable, this implies that the incentive framework provides adequate incentives for profitable production at the scale of smallholders. Agricultural water, by its nature, expands the technology available to smallholder producers, not only in terms of improved water management but also in terms of associated improvements in high yielding varieties and more intensive husbandry patterns. The Green Revolution amply demonstrated the poverty reducing impact of the association of agricultural water and complementary improved technologies.[5] Finally, investments in irrigation, drainage and flood control reduce the risks faced by poor smallholders and increase farming returns by improving the predictability of water availability and so reducing crop losses and allowing investment in more intensive production strategies.

As for the other two main channels for poverty reduction identified by the World Bank, agricultural water investments both have the potential to enhance security and improve empowerment. On the one hand, farmers' vulnerability to climate variability is particularly acute in rainfed agriculture, with delayed rainfall, small floods, or droughts that result in crop losses and decrease in income and employment. Agricultural water investments are key to securing the water supply and ensuring the drainage of excess water. On the other hand, the paradigm for agricultural water development now links improvements in the physical infrastructure to institutional development, which seeks to build the social and human capital of communities and organizations, such that they are better able to manage the physical infrastructure. Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT) have been the focus of many interventions since the early 1990s.

Thus. prima facie, the characteristics of successful agricultural water operations are well-adapted to poverty reduction. As a corollary, pro-poor agricultural policies are likely to reinforce the growth and poverty reduction impacts of agricultural water. However, it will be evident that actual experience often falls short of this paradigm. The challenge is precisely how to improve the performance of agricultural water operations so that significantly more of the poverty reduction potential can be realized.

1.2 Empirical Findings on the Impacts of Agricultural Water on Poverty Reduction

Given the above-discussed potential of agricultural water investment to reduce poverty, what is the evidence? Until recently, studies were localized and sporadic but some recent empirical work, notably an ADB/IWMI study of 26 irrigation schemes across six countries in Asia (ADB/IWMI 2005) provided a considerable body of evidence on the poverty reduction impact of agricultural water. This section largely summarizes the ADB/IWMI findings.

1.2.1 Findings That Agricultural Water Investment has Reduced Poverty

Incidence of poverty is much lower in irrigated areas than rainfed and access to agricultural water reduces the incidence and severity of poverty. Agricultural water enables households to improve crop productivity, grow high-value crops, generate high incomes and employment, and earn a higher implicit wage rate. The review of 120 published studies on the "irrigation poverty nexus," conducted as part of the ADB/IWMI study, shows that cropping intensities and yields are higher for irrigated than for rainfed agriculture. Employment and wage rates, too, are higher in irrigated areas, with a 50 percent

[5] This is an example of the need pointed out by IEG (see *Introduction*) for investment in agricultural water to be combined with other factors such as inputs and capacity building.

differential not uncommon (Hussain and Hanjra 2004). This has an impact on income inequality and on poverty rates. Overall, the ADB/IWMI study shows that income inequality and poverty rates are consistently lower for irrigated areas, and households with access to agricultural water and complementary inputs are less likely to be poor.

Agricultural water reduces poverty through three direct first-round effects: increased food output, higher demand for employment, and higher real incomes. The poor will have better access to food; this will include not only the irrigated producers themselves, but also poor rural laborers, poor net food purchasers in rural areas, and the urban poor (Lipton and Litchfield 2003). The poor with access to irrigated land enjoy higher employment and there is a positive link between agricultural water and labor demand generally. Reliable and adequate agricultural water raises employment, and this effect increases with increased cropping intensity. Real incomes are higher in irrigated areas, which have more work all year round. In villages with high intensities of irrigation, employment is almost continuous, creating a continuous flow of cash and food to the household. Irrigation also benefits laborers through an increase in daily wage rates, more stable conditions of employment and income, and lower food prices (Lipton and Litchfield 2003).

Indirect effects of agricultural water are even stronger than the direct productivity-related impacts. Agricultural water has longer-run effects on the poor through a multiplier effect that drives an increase in nonfarm rural output and employment as the level of rural spending rises.[6] The ADB/IWMI study also found an "investment multiplier" effect: public sector investments in canal irrigation attract private investment in both irrigated agriculture and in the local economy generally.

Risk reduction is an important poverty reducing impact of agricultural water. Reduced variability of output, employment, and income will reduce the vulnerability of the poor to risk. This stability can increase food security and reduce dependence on borrowing. The better opportunities for crop diversification also reduce risk: a study of the Udawalwe scheme in Sri Lanka showed that household level severity of chronic poverty varies inversely with the crop diversification index (Lipton and Litchfield 2003; Hussain and Hanjra 2004).

Social benefits may also accrue. Agricultural water has been linked, for example, to such diverse effects as reduced seasonal rural out-migration, and girls' attendance at school.

1.2.2 Findings That There Are Risks and Limitations to Agricultural Water as a Poverty Reducing Investment

Despite the evident benefits of agricultural water, many irrigated agricultural systems are still home to large numbers of poor. The ADB/IWMI study found that 38% of households on the schemes surveyed were poor, with levels as high as 65% on schemes in Pakistan.[7] There is also more poverty among some social groups than others. The ADB/IWMI study found that poverty levels are highest in marginal areas, downstream sites and areas where canal water is in short supply or the quality of groundwater is poor. Poverty tends to afflict particularly the agriculture-dependent landless and households where the sole breadwinner is usually a woman.

Agricultural water can even have direct negative impacts on the poor in situations where adverse social, health and environmental costs of irrigation have not been mitigated and are so high that

[6] The size of the multiplier effect varies considerably. ADB/IWMI 2005 quotes rates ranging from 1.2 for areas in India to 6.0 for New South Wales. IEG 2006 points out that multipliers are typically estimated to be much lower for smallholder farming systems.

[7] By contrast, poverty rates are as low as 6 percent on schemes in "pro-poor" China and Vietnam, where irrigation has been part of a poverty reduction strategy.

they outweigh the benefits the poor receive. The health and nutrition impacts of agricultural water on the poor may be mixed. For example, irrigation may encourage waterborne diseases due to inadequate drainage (particularly the spread of *Anopheles* mosquitoes and schistosomiasis snails) and due to untreated contaminated water. The poor are more vulnerable to such waterborne diseases. The poor are also more likely to suffer negative environmental impacts because they frequently face resettlement, and are more likely to be tail-enders and so suffer the consequences of indifferent water services and inadequate drainage. There may also be anti-poor impacts on land and product prices. Higher profitability in irrigated areas may be consolidated into land prices and rents, excluding the poor from access (Lipton and Litchfield 2003). One other social condition that may produce a negative impact is elite capture of water even in local institutions created to manage the irrigation facility. There are examples of this in water user associations in rural Bangladesh and northern Thailand.[8]

The principal factors determining these failures to reduce poverty were found to have been:

- *Agricultural water can only reduce poverty if schemes are well managed*. Poor irrigation performance is associated with higher poverty levels. Well-maintained infrastructure improves the impact of agricultural water on poverty, while poor maintenance leads to erratic water service, and waterlogging and salinization, which adversely affect the poor tail-enders. The ADB/IWMI study found that systems transferred to autonomous management or with participatory management styles, and with levels of water charges adequate to make schemes sustainable, performed better in delivering water equitably—and so were more pro-poor. Design of water charges can also affect pro-poor outcomes: in Pakistan, farmers are charged according to cropping intensity, which penalizes poor farmers with small plots who tend to double crop. Overall, evidence from the first round of reforms suggests that agricultural water management reform benefits the poor, provided that land holdings are fairly equitably distributed (ADB/IWMI 2005).
- *Position within an irrigation scheme is generally correlated with poverty incidence*. Head- and tail-ender positions affect agricultural productivity—and therefore income and poverty. The ADB/IWMI study shows that areas receiving less water per ha have lower productivity and higher poverty rates. For example, in ten irrigation areas of Pakistan, wheat yields were found to average 1.7–3.4 tons/ha at the head, but only 1.2–2.9 tons/ha at the tail end (Hussain and Hanjra 2004).
- *Agricultural water impact on poverty is highest where landholdings—and therefore water—are equitably distributed*. The difference in antipoverty impacts of irrigation improvements between Sri Lanka and Pakistan (Box 2) is primarily a function of access to land, and also of the extent to which project interventions targeted the poor to correct for initial inequalities (Hussain and Hanjra 2004). In the Pakistan case (where as many as 65% of households on schemes remained poor, see above), up to half of households were landless and land ownership was highly skewed.
- *Agricultural water may not always be the most efficient poverty reduction strategy*. For example, in some areas of China and India, other investments were found in one study to have more favorable benefit-to-cost ratios and higher impact on the poverty headcount than irrigation. These investments included roads, education, research and development, and poverty-targeted rural finance. However, some investments, such as electricity, performed less well than irrigation (World Bank 2005c).[9] A number of studies have found that investments in infrastructure can be most effective in some cases when used in packages (World Bank 2005b).

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[8] From a personal communication by Prof. Alain Vidal.

[9] IEG 2006, however, quotes an econometric study using state-level data for India 1970–94 (Bhattarai 2004) showing that the impact of irrigation on reducing poverty was even higher than that of rural literacy, and significantly higher than roads, fertilizer and modern varieties.

Box 2 Reasons for Differences in the Poverty Reduction Impacts of Agricultural Water Improvements in Sri Lanka and Pakistan

Improvement of selected irrigation systems in Sri Lanka benefited the poor more than other farmers on the schemes, whereas in Pakistan the effect was the opposite—the better off benefited the most. The reasons were that in the Sri Lanka schemes:

- Inequity in land distribution systems was low (in Pakistan it was very high).
- Landlessness was not common (in Pakistan it was high and increasing).
- All irrigation infrastructure was improved uniformly without regard to size of landholding, and the improvements were targeted to the poor (in Pakistan, there was no targeting to the poor).
- Improvement and subsequent governance systems have increased crop water productivity and incomes for the poor (in Pakistan, many of the benefits went to the non-poor).

Source: Hussain and Hanjra 2004

1.3 Maximizing the Impact of Agricultural Water on Poverty Reduction: Lessons From Experience

The findings of studies summarized above confirm that agricultural water can reduce poverty for irrigated farmers. The ADB/IWMI study in particular concluded that agricultural water investments can be pro-poor without reducing their efficiency as drivers of growth. Based on the evidence, 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 (head- and tail-ender policies, for instance)
- Infrastructure and management are designed with the needs of the poor in mind (for example, equitable governance systems through water user associations)
- There is equity in land distribution
- Production technology, cropping patterns and crop diversification are available
- Support measures such as input supply, output markets and roads are in place
- The needs of the landless and of women are understood and taken into account

The ADB/IWMI study also concluded that the poverty-reducing impact of agricultural water investments can be increased. The study found that attention to distributional issues—i.e., which income classes, particularly the poor, get what share of net benefits—creates higher poverty reducing impacts. For example, China and Vietnam have focused on ensuring broad access to land and irrigation water, and to rural development as a whole, and the success of those countries in reducing poverty through irrigation has been remarkable. Although farm sizes are typically very small, productivity is very high and net benefit per hectare is two to four times higher than in

Pakistan and China: Contrasting Distribution of Irrigation Assets and Benefits

Pakistan	Relatively large farms (4.3 ha average) Skewed land ownership (Gini coefficient of 0.51) Low productivity ($448/ha) High landlessness (28%) **Very high poverty incidence (52%)**
China	Very small farms (0.7 ha average) Equal land ownership (Gini coefficient of 0.19) Very high productivity ($1,661/ha) Zero landlessness **Low poverty incidence (7%)**

South Asian countries such as Pakistan, Bangladesh and India where access to land and water is more skewed (see Table 2). In fact the contrasts are remarkable (See the examples of Pakistan and China in the inset). ADB/IWMI conclude that irrigation could have benefited the poor more in South Asia if more attention had been paid to distributional issues.

Additionally, the ADB/IWMI study found that larger poverty impacts can be realized by integrating investments in irrigation infrastructure, management and service delivery.

Based on experience, there is clearly scope for increasing the poverty-reducing impact of agricultural water. The next two chapters will explore to what extent the design of recent Bank-financed agricultural water projects has maximized the poverty reducing potential of agricultural water.

Table 2 Land and Water Factors Affecting Poverty in Irrigated Areas

	Farm size (ha)	*Gini coefficient*	*Productivity ($/ha/year)*	*Poverty headcount (%)*	*Landlessness (%)*
Bangladesh	0.9	0.70	$692	46%	15%
India	2.4	0.53	$985	40%	37%
Pakistan	4.3	0.51	$448	52%	28%
China	0.7	0.19	$1,661	7%	0
Vietnam	0.4	0.25	$1,577	15%	0
Indonesia	0.7	0.57	$1,002	41%	20%

Source: Adapted from ADB/IWMI 2005

2 POVERTY ANALYSIS IN BANK-FINANCED AGRICULTURAL WATER PROJECTS

Chapter 1 discussed the evidence that agricultural water can contribute to poverty reduction. The chapter suggested an analytical framework for linking agricultural water interventions to factors known to reduce poverty (Section 1.1), examined the empirical evidence on how agricultural water has or has not reduced poverty (Section 1.2), and drew lessons for maximizing the poverty reducing impact of agricultural water projects (Sections 1.3). Building on this background, the present chapter reviews how poverty analysis has been conducted in recent Bank-financed agricultural water projects. The chapter first attempts to define what factors may need to be considered in a poverty analysis of agricultural water interventions, and to list the tools and methodologies generally used in World Bank project appraisals which might contribute to that poverty analysis (Section 2.1). Subsequent sections of this chapter then make a *preliminary assessment of how effectively those instruments have been used* at the macro and sectoral level (Sections 2.2) and at the project and farm level. The discussion in this chapter of poverty analysis in project design and appraisal is completed by a discussion in Chapter 3 of the extent to which resulting project design was pro-poor.

2.1 Poverty Analysis Methodology for Agricultural Water Operations

2.1.1 Factors to be Considered in a Poverty Analysis of Agricultural Water Projects

Conceptually, it is suggested that poverty analysis of agricultural water investments requires analysis of three levels of factors.

- At the macro and sectoral levels, the analysis would need to characterize the poverty problem, using poverty and socio-economic data at the national, regional and local levels. The analysis would also need to examine policy factors such as investment policy, land policy, price and cost recovery policy, agricultural and rural development policy, and policy on the institutional set up for agricultural water management. The analysis might also address the legal and regulatory framework and judicial process to capture issues of accountability, enabling environment and enforcement.
- At the project level, the analysis would need to characterize poverty problems in the project area, using poverty and socio-economic data for the local population. The analysis would then need to examine: economic factors such as the profitability of the production package and arrangements for marketing; organizational factors such as the efficiency and financial autonomy of the water service provider, and arrangements for farmer organization; technical factors such as the technology proposed and arrangements for technology transfer; institutional factors such as land and water rights; and social factors such as gender and ethnicity.
- At the farm level, the analysis would have to look at the underlying structural factors driving poverty at the household level such as land tenure, water distribution, cropping patterns, and household attributes.

For illustration purposes, Table 3 shows how poverty analysis, coordinated at these three levels, can be linked to the analytical framework developed above (Section 1.1) and to the lessons of experience highlighted in Section 1.3.[10]

[10] This illustration is provided only as a basis for reflection and discussion: if appropriate, the illustration could be further developed in Phase Two of the review, the preparation of tools and methodologies.

Table 3 Sample Checklist for Poverty Analysis in Agricultural Water Operations

	Macro and sectoral level analysis	*Project level analysis*	*Farm level analysis*
Identifying the poverty challenge			
	What is the nature of the poverty problem at the national and regional level?	Who are the poor in the project area and what are their characteristics?	What are the factors driving poverty at the household level?
Interventions reducing poverty			
• Improving market access and lowering transaction costs	Is there a market-driven agricultural water development strategy?	Are agricultural water investments accompanied by complementary development in infrastructure and marketing?	How can the poor and landless benefit from market opportunities (e.g. through cooperatives?)?
• Strengthening property rights for land and water	Is there a stable framework for land and water rights and governance?	Are land and water rights secure in the project area?	And are those rights equitably distributed?
• Creating an incentive framework that benefits all farmers	Is there a market-based incentive system for irrigated agriculture (including cost recovery)?	Are production packages and cropping patterns for typical farmers profitable? Does the cost recovery regime ensure project financial viability?	Do expected increases in net incomes and employment accrue equitably to the poor and lift a fair proportion out of poverty?
• Expanding the technology available to smallholders	Are research and extension producing solutions for the poorest farmers?	Does project design account for the situation of the smallest farmers and the landless (e.g. labour intensive cropping and processing)	Are the poorest able to adopt the technology (e.g. do they have access to credit)?
• Helping poorer and smaller producers to deal with risk	Does the institutional framework for agricultural water promote efficient water service providers and accountability?	Is the project organization well managed and providing efficient water service?	Is there provision to ensure that the poorest producers at least have a fair share of water (e.g. tail enders)?

Source: Authors

World Bank tools for poverty analysis in projects

There is no formal requirement for the analysis of poverty issues in project appraisals of World Bank financed projects,[11] there is no specific section of the Project Appraisal Document (PAD) that requires discussion of poverty, and there is no guideline on poverty analysis in projects. However, a number of tools are used that typically involve some aspects of poverty analysis.

At the macro and sectoral level, issues of agricultural water and poverty reduction may be analyzed through the Poverty Reduction Strategy Paper (PRSP) or Country Assistance Strategy (CAS), or through sector-specific instruments such as the Country Water Resources Assistance Strategy (CWRAS) or sector studies under Economic and Sector Work (ESW). The poverty impacts of agricultural water sector

[11] Apart from a general requirement that economic analysis examines consistency with poverty reduction strategy. See below, Section 2.3.

reform programs may be analyzed through the Poverty and Social Impact Analysis (PSIA) tool. Poverty and socio-economic data would be collected through national household surveys and analyzed in Poverty Assessments.

At the project and farm level,[12] a social assessment would usually be carried out during project preparation. At appraisal, three mandatory analyses are required which may involve review of poverty aspects: economic and financial analysis; technical analysis; and social assessment.[13] Poverty-related results and indicators are set in the Results Framework. Sector-wide issues affecting a project can be analyzed through a PSIA approach.

The potential use of these various tools is summarized in Table 4. The way in which they have been used in the appraisal of World Bank agricultural water projects is discussed below (Sections 2.2 and 2.3).

Table 4 The Tools Used for Poverty Analysis in World Bank-Financed Agricultural Water Projects

Increasing Poverty Impact Requires Analysis of Three Levels of Factors:	*Analysis Can Be Through Different Tools:*
At the macro and sectoral levels:	
• Poverty and socio-economic data at the national, regional and local levels.	Poverty Assessment, National Household Surveys
• Policy factors such as investment policy, land policy, price and cost recovery policy, agricultural and rural development policy, and policy on the institutional set up for agricultural water management.	PRSP, CAS, CWRAS, sector studies. Specific policy reforms can be analyzed through a PSIA approach.
At the project level:	
• Poverty problems in the project area, using poverty and socio-economic data for the local population.	Social Assessment
• Economic factors such as the profitability of the production package and arrangements for marketing; organizational factors such as the efficiency and financial autonomy of the water service provider, and arrangements for farmer organization; technical factors such as the technology proposed and arrangements for technology transfer; institutional factors such as land and water rights; and social factors such as gender and ethnicity, or interest and influence of stakeholders	Analyzed at the project level through Social Assessment carried out during preparation and through economic & financial, technical and social analyses at appraisal. Poverty-related results and indicators are set in the Results Framework. Sector-wide issues affecting a project can be analyzed through a PSIA approach
At the farm level:	
• The underlying structural factors driving poverty at the household level such as land tenure, water distribution, cropping patterns, and household attributes	Analyzed at the project level through Social Assessment carried out during preparation and through economic & financial, technical and social analyses at appraisal. Poverty-related results and indicators are set in the Results Framework.

[12] In practice, analysis of factors at project and farm level is designed to answer a series of connected questions and is usually performed at the same time and largely using the same tools. Therefore, although it is important to bear in mind the distinction, analyses of project and farm level factors are from now on treated together in this report.
[13] Environmental analysis may also raise poverty-related issues. In addition, appraisal involves a mandatory review of the applicability of safeguard policies, of which at least two may require an analysis of poverty aspects: involuntary resettlement (OP/BP 4.12) and indigenous peoples (OP 4.20) in World Bank Operational Manual, 1994. However, in practice these analyses rarely raise issues that are nor also discussed as part of other poverty analysis in the PAD, and hence they are not treated separately in the discussion in this chapter.

2.2 Macro and Sector Level Poverty Analysis

Section 2.1 above listed seven tools which could contribute to the analysis of the macro and sectoral level factors affecting agricultural water operations and poverty reduction: PRSP, CAS, Poverty Assessment, National Household Surveys, PSIA, CWRAS, and ESW. The present section briefly describes each of these tools and then examines evidence from the project review of how these tools have contributed to poverty analysis in project design.[14]

Poverty Reduction Strategy Papers (PRSPs) set out the countries' vision of development. They analyze the determinants of poverty and set out a program of action to reduce poverty. They serve as a national framework for policies and programs to reduce poverty and for development assistance. Where irrigated agriculture is assigned an important role in poverty reduction by governments, the PRSP might be expected to spell out the dynamic linkages of agricultural water policy and operations with poverty reduction strategy (see Box 3).

The PRSP is also intended to contribute to donor alignment and harmonization, and so might, for example, facilitate pro-poor programmatic lending for agricultural water. In addition, the PRSP is designed to be results-oriented and thus might, if agricultural water were important to poverty reduction, spell out specific sector policies, programs, and reforms linked to achievement of monitorable poverty reduction results, including any links to the attainment of MDGs. In the PRSP or other policy documents (for example, a Food Security Strategy), the role of agricultural water in food security might also be explored, as this is a potential contribution to poverty reduction, and trade offs with alternative food security options might be discussed.

The World Bank Country Assistance Strategy (CAS) provides a World Bank perspective and operational complement to the PRSP. It identifies the key areas in which the World Bank can assist the country to achieve sustainable development and poverty reduction. Its treatment of poverty is particularly important if there is no PRSP. The CAS is typically supported by detailed ESW on poverty, particularly Poverty Assessments.[15]

Box 3 The PRSP Can Set the Agenda for Poverty Reduction through Agricultural Water Operations

The PRSP has the potential to set the agenda for poverty reduction through agricultural water operations by setting out:

- The specific ways in which agricultural water investment is expected to reduce poverty, in which areas and on what scale;
- How policies for agricultural water (and for water resources and for agriculture in general) are expected to improve agricultural water performance and pro-poor impact (for example, making sure that water allocation and distribution practices are equitable, strengthening land and water rights, etc);
- How the pro-poor governance agenda affects agricultural water (for example decentralization, CDD, PIM, IMT);
- What are the implications for the poor of fiscal policies for agricultural water operations, particularly the sharing of costs for agricultural water development and improvement and for Operation and Maintenance (O&M); and
- How links with other sectors will have an effect on the poverty reducing impact of agricultural water operations (such as the impact of agricultural water on health and nutrition) and how cross-cutting issues affect poverty reduction impacts (such as the interaction between agricultural water and gender, or agricultural water and the environment, etc).

[14] During review of this paper, it was suggested that the poverty reduction impact of agricultural water investments could be factored in to public expenditure review work (PER), using tools that allow comparison of rates of return and other benefits between different sectoral alternatives.

[15] In the latest Quality at Entry Assessment on poverty and social impacts, it is noted that one half of projects reviewed from all sectors made use of findings from completed Poverty Assessments.

National Household Surveys are conducted by ministries and national statistical agencies and can include, for example, population and housing census, integrated household surveys, and agricultural census and surveys. They provide useful data on poverty profiles, usually with information disaggregated at the regional level.[16] The Tarim Basin II Project in China was able to target the poorest prefectures for intervention, which enhanced its poverty reduction impact, thanks to the data available on nationally classified poverty areas.[17]

Where a country is proposing reform programs that will likely have significant poverty and social impacts, a *Poverty and Social Impact Analysis* (PSIA) should be carried out. This is particularly the case where the World Bank is to support the reforms through Development Policy Lending (DPL). The PSIA[18] analyzes the distributional impact of policy reforms on the well being of different stakeholder groups (both income and non-income dimensions)[19] with a particular focus on the poor and vulnerable. The PSIA examines how impacts on the poor are transmitted through six "channels:" employment, prices, access to goods and services, assets, authority, and transfers and taxes. The PSIA can be used to assess the poverty and social impacts of agricultural water sector reforms: for example, it will be used for this purpose in Yemen in FY07.

At the sectoral level, the *Country Water Resources Assistance Strategy* (CWRAS), introduced under the Bank's 2004 Water Resources Sector Strategy, is designed to provide an integrated and inter-sectoral approach to water sector policy and investment, including agricultural water. There is no standard form for a CWRAS, but where poverty is a country issue, a discussion of agricultural water and poverty is expected. Sector studies under *Economic and Sector Work* (ESW), or broader agriculture or water ESW studies, may also address issues of agricultural water and poverty.

2.2.1 Results of the Project Review

A review of the treatment of agricultural water and poverty issues in PRSPs, CASs or sector studies was beyond the scope of this paper which focused instead on the extent to which the preparation and appraisal of agricultural water projects, as presented in PADs, demonstrated that agricultural water investment was a strategic instrument for poverty reduction in the country.

The project review asked three questions:

- Is the fit with the national PRSP discussed (e.g.. is there a discussion of agricultural water as a poverty reduction investment in the PRSP)?
- Is there a discussion of how the project fits into the country poverty reduction strategy as set out in the CAS?
- Is the specific relation to MDG 1 discussed (e.g., is there a consideration of how the project will specifically reduce income poverty)?

Overall, and with some notable exceptions, PADs did not demonstrate close links between government's poverty reduction policy (or Bank strategy to assist poverty reduction policy) and the choice of agricultural water as an investment for World Bank support.

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[16] See the World Bank Development Data Platform website for a repository on countries' surveys: http://go.worldbank.org/DNBRRS9TB0

[17] World Bank 2005, Tarim Basin II Project, Implementation Completion and Results Report.

[18] See World Bank 2003a.

[19] Non-income dimensions of welfare and poverty include human development and social development indicators addressing risk, vulnerability and social capital.

For most dedicated projects the discussion of the poverty strategy as set out in the PRSP and CAS was summary and formal; in only a few cases was there a discussion of how policy and strategy for poverty reduction drove the project concept. MDGs were occasionally mentioned but no project made a serious attempt at linking project impacts to attainment of an MDG. Three of the better examples of discussion of the fit with poverty strategy were:

- In Niger,[20] there is a discussion of the shift in national irrigation strategy towards the kind of scheme being promoted under the project ("smaller, simpler designed schemes in the most favourable areas with lower unit costs")
- In Vietnam, the CAS discussion makes clear why irrigated farmers are a target group. The PRSP discussion analyses the reasons why rural poverty is falling and links the project to these reasons (equitable distribution of land rights, price liberalization, targeted investments in infrastructure).
- In India UP, there is a clear discussion of how poverty reduction strategy emphasizes sustainable natural resource management, effectiveness of public spending, especially for the poor, and beneficiary participation, all elements incorporated in the project.

Several PADs referred to a CWRAS or to ESW on agricultural water as part of the strategic justification of the project, but none referred to poverty in this context.

In the non-dedicated projects, the link to poverty reduction strategies was easier to demonstrate as most of the projects are of the CDD type. These fit readily with PRSPs and CASs emphasizing poverty reduction through governance, service delivery and targeted investment and relying on decentralization and community participation (Brazil, Indonesia, Nepal, Peru, Turkey). Examples of discussions where the design of a non-dedicated project does seem to implement poverty reduction strategy are Bhutan, Brazil and Peru. Indonesia Local Governance was based not only on the national PRSP but also on district level poverty reduction strategies. In some cases there were links to Poverty Assessment: in Turkey, for example, project design built on the finding of the Poverty Assessment that "poverty increases with altitude" to design a targeting strategy.

2.3 Project and Farm Level Poverty Analysis

This section examines the use of the project appraisal tools, listed in Section 2.1 above, that may be used for poverty analysis: economic and financial analysis, technical analysis, and social analysis, together with the use of the Results Framework for setting poverty reduction results and indicators.

2.3.1 Economic and Financial Analysis in PADs

The Operational Policy OP 10.04 *Economic Evaluation of Investment Operations* (World Bank, Operational Manual, 1994) requires that, for each investment operation, Bank staff conduct an economic analysis to determine whether the project creates more net benefits to the economy than other options. The basic criterion for a project's acceptability involves the discounted expected present value of its benefits, net of costs.

The *Handbook on Economic Analysis of Investment Operations* (World Bank, 1998) is a practical guide to economic project evaluation for Bank staff. It offers a set of usable tools that integrate financial, economic, and fiscal analysis. The handbook covers basic principles of economic analysis, such as the with- and without-project comparisons and discounting techniques, identification of costs and benefits, externalities, and risk assessment. It defines the distinction between economic analysis, which

[20] Throughout this paper, projects are referred to by the country name alone, except where more than one project in one country has been reviewed. See Table 1 at the end of the Introduction for the details of each project.

uses opportunity costs to society, and financial analysis, which relies on the actual prices faced by the farmers and the implementing agency.

Economic and financial analysis can provide key insights into the poverty reduction potential of an agricultural water project through several mechanisms:

1. The economic analysis assesses the growth impact of the projects over a long period, and the sensitivity analysis evaluates the risks that may constrain that growth.
2. The financial analysis can measure the impact on individual household incomes based on farm budgets and—by scaling up—can assess the distributional impacts and the potential for moving people above the poverty line.
3. The farm budgets can be used as the basis for analysis of the incremental labor demand and of estimates of the job creation impact of the project, both family and non-family on-farm labour
4. The financial analysis can assess the impact on household incomes of different scenarios for financing capital costs and O&M, and hence can assess the impact on poverty of policy relating to cost sharing and to targeting subsidies to the poor.
5. The analysis may be also extended to estimate economic impacts beyond the farm at the local community level.

2.3.1.1 Results of the Project Review

2.3.1.1.1 Growth Impacts and Risks

Overall, the economic analysis was adequately carried out and provided an accurate picture of the growth impacts of the projects reviewed. The quality of the economic analysis in the dedicated projects reviewed was professional and of good quality. All the PADs had an economic internal rate of return, a net present value and sometimes a benefit-cost ratio generally based on incremental production (Table 5). The net present values and the benefit-cost ratios, if calculated, used either a 10 percent or a 12 percent discount rate, the generally accepted discount rates in the World Bank. The length of the analytical period was on the order of 20 to 25 years, an appropriate choice. The analysis generally was limited to components producing a valued output so it sometimes did not include small elements that did not contribute directly to incremental value, an acceptable practice. In projects where the project was largely composed of demand-driven elements, several projects computed internal rates of return and net present values for individual elements that could be financed by the project; other PADs chose a representative selection of individual demand-driven elements and computed a rate of return for the project as a whole. Either approach is acceptable and may be chosen in the light of the project design and the preference of the analyst.

Table 5 Number of Sample Dedicated Agricultural Water Projects Using Specific Economic Analysis Methodologies

Internal rate of return/NPV/benefit-cost ratio	18
Sensitivity analysis	18
Shadow prices	13
Farm models	14
Income distribution indication	10
Operation and maintenance specification	14
Dedicated projects in the overall sample of 27 projects	18

All of the analyses properly omitted taxes and subsidies. Nine of the sample dedicated projects employed some form of shadow pricing in computing the economic rate of return and Net Present Value (NPV). A few had a fully developed economic analysis using standard and specific conversion factors, while others assumed there was little distortion in prices. The most common shadow price was that for

unskilled labor. Although most took farm gate prices as the basis for valuation, a few computed values based on world market prices adjusted for transportation and marketing costs to arrive at the economic value at the farm gate, a preferable approach.[21]

Typically, economic analysis of project benefits was based on farm level analysis: fourteen of the projects based their valuations on farm budgets. Three others based their estimates of incremental production on cropping patterns for a whole command area, a generally less preferable approach. One project—Armenia—used cropping patterns of the command area to estimate losses avoided, which seems appropriate.

All of the projects had a sensitivity analysis to assess *risks* and some included a switching value (the change in costs or benefits large enough to reduce the Internal Rate of Return (IRR) below the accepted discount rate). The sensitivity analyses were almost always based on a proportional increase in cost and a proportional decrease in benefit. A better approach would be for the analyst to determine the likely risks—the elements of which the estimates are most unsure—and use them for the sensitivity analysis (for example, delay in physical investments, lack of effective service delivery, and rise in input prices).

The sample included nine non-dedicated projects. Eight of these non-dedicated projects were demand-driven, for which it was consequently not possible to estimate an IRR for the project as a whole. Five of the projects gave no or very limited information about the economic analysis of the irrigation component, but four included an economic analysis in greater or lesser detail based on farm budgets and computing a sample rate of return. Of these four projects, three estimated an economic rate of return to the project based on a representative distribution of investment activities including the irrigation component; and one—which was not demand driven—had a standard economic analysis of the irrigation component.

2.3.1.1.2 Distributional Impacts

Only just over half of the dedicated projects reviewed (10 out of 18, see Table 5) used the farm budgets and financial analysis to estimate the distribution of benefits among different classes of beneficiaries, although the underlying data appeared to be available to the analyst. However, even amongst the ten projects that undertook a distributional analysis, only a few used this to show how the project would reduce poverty. Most projects simply stated that the incremental income would reduce poverty or, at a minimum, prevent regressing into poverty, pointing out that most farmers in the command area were either below the poverty line or only just above it. In Iran, Mexico, Nigeria and Romania there was no quantitative discussion of distributional impacts at all. Only three projects (India Maharastra, India AP and India MP) made an estimate of the number and proportion of farms in the command area that would be lifted from below the poverty line to above it (see Box 4 for India Maharashtra).

None of the non-dedicated projects discussed the income distribution from the incremental increased income from the irrigation component, although all the projects had a strong poverty alleviation objective. This was presumably because the projects were targeted at the poor, and perhaps also because the beneficiaries were not identified in advance under CDD approaches.

2.3.1.1.3 Employment impacts

Employment impacts are of considerable importance, especially for the landless poor who would not otherwise benefit from the project. On site and downstream (or off-site) employment impacts were es-

[21] Another issue, outside the scope of this review, is regularly emphasized in the literature: that of the accuracy of assumptions used for estimating future project benefits and costs. See, for example, Jeremy Berkoff, 2002 *Economic evaluation for irrigation: why is it so often unsatisfactory?*

Box 4 Financial Analysis of Poverty Alleviation Impacts in India Maharashtra Water Sector Improvement Project

The PAD describes the results of a classic detailed economic and financial analysis and then adds a special section under financial analysis on *Project benefits and poverty alleviation impacts*.

It is estimated that in the project area farm households have on average 5.5 members and about 63 percent of the 233,400 farms are small farms with an average holding of less then 2 ha. Due to project interventions, farm incomes on average are expected to increase by 49 percent at project completion. It is estimated that project interventions will help about 33,610 farm families, who are fully dependent on agriculture, to generate additional incomes that will bring them above the poverty line.

Source: PAD

timated in a number of dedicated projects, including India AP (105,000 on-farm jobs plus downstream employment), India MP, and Romania (on farm family labor, on farm paid employment, plus 10,000 downstream jobs). However, the farm budgets were not used systematically to estimate incremental employment impacts, although, again, the information appears to have been available. In no case was any provision made for monitoring of the downstream employment creation.

Amongst non-dedicated projects, a number of PADs mention employment impacts expected, including for the landless. Brazil did in fact create 40,000 jobs, according to the Implementation Completion and Results Report (ICR).

2.3.1.2 Impacts of Cost Sharing and Subsidy Arrangements

2.3.1.2.1 Cost Sharing

The financial analysis for fourteen of the dedicated projects dealt in detail with arrangements for operation and maintenance expenditures (see Table 5), but largely from a fiscal sustainability perspective or linked to government policy to reduce fiscal outlays, rather than from the viewpoint of the poor. In a few cases, this kind of discussion of the O&M expenditures constituted almost the whole of the financial analysis.

There was little discussion of the impact of the financing arrangements on the poor, even where these required increased financial outlays, for example, in farmer financial contributions to capital cost (Albania, Mexico); or in increased water charges (India AP, India Maharastra). In one case, there was discussion of the fiscal and efficiency advantages of reduced government support and a switch to direct payments to users (Romania), but no discussion on the key poverty issue of what was to happen to poor producers in the "non-economic areas"[22] where farm incomes would drop under the new direct payment system.

In seven of the nine non-dedicated projects, it was specifically stated that farmers would be responsible for O&M of the small irrigation works financed under the project; in one project the local government would be responsible for organizing the O&M, perhaps engaging the farmers to do the actual work. In one project there was no specific mention of O&M responsibility but all investments were to be on-farm and the implication was that the farmer would bear the O&M responsibility. However, the impact of these arrangements on the poor was not analyzed.

[22] "Non-economic" areas are irrigated areas that are not economically efficient—i.e., higher terraces which require more energy for pumping water

2.3.1.2.2 Subsidy

Very few dedicated projects examined the extent to which public subsidy in the project was explicitly justified by poverty reduction, and whether it was clear that the subsidy would go predominantly to the poor. One clear treatment of this topic was in India UP which discusses the question objectively and quantitatively: subsidy would be 40–65 percent of total costs, and over 75 percent of this subsidy would go to those below the poverty line. In other dedicated projects, there is some discussion from the fiscal viewpoint, largely about savings gained by introducing PIM and IMT (for example, in India AP). Only in Yemen was there a clear case of targeted subsidy (see Section 3.1 below). The long discussion of subsidy elimination in Romania was entirely from the viewpoint of fiscal savings, without any consideration of poverty impacts. Amongst non-dedicated projects, Peru had clear rationale and guidelines for public subsidy in irrigation. Bhutan justifies subsidy of irrigation channels as "local public goods".

2.3.1.3 Impacts on Poverty Beyond the Farm Level

None of the projects reviewed used the economic and financial analysis to make any estimate of economic impacts beyond the farm level.[23]

2.3.2 Technical Analysis in the PADs

Technical analysis is conducted for every project and written up in a mandatory section of the PAD. There is no guideline or specific format laid down for this analysis, and no requirement that it address poverty issues.

The technical analysis can treat issues of project design in relation to poverty reduction, for example, technology choices that are more accessible to poorer farmers, or technology improvements that will increase the availability of water to poorer downstream farmers.

2.3.2.1 Results of the Project Review

There is evidence in the PADs reviewed that in a few cases poverty reduction considerations have influenced technology choices (see Section 3.1 below). However, these choices had to be inferred from references elsewhere in the PAD: in no case was there any discussion of these choices in the technical analysis section.

2.3.3 Social Analysis in the PADs

Project and farm level social analysis is "undertaken by the Bank for sociological appraisal of the opportunities, constraints and likely impacts of a project. Social analysis is intended to determine whether a proposed project has social development outcomes that contribute to equitable and sustainable development."(World Bank 2003b) Social analysis does not directly assess poverty reduction, but focuses on equity and sustainability as factors that make it "more likely" that economic growth will reduce poverty.

Social analysis is conducted throughout preparation and at appraisal. At PCN stage, a Rapid Social Assessment is required to identify social issues. On the basis of its findings, a full Social Assessment will normally be commissioned. The Bank will evaluate this social assessment as an integral part of project appraisal, and the results will be written up in the mandatory social analysis section of the PAD.

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[23] By design, the review in Phase One was based on on-going and completed Bank projects in which the economic and financial analysis typically focused on output-impacts at the farm level. Hence, issues about extending the analysis framework to cover indirect economic impacts off the farm were not considered in this phase of the review. These will be taken up in Phase Two.

The Social Analysis Sourcebook (see Box 5) is intended to provide a practical guide to social analysis, including social assessment carried out during project appraisal. It is supplemented by sector guidance notes. There is a guidance note for natural resources management (World Bank 2005b) but not yet one for agriculture or agricultural water projects.

One poverty-related aspect of the social analysis is the participatory approach and the related organizational agenda of water user associations etc. Building social capital is one of the key elements in the fight against poverty.

2.3.2.1 Results of the Project Review

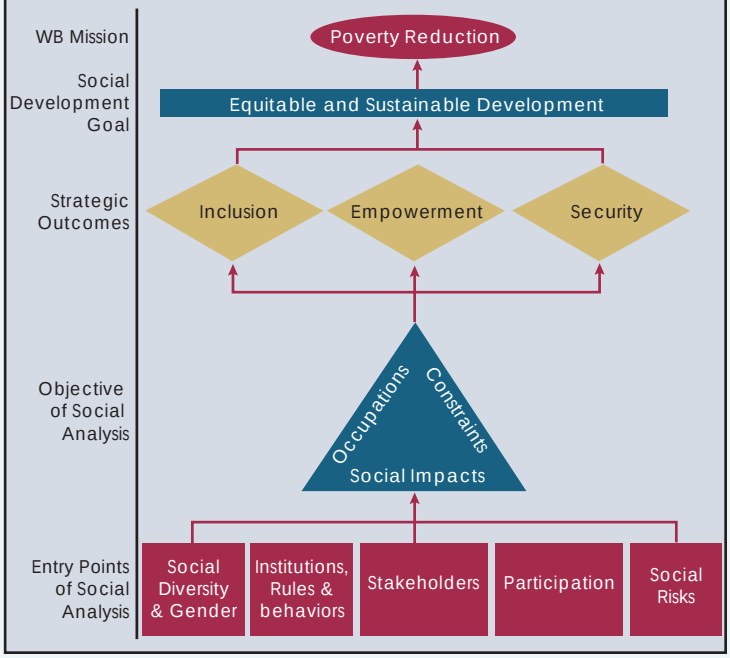
Social assessments and social analyses were carried out for all but one of the FY04/05 dedicated agricultural water projects reviewed.[24] In some cases, social assessments were conducted together with the environmental analysis as part of an Integrated Social and Environmental Assessment. In two cases in India (India MP and India Maharashtra) where there were a number of sub-project areas, a Social and Environmental Management Framework (SEMF) was produced, and in the case of India Maharashtra, a dedicated unit in the PMU was to be set up to oversee SEMF implementation. In Vietnam, social assessments were conducted in all project areas and helped to drive design.

All of the social analyses in the PADs either discussed poverty as a social issue (for example, Egypt, Nigeria, India UP) or discussed social aspects related to poverty such as unequal land tenure or the role

Box 5 Guidelines for Social Assessment and Social Analysis

Guidelines for social assessment and social analysis are set out in the Social Analysis Sourcebook, which lists **five entry points** for the analysis: *social diversity and gender* (particularly access to project benefits); *institutions, rules and behaviours* (for example, issues related to Water Users Association); *stakeholders* (including issues of targeting to the poor); *participation* (including issues such as elite capture); and *social risks* (including issues of negative impacts). These entry points allow analysis of the opportunities, constraints and impacts, and definition of the **strategic social outcomes** (organized under the headings of inclusion, empowerment and security). The outcomes contribute in turn to the **social development goal** of equitable and sustainable development, and thereby to poverty reduction. This analytical model is shown schematically in Figure (1.1). Social assessment and social analysis also ensure that the project is compliant with Bank **social safeguards.**

Figure 1.1 Social Analysis and the Bank's Mission



[24] The only recent project reviewed for which no social assessment appears to have been carried out was Armenia Dam Safety where social issues were minimal.

of small farmers in Water Users Associations (WUAs).[25] Most highlight some social development objectives or social outcomes, although these are not always reflected in the Results Framework. Poverty-related social development objectives listed for the dedicated projects include:

- Promoting participation and decentralization (Albania)
- Targeting the vulnerable and marginalized (Nigeria)
- Teducing conflict and social exclusion (Nigeria)
- Building the social capital for local water management (Yemen)

Some social assessments were clearly well integrated with the economic and financial analysis and the technical analysis. Typically this was the initiative of a task team leader alert to the multi-dimensional nature of poverty and able to mobilize social analysis early in the project cycle. An example of a useful social assessment for a dedicated project was that for India UP, which identified specific poverty-related issues of inclusion, accountability, sustainability, and gender. The social assessment for Romania identified elite capture in WUAs due to already existing power relations as an issue (see Section 3.2 below). Measures to resolve these issues were incorporated in the project. Another example of a constructive and well-integrated social assessment is India MP (see Box 6 in Section 4.1). However, in many cases the social assessment did not show clear links to the economic and financial analysis or technical analysis, and did not discuss how the management of social issues was expected to contribute to poverty reduction outcomes where these were targeted.

Social assessments and analyses were also carried out for all the recent non-dedicated projects, and for several the social assessment played a constructive role. The assessment for Peru helped structure the eligibility criteria and set the requirements for beneficiary contribution. That for Turkey analyzed livelihoods and set clear monitorable social outcomes. The assessment was to be used as the basis for the baseline survey and for the participatory M&E. The social assessment conducted for Indonesia Local Governance worked through two parallel tracks: (1) compilation of quantitative data from statistics and surveys; and (2) a multi-stakeholder consultation through professional facilitators. The assessment "did not just check with stakeholders if it was a good project but involved everybody in project preparation."[26] Key to this approach was the availability of financing for the assessment from a bilateral (DfID) grant.

2.3.4 Results Framework in the PAD

The World Bank revised its guidelines for the Project Appraisal Document (PAD) in 2004 (World Bank 2004) to increase focus on results-oriented design and monitoring. The PAD now includes the Results Framework, which combines a logical framework and related provisions for results monitoring. The Results Framework lists: (1) the Project Development Objectives (PDO) and related results indicators; and (2) "intermediate results per component" and related intermediate results indicators for each component.

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[25] During review of the draft of this report, the role of WUAs in relation to poverty reduction was emphasized. Key lessons were highlighted from the China experience where well-functioning WUAs are instrumental in poverty reduction by, for example, allowing male household heads to work off-farm, more than doubling household incomes. In China, too, well-functioning WUAs, along with modernization of irrigation system infrastructure are key to improving level and frequency of irrigation, reliability and equity of water distribution, which reduces farmer risks and creates the right incentives for income-enhancing investments in seeds, fertilizers, land preparation etc. The internal dynamics of WUAs in ensuring—or not ensuring— equitable distribution is also an important theme.
(d) scheme modernization has technical and social elements in, e.g., moving cropping systems from mono-culture to diversified production

[26] Interview with Erman Rahman and the task team.

Where poverty-related objectives are included in a Results Framework, relevant indicators have to be identified, with baseline values and target values, as well as monitoring arrangements. PAD guidelines advise that, for PDO indicators that normally cannot be observed or measured before the end of the project, intermediate results should be defined together with indicators that can capture performance that can be observed or measured while the project is still under implementation. There is therefore an opportunity for projects to include poverty alleviation as a PDO and to set either direct poverty reduction indicators or relevant intermediate results and indicators in the monitoring system.

2.3.4.1 Results of the Project Review

Results Frameworks in the projects reviewed clearly—and rightly—list only the PDOs and indicators that the project, through its interventions, can be reasonably assumed to be able to influence. Poverty reduction normally involves variables outside direct project control. In practice, only a minority of dedicated projects specify poverty reduction among their PDOs (24 percent of dedicated projects in the IEG review) and consequently few projects set specific poverty indicators. Among the projects reviewed for this report, only one project (Mauritania) set a reduction in the poverty rate in the project area as an indicator, and only three set the number or percentage of beneficiaries lifted out of poverty (India Maharashtra, India AP, India MP—see above). A number of PADs quote poverty reduction as a 'higher level objective' to which the project would contribute, or as a 'positive social impact', and do not set specific indicators to monitor it.

A number of projects do set intermediate results and indicators relevant to poverty reduction such as: income increases, employment increases, equity, and access to land. Some projects set intermediate results that suggest improved distribution of benefits, such as the number of women beneficiaries, and farmer access to services (for more details and information on the specific projects, see Section 3.4 below).

Non-dedicated projects typically targeted numbers of beneficiaries and increases in incomes and employment. Only Chad set a specific poverty reduction target (see Section 3.4 below).

3 POVERTY REDUCTION IN BANK-FINANCED AGRICULTURAL WATER PROJECTS

Following the discussion in Chapter 2 about what factors need to be considered in poverty analysis and on the use of various World Bank tools to conduct that analysis, the present chapter examines the extent to which the agricultural water projects reviewed were, in fact, likely to contribute to and measure poverty reduction. The chapter first assesses the relevance to poverty reduction of project design (Section 3.1) and of project risk assessment (Section 3.2). The chapter then assesses the treatment of benefits and their distribution in the projects reviewed (Section 3.3) and concludes by assessing the use of poverty reduction targets and the monitoring of poverty related results (Section 3.4).

3.1 Poverty Reduction in Project Design

This section assesses the extent to which poverty reduction was factored into the design of the projects reviewed. It considers the way that the PADs defined the nature of poverty problems and the extent to which an explicit poverty reduction model drove the projects, together with specific aspects of pro-poor design: technical design, institutional design, and the design of access of the poor to the project interventions.

3.1.1 Definition of Poverty Problems

Where projects identified poverty problems, the review assessed whether the nature of these problems was adequately defined. Some dedicated projects provided a clear definition of poverty problems. For example, in India MP, the local income poverty line is used to define the poor, and the poor are characterized as (1) farmers whose farms presently produce incomes below the poverty line; and (2) landless laborers. The PAD then shows how the low productivity of water drives the poverty of irrigated farmers, and builds the project design to improve water productivity and create employment.

Some other PADs mention poverty incidence either nationally, or in rural areas—for example in Nigeria, 70 percent of the population is reported as poor and Gross Domestic Product growth is 1 percent, but without specific reference to the project beneficiaries. In the projects reviewed, poverty was generally defined as income poverty: for example, in Iran, the poor “have less than $2 a day.”

For the non-dedicated projects, there are good examples of how the poverty problem has been diagnosed: Brazil, Indonesia Nusa Tengara and Local Governance, Turkey. In Indonesia Nusa Tengara, for example, the poor productivity of agriculture is identified as the main cause of poverty, and agricultural growth as the main instrument of poverty reduction.

3.1.2 The Poverty Reduction Model

Where poverty reduction was an objective, the review assessed whether the way in which the project was intended to reduce poverty was explicit (e.g., through direct increase in incomes and employment, through indirect employment creation, or through local and national multiplier effects, etc).

All dedicated projects (except Armenia—a dam safety project) either explicitly or implicitly expected that an increase in productivity would lead to increased incomes, and hence to poverty reduction. In some cases, productivity and income increases were expressed directly in terms of increased farming productivity (Albania, Egypt, India AP, India MP) or increased production (Ghana, Nigeria). In other cases, intermediate objectives were stated: improved water service (Egypt, India Maharashtra, Mexico); increased area from water savings (India MP); or reclaimed salt affected lands (India UP).

A few PADs also mentioned risk management and sustainability as elements in poverty reduction, for example, reduced risk and variability (India AP), or sustainable natural resource management (Nigeria, Yemen). In one case (Nigeria), reduced conflict was a factor in mitigating risk and hence of reducing poverty.

In some cases, associated employment impacts were expected to reduce poverty, for example jobs created on-farm for the landless, off farm and downstream employment created, and other multiplier effects (India MP, India AP).

In most cases, the social capital developed through empowerment of WUAs and farmer organizations was implicitly expected to have multiplier effects on poverty reduction, and this was explicitly mentioned in two cases (Ghana, Nigeria).

The non-dedicated projects typically expected poverty reduction from investment in infrastructure and institutions that would increase incomes. Other mechanisms for poverty reduction mentioned are policy reforms (Chad), service delivery (Indonesia Local Governance), and holistic natural resource management (Turkey).

3.1.3 Pro-poor Technical Design

The review assessed how far technical design took account of the specific needs of the poor. Were specific sub-components or interventions that would improve the lives of the poor included in project design, e.g., choice of technology that is accessible to the poor, distribution of land and water rights in favor of the poor?

Several dedicated projects specifically targeted the production systems of the poor. For example, Nigeria targeted the poor *fadama* system. In Niger, in line with national irrigation strategy, the project technology choices were focused on “low cost, low risk, simple techniques” accessible to the poor like the treadle pump. In a few projects, it is mentioned that the project design had been specifically adjusted to address the needs of the poor. For example, in Iran, a “rainfed and supplementary groundwater area” was added to the project to help the poorer rainfed farmers upstream of the irrigation area that was the original focus of the project.

The non-dedicated projects typically offer a menu of sub-projects adapted to the needs and capabilities of the poor. For example, Chad offered small-scale water management schemes such as water retention ponds and the development of small irrigation and drainage infrastructure. In Indonesia Nusa Tengara, an irrigation survey was carried out at appraisal to identify technologies suitable for the poor, and farming systems research under the project was to develop further pro-poor technologies. In Turkey, labor-intensive components were promoted in order to provide cash incomes to the poorest.

3.1.4 Pro-poor Institutional Design

The review assessed how far institutional arrangements considered effects on the poor, e.g., did institutions such as WUAs empower the poor or were they dominated by larger landowners or traditional leaders, what was the effect of changes in management arrangements such as IMT on the poor, what was the effect on the poor of improved water service combined with higher water charges etc.

The institutional aspects of the dedicated projects were much discussed in the PADs. In general, the institutional model was one of decentralization, farmer empowerment, and self-financing farmer-managed schemes in a context of secure property rights and free markets. This basic model was variously assumed to be able to deliver: efficiency, equity, sustainability, and farmer profit. In only a few cases was the impact of these arrangements on the poor explicitly evaluated, although there was an implicit assumption that these institutional improvements would benefit the poor.

Poverty reduction impacts were implicit rather than explicit in the discussion of organizational aspects of projects. Poverty considerations were implicit in the arguments for establishing WUAs as democratic organizations driving equity, transparency and access for downstreamers (Albania, Egypt, India AP, India MP, Iran, Mexico, Nigeria, Niger, Romania, Vietnam, Yemen). Pro-poor considerations were also implicit in the discussion of empowerment driving efficiency, and accountability of service provision (Ghana, India Maharashtra, Mexico, Romania); of IMT driving efficiency and sustainability (Albania, Armenia, India Maharashtra, Mexico, Romania); and participatory Integrated Water Resources Management as a mechanism for improving water use efficiency and sustainability, and for empowering farmers (Egypt, India MP, India Maharashtra). In a number of projects, administrative and fiscal decentralization was important; with an unspoken and unanalyzed sub-text that decentralisation was pro-poor (Ghana, Mexico, Niger, Romania).

One coherent pro-poor organizational design in the sample of dedicated projects was India UP, where a pilot project had tested a decentralized and participatory model supported by Non Governmental Organizations (NGOs). Small WUGs and inclusive Site Implementation Committees (including both husband and wife from all participating households) were the basic building blocks for this inclusive and pro-poor institutional set up.

Several PADs discussed policy aspects of institutional design, for example, land tenure security (Niger) and liberalized marketing policies (Mauritania). However, although these policy reforms have strong links to poverty reduction impacts (see Chapter 1 and Section 2.1 above), there was no discussion of how these changes were expected to reduce poverty.

The non-dedicated projects all had institutional arrangements based on decentralization, participation and cost sharing, with the assumption that these arrangements would be pro-poor. The Chad project is an example from a very poor and low-performing environment.

3.1.5 Access of the Poor

The review assessed the extent to which projects were explicitly targeted at the poor, how far the needs of particular social groups such as the landless and women were factored in, and how far the actual proportion of the poor in the beneficiary total was known (see 3.3 on this last aspect).

The review assessed how far projects were targeted at poor farmers, and the way in which they were targeted, e.g., special attention to tail-enders or to the production systems of the poor. Most dedicated projects were not targeted at the poor. Instead, for their poverty reducing impact, they relied on the prevalence of poverty in rural areas and the generally low incomes of the irrigated farmer beneficiaries. In some cases (Albania, Egypt), there is an explicit discussion of the fact that as all farms on the irrigation schemes are small, all potential beneficiaries are poor and hence targeting is unnecessary.

However, a number of dedicated projects identified poor groups within the larger pool of potential beneficiaries, and used a variety of targeting mechanisms to deliver benefits to the poverty target group:

- Targeting tail-enders (India Maharashtra)
- Targeting the smaller “Irrigation Units” where the smaller (i.e., poorer) farmers are concentrated (Mexico)
- Targeting the production systems of the poor with appropriate technology (Niger, Nigeria)
- Targeting the poorest areas of the country (Ghana)
- Targeting the upper watershed in an integrated basin project (Iran)
- Targeting smaller farmers through a ceiling on hectarage and a sliding scale of subsidy (Yemen)

For the non-dedicated projects, targeting was typically more sophisticated. Brazil had four levels of screening; Peru had three (including an "economic" filter to make sure the poor areas targeted actually had economic potential). Turkey had a multi-stage approach to target communities where cash incomes were $0.50–2.00 per person per day.

Among the needs of particular social groups, considerable attention was paid to women. In most reports, gender is the object of intensive analysis, and often of specific project actions. A certain number of dedicated project documents discuss gender as a poverty issue (Ghana, India MP, India Maharashtra, Iran, Mauritania, Niger), and some target actions by gender (India Maharashtra, India MP, Mauritania, Nigeria). In India UP, women were to be co-title holders of the reclaimed lands and to participate in the WUGs etc.

Almost all of the non-dedicated projects included specific provision for women, ranging from inclusion of women in planning (Bhutan) to the stipulation that 40 percent of sub-projects should be for women's groups (Chad).

3.2 Project Risk and Poverty Reduction

This section assesses the treatment of project risk and poverty reduction, including assessment of the risk of negative impacts on the poor, the risk that poor people may not benefit the most, and the risk that the project may not be the best poverty reducing investment. The section also reviews treatment of environmental and health impacts on the poor and of the risk that trade-offs between poverty reduction and growth may be needed.

3.2.1 The Risk of Negative Impacts on the Poor

The review assessed the extent to which the risks of negative impacts on the poor were analyzed, e.g., negative impacts on tail-enders, disadvantages to rainfed farmers, and the costs to the poor of resettlement and rehabilitation.

In many cases, these risks were adequately discussed in the dedicated projects, including resettlement and related provisions (Egypt, India AP, India Maharashtra, Vietnam);[27] conflict of interest between the poor upper watershed and the better off lower watershed (Iran); consideration of the landless (India AP); and the risk of conflict with traditional land and water rights (Iran, Mauritania, Nigeria).

By contrast, some important potentially negative impacts could be detected in the reports that required but did not receive analysis, for example, the effect of the withdrawal of irrigation subsidies on the "non-economic" farmers (Romania, see Section 2.3 above). The report contains a long discussion of the social safety net for redundant civil servants, but nothing about the impact this policy measure (promoted under the project) would have on poor rural people.[28] In some cases, the risks to poor farmers from higher water charges might have been assessed (India AP).

No significant risks of this type were identified for the non-dedicated projects.

3.2.2 The Risk that Poor People May Not Benefit the Most

The review examined analysis of the risk that poor people may not benefit the most, for example the risk that benefits would simply accrue proportionally to existing land and water ownership patterns.

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[27] In other projects also there was extensive discussion regarding the statutory resettlement provisions even where they were not required.

[28] In interview, the task team explained that the details of the reformed system were not available at the time of appraisal, and that mitigating measures outside the project are expected to overcome the negative impacts of policy change.

For some dedicated projects that took place in areas of unequal access to land and water, this issue was raised and, in some cases, mitigating measures such as the targeting mechanisms discussed above (Section 3.1) were adopted. In other projects, however, the problem does not seem to have been raised: for example in Egypt, the poorest do least well out of the project (see Section 3.4 below)—yet there is no discussion of this or of how the problem might be mitigated.

Some PADs for dedicated projects raise the issue of *elite capture*.[29] In Romania, past experience with large farmers dominating WUAs led to institutional change under the project separating the decision-making elected board from the executive team and imposing a cap on the voting rights of larger farmers. The Yemen project discusses why large farmers have to be included (as they are the main causes of groundwater overdraft) and sets out a mechanism for ensuring they do not capture an unfair share of the benefits. India UP also identifies the need to include large farmers who are in the same drainage unit, and argues that the participatory institutions under the project will prevent large-farmer dominance.

Other PADs for dedicated projects raise the issue but leave it unclear how it is to be dealt with. In Mexico, the social assessment highlights the risk of large competitive farmers dominating their neighbouring small traditional farmers—yet no thoughts on how to manage the risk are offered. The risk of "elite capture" is raised for Nigeria, to be avoided by "social guidelines" to be drafted later.

The problem of elite capture is also raised by several non-dedicated projects. In Pakistan, there are criteria to avoid it; in Turkey, the risk is to be managed through participatory institutions and a menu of investments that target only the livelihoods and production systems of the poor. The Nepal project contend, "user groups in CDD have often proved exclusionary:" an independent board and work through NGOs are the remedies. In Indonesia Local Governance, the use of district level poverty reduction strategies and a "strict bottom up planning process" was designed to avoid elite capture.

3.2.3 The Risk that the Project May Not Be the Best Poverty Reducing Investment

The review examined whether the choice of the project was explicitly justified as being the best poverty reducing investment available in the project area.[30] Choices of the type of agricultural water project selected were also reviewed to see whether the choice of irrigation system was analyzed in terms of its pro-poor potential (e.g., large scale irrigation, small scale, decentralized CDD model)

Very few reports for dedicated projects considered this issue. In two projects (Albania, India AP), it is explicitly stated that irrigated agriculture is the best creator of incomes and employment for the rural poor. In the Ghana project, irrigated infrastructure and related social capital are said to be a "catalyst for development." In two projects (Niger, Nigeria) there is a discussion of the choice of low cost technology as accessible to the poor. Other dedicated projects are generally silent on the question.

By contrast, a number of the non-dedicated projects discuss in some detail why the project approach—typically CDD—has been selected. Brazil documents a long history of alternative approaches to poverty reduction, all relative failures, ending with a successful CDD pilot on which the project is based. Nepal has a similar discussion. In Indonesia Nusa Tengara, agricultural investment is shown to be the best source of growth, employment and food security for the project area.

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[29] During the review process, commentators emphasized that elite capture would usually reflect pre-existing power relations quite unrelated to the project. As the example shows, the risk of elite capture can be managed if projects consider this and explicitly address it in design.

[30] This question is important because critiques of agricultural water investment often point to the apparently higher benefits from alternative rural investments (see Section 1.2 above).

3.2.4 Treatment of Environmental and Health Impacts and Risks for the Poor

The treatment of environmental and health impacts and risks for the poor (both internal to the project and externality) was assessed. Much research has shown the risk and potential of agricultural water to harm or improve the environment and human health, and this typically has much greater impact on the poor. There is some discussion of these impacts and risks in both the dedicated and the non-dedicated projects, but there is no systematic consideration, and even the presentation of positive impacts is muted. For example, India AP, according to the ICR, "reduced water borne diseases and eliminated malaria"—yet little is made of this very substantial benefit to the poor. Risks from sewage discharge are mentioned in Egypt and Bhutan, and risks from groundwater depletion are mentioned in Iran: both of these types of risk typically affect the poor above all other segments of the population, yet there is no substantive discussion or action. Only Mauritania mentions positive impacts from the potable water supply to be associated with irrigation under the project.

3.2.5 Trade-offs between Poverty Reduction and Growth

Although empirical evidence suggests that pro-poor agricultural water investment can be highly efficient (see Section 1.3 above), there may be trade-offs in adopting pro-poor approaches, for example, where there are significant returns to scale or investment intensity in farming, or where the lower multipliers typically associated with smallholder economies reduce the potential contribution to overall growth (IEG 2006, page xi).

The review found no discussion of any trade-offs between poverty reduction and growth in the dedicated projects. It was, however, an issue raised for several non-dedicated projects. Indonesia Nusa Tengara and Nepal both raise the possible trade-off between selecting projects for poverty reduction and economic efficiency. The Indonesia Nusa Tengara ICR says "villages were selected by a process not related to their economic potential." Peru identifies three possible conflicts (as well as the related solutions): will sub-projects be economic, will sub-projects fit the natural resource management imperative, and do poor communities have the management capacity for CDD.

3.3 Benefits and Their Distribution

This section reviews how the benefits of agricultural water projects were defined, how the poor were identified, and how the distributional aspects were analyzed (i.e., who receives the benefits).

3.3.1 Benefits

The review assessed how benefits were defined. Most of the projects, consistent with the economic and financial analysis (see Section 2.3 above), defined benefits in terms of increases in farm income (Albania, India AP, Iran, India UP). In some cases, intermediate benefits were considered, such as increase in water use efficiency and productivity (Egypt, India MP, Iran). A few projects mentioned other benefits, particularly farm employment increases (India AP, India MP, Romania, see Section 2.3 above), other employment increases (India AP, India MP), or environmental and health benefits (see section 2.3 above).

In non-dedicated projects, benefits were primarily income increases. For example, Chad mentions output 25 percent higher for 60,000 families due to increased productivity and reduction of losses, and also more general benefits from increased monetization, increased asset values, and institutional benefits of participation.

3.3.2 Identifying the Poor

For many dedicated projects, the proportion of poor in the beneficiary total was not mentioned in the PAD. In one or two cases (e.g., Albania, India AP), the impression was given that "all beneficiaries are

poor farmers." In the case of Mexico, the beneficiaries are described as "mostly small." In four cases, the proportion is stated or can be inferred:

Egypt	70 percent of beneficiaries are poor
India MP	61 percent of beneficiaries have less than 1 ha
India Maharashtra	63 percent of beneficiaries have less than 2 ha
Iran	9 percent in the lower watershed are poor, 35 percent in the upper watershed

For the non-dedicated projects, it was not feasible to determine the proportion of poor as these were demand-driven projects, but in any case targeting was supposed to ensure that all beneficiaries were poor (a claim made explicitly for Chad).

3.3.3 Distributional Aspects

As discussed in Chapter 2 above (Section 2.3), some PADs used the financial analysis based on farm budgets to assess which income classes were to receive project benefits, although the analysis was inconsistent and partial. Did this distributional analysis actually show that the projects were expected to reduce poverty? By and large, poverty reduction was indeed the expected outcome:

- In India MP, all beneficiaries start below the poverty line but the poorest are expected to do better than the less poor. 74,000 families out of a total 193,000 will move above the poverty line.
- In India Maharashtra, 34,000 farmers will emerge from poverty
- In India UP, 75 percent of beneficiaries are poor and "the landless will benefit the most."
- But a pro-poor distribution of benefits was not always anticipated:
- In Egypt, all beneficiaries will remain poor but the poorest will do least well
- In India AP, the larger farmers did better according to the ICR
- In Mauritania, some beneficiaries have farms larger than 40 hectares, but there is no discussion of distributional impacts.

3.4 Poverty Reduction Targets and Monitoring

This section assesses whether agricultural water projects have set specific poverty reduction targets, and the provision in project design for monitoring poverty reduction impacts.

3.4.1 Poverty Reduction Targets

The review assessed the extent to which the Results Framework (see Section 2.3 above) set poverty reduction, income and gender targets.

The Results Frameworks for dedicated projects set a wide variety of quantitative targets by which project performance can be judged. Of these, some show directly the poverty reducing impact of the project, whilst others are intermediate results that contribute to but do not demonstrate a poverty reduction impact. The most ambitious target is the 15-year target of the Mauritania APL: reduction of the poor in the target area from 60 percent to 20 percent. However, in the PAD for the second phase project no indication of progress towards this target is given. The principal poverty related targets were:

- Targets directly related to poverty reduction, which were expressed in a number of ways: reduction in the poverty rate in the project area (Mauritania); number or percentage of beneficiaries lifted out of poverty (India AP, India MP); equity, measured by the difference in incomes or yield between the head and the tail (India Maharashtra, Egypt); percentage of develop-

ment funds going to the disadvantaged (Romania); and access of poor families to land (India UP).

- Intermediate results directly related to increasing incomes that could contribute to poverty reduction, including income increases (Ghana, India MP, Nigeria, Romania, India UP); returns to labor (Romania); production increases (Albania); increase in area cultivated (Vietnam); rate of adoption of technology (Niger); value of production/m3 of water (Egypt, India MP, Yemen); and crop yields (Egypt, Romania, India UP).
- Intermediate results suggesting improved distribution of benefits, which included: number of beneficiaries (Niger, Yemen); number of women beneficiaries (Niger, Nigeria); and access to services (Ghana).
- Other results that may be related to poverty reduction, which included reduction in conflict (Nigeria), and increase in land values (India UP).

For non-dedicated projects, number of beneficiaries, and increases in incomes and employment are the typical targets (Bhutan, Indonesia Nusa Tengara, Nepal, Pakistan, Turkey). Few non-dedicated projects set specific poverty reduction targets. Chad, however, set a very specific poverty reduction target: beneficiaries under the poverty line reduced by 20 percent.

3.4.2 Monitoring Poverty Reduction Outcomes

The review examined the provision for a M&E system that captures poverty reduction impacts, assessing the extent to which project M&E could capture: (1) the results of any targeting of benefits; (2) analysis of the distribution of benefits; (3) impact on employment and incomes; and (4) broader impacts on the local and national economy, including forward and backward linkages and multiplier effects.

M&E mechanisms proposed in dedicated projects were many and various. For the completed projects, India AP stood out as having an extremely ambitious design—but a result that, according to the ICR, was weak in practice: baseline inordinately delayed, monitoring only able to show increase in net income, number of beneficiaries and increase in farm employment. Some projects proposed very elaborate instruments: for example, Romania sets up a hierarchy of assessment, mapping, inventory, baseline study and final year assessment, and its social development outcomes are to be monitored by "annual focused qualitative social assessments." Vietnam, which is directed entirely at improving service delivery, will establish a national benchmarking program under the project to measure the efficiency of the water service. The most common approaches to capturing the income and distributional results in the recent PADs were:

- Socio-economic baseline survey and impact monitoring (Albania, India AP)
- Participatory M&E (Ghana, Nigeria)
- Institutional audits e.g. of WUA performance (Albania)
- Specific gender monitoring (India AP)
- Crop surveys (Albania)

India UP started with a baseline conducted by independent consultants, and impact evaluations were also to be conducted by a consulting firm.

Arrangements for M&E in non-dedicated projects were often very detailed, with an emphasis on participatory monitoring. Indonesia Nusa Tengara provided for annual impact monitoring and detailed gender monitoring. Nepal has an apparently well-structured hierarchy of assessment, mapping, inventory, baseline and final year assessments.

In addition to design weaknesses, there were clearly implementation shortcomings with M&E of poverty reduction. Some of these were caused by lack of institutional capacity and resources in the implementing agencies. In Turkey, for example, the implementing agency was "weak on day–to-day monitoring, hence it was hard to get them to focus on impact evaluations."[31]

Impact evaluation of poverty reduction, with data collection on households on site and in control groups, was rarely provided for.[32] In Indonesia Local Governance, the project provided only 10 percent of investment, so that links to changes in poverty level were frail. As the project was placed within the national and district PRSPs, poverty reduction was to be measured instead at that level.

In no case did it appear that the M&E system would capture environmental and health impacts on the poor, although this might be expected to be part of the Environmental Management Plan. There was no evidence of any provision for specific research on poverty impacts in projects.

[31] Interview with Peter de Wees, Task Team Leader

[32] For more guidance on M&E of Agricultural Water Management project, see World Bank, 2007. Toolkit for Monitoring and Evaluation of Agricultural Water Management Projects.

4 THE CHALLENGE OF IMPROVING THE POVERTY REDUCTION IMPACT OF BANK-FINANCED AGRICULTURAL WATER PROJECTS

Chapter 2 above presented findings on poverty analysis in Bank-financed projects, and Chapter 3 reviewed how far recent agricultural water projects were in fact likely to contribute to and measure poverty reduction. The present chapter summarizes the analysis and reviews options for improving poverty analysis and poverty reduction impacts and measurement for the future. The chapter starts with a summary of findings, a diagnosis, and a rationale for seeking improvements (Section 4.1). The chapter then briefly reviews options for improving pro-poor design (Section 4.2) and the targeting and measurement of results (Section 4.3). A final section (Section 4.4) outlines specific possible improvements and proposes next steps.

4.1 An Opportunity Missed

There is no doubt that the projects reviewed are contributing substantially to poverty reduction, even when economic growth, rather than poverty reduction is identified as the main objective. The analysis also showed that projects may achieve more pro-poor impacts if attention is paid to the needs of the poor and to inclusion of pro-poor elements in their design.

In some of the projects, the poverty problem has been analyzed and the project has been designed with the poor in mind. Targets and indicators have been set that illustrate the poverty reduction results, and provision has been made for monitoring of the results. A good practice example is India MP (see Box 6).

Box 6 Good Practice on Poverty in the India Madhya Pradesh Project

The project demonstrates a good fit with national and state strategy for poverty reduction, showing how project actions will implement poverty reduction strategy through infrastructure investment, decentralization and empowerment, and improved natural resource management. Water resource management issues that affect poverty outcomes are analyzed.

The project is clear about the beneficiaries and their incomes. The key performance indicator is a productivity measure "net benefit per unit of water delivered" but there is also a quantified target for moving 75,000 farmers out of poverty.

The poverty reduction model is clear. Technical improvements and decentralized management will deliver reliable water service at reasonable cost by financially self-sustaining entities. This will increase the area irrigated, improve water productivity, and allow intensification and diversification. The poor will benefit the most, with their net income going up by four times (compared to three times for larger farmers). The project also considers employment impacts for the landless (an extra 122,000 jobs).

Social analysis drove the pro-poor design. Social assessment started early and was integrated with the financial and technical analysis. The analysis captured social issues and impacts, and the resulting social and institutional design promoted poverty reduction by emphasizing decentralized and participatory approaches.

This pro-poor design was helped by a preparation process that considered the poor:

- Good data on a sample of 450 farmers available through the NSS survey at the village level allowed the project to characterize beneficiaries by income level.
- The project takes place in five basins for different scales of scheme (major, minor, village level etc.). Thirteen models were prepared and analyzed in an integrated fashion from the technical, economic and financial, social and environmental standpoints.
- A unified team did the stakeholder and environmental analyses through participatory approaches.
- The farm models allowed the team to forecast expected benefits by farm size, and the poverty line was correlated to the farm size.

Source: PAD and interview with the task team led by Srinivasan Raj Rajagopal

Despite the evident poverty-reducing impacts of many projects reviewed, and although the quality of pro-poor design and results monitoring has clearly been improving, many projects were less clear in their poverty-reducing design and results measurement. In most PADs, the treatment of poverty was hesitant and scattered. In many cases significant poverty reduction may have been achieved but it was not adequately analyzed and measured. In other cases it was likely that changes to project design could have increased poverty reduction effectiveness or mitigated negative impacts on the poor. Of course, some of these shortcomings may be more apparent than real. Certainly in some cases, projects were likely to have a definite poverty reduction impact, but perhaps the PAD did not explain it in those terms. With this important caveat, a number of common characteristics were noted in the review:

- There was rarely a sense of agricultural water projects as part of a coherent poverty reduction strategy and many projects did not show links to Poverty Assessments.
- The poverty reduction process supported by the project was often not explicit and the mechanism by which the specific project interventions could reduce poverty was often not clear. The "project logic" in the Results Framework was sometimes not clear and there was generally a loose conception conveyed of what constitutes poverty and poverty reduction.
- Financial analysis usually stopped short of distributional analysis, i.e., of saying which income classes, particularly the poor, would get what share of net benefits.
- The technical design of projects rarely considered alternative pro-poor options.
- Social assessment and social analysis addressed some aspects of poverty but often without clarity in reference to relationships between social development objectives and poverty reduction. In some cases, the social assessment was inconsistent and not well integrated with other parts of the analysis.
- The relationship of institutional design to poverty was not always coherent. Institutional arrangements have a strong impact on the access of the poor and on mitigation of negative impacts, yet the analysis of institutional arrangements (WUAs, for example) often did not explicitly consider the poor.
- Risks and alternatives related to poverty were generally not fully considered. The risk that there might be negative impacts on the poor was often not addressed in a systematic way, nor was the risk that the poor might not benefit the most. There was virtually no discussion of whether agricultural water was the best poverty reducing investment available.
- The Results Framework often did not adequately define poverty targets or intermediate results, and monitoring systems typically did not provide a clear picture of progress against poverty related targets. Employment aspects, important for the landless poor, were often not considered.

4.1.1 Diagnosis

Four causes of the characteristics highlighted above are suggested: (1) lack of clarity about agricultural water as a means of poverty reduction; (2) the weak links between country poverty reduction strategy and the agricultural water sector; (3) the weakness of project appraisal tools in poverty analysis; and (4) the lack of incentives for task teams to integrate poverty reduction into project design and results monitoring.

Lack of clarity about agricultural water's role in poverty reduction. Despite the evidence that agricultural water operations can contribute to both growth and poverty reduction (see Chapter 1 passim), there appears to be an implicit assumption that agricultural water is about growth and that distributional aspects are secondary. Projects tend to be conceived in terms of efficiency leading to increased incomes and employment. The way in which this growth contributes to poverty reduction is rarely con-

sidered. The conception of reduction of non-income poverty is even more vague, scattered among various social development objectives. Because project designers may not consider how agricultural water investment can contribute to the reduction of both income and non-income poverty, projects may not be designed with the poor in mind, and poverty reduction results are not necessarily captured.

Lack of strategic focus. At the country level, poverty reduction strategy should drive sectoral investment programs (see Section 2.2 above), highlighting the expected contribution of agricultural water investment to growth and poverty reduction, and linking agricultural water sector reforms and investment to complementary policies in other sectors and to the broad governance and fiscal agendas, all through a pro-poor lens. Strategy should identify the pro-poor entry points for agricultural water, including: equitable distribution of land and water rights, choice of pro-poor technology, pro-poor institutional arrangements, and equitable distribution of subsidies. However, very few poverty reduction strategies or CASs place agricultural water within this strategic context. As a result, projects are designed more with chance pro-poor links than as components of a structured national level approach to poverty reduction.[33]

Lack of appropriate use of tools. There does not seem to be any settled methodology for multi-dimensional poverty analysis in projects.[34] Table 6 below assesses the framework of poverty analysis tools described in Section 2.1 above (as summarized in Table 4), and briefly characterizes their effectiveness, based on the project review. In sum, it appears that there are analytical tools available but their use for poverty analysis is ad hoc and not always well integrated into a coherent approach to the poverty problem. Economic and financial analysis has the information and capacity to do more distributional analysis, to evaluate direct and indirect employment impacts, to assess the impact of financing arrangements on the poor, and to evaluate impacts on poverty in the broader economy beyond the farm level. However, there is no clear methodology for linking the economic and financial analysis to poverty analysis. Technical analysis rarely considers poverty-related aspects. While aspects of the poverty reduction problem are addressed in social analysis conducted by social development specialists and poverty analysis conducted by PREM, at the project level there is lack of a systematic framework for capturing various poverty-relevant impacts from agricultural water projects. The Results Framework can target and monitor objectives and intermediate results related to poverty reduction, but only if there is a focus on poverty reduction objectives in the project.

Lack of knowledge and incentives to address the poverty issue. Task team leaders have the skills and incentives to deliver well-defined projects with clear, measurable and achievable outputs and growth outcomes. The focus in agricultural water projects is typically on engineering (IEG 2006 page xii), and specific analyses (economic and financial, technical, social, and institutional) are prized to the extent that they can optimize the performance of the engineering design, facilitating implementation and sustainable subsequent operations and removing constraints. Adding the distributional dimension to such a growth-oriented design and factoring in poverty calls for knowledge of how to manage multi-dimensional poverty analysis; particularly of how to link an agricultural water investment to the broader strategic framework for poverty reduction, how to master from the start of design the ways in which the project will help reduce poverty, and how to optimize pro-poor aspects of that design. In managing the design and appraisal process the team leader will have to get the financial, technical, social and institu-

[33] The weakness of poverty reduction strategy in guiding investment in agricultural water is confirmed for the rural sector as a whole by the 2005 report on rural development aspects of PRSPs (World Bank 2005d), which found that countries tend to propose a large number of actions across a wide range of areas, but that *the intended focus of the strategy is typically unclear.*

[34] Operational Procedure 1.00 on Poverty Reduction focuses on requirements for poverty assessments and on the quality enhancement and monitoring responsibilities of the Poverty Reduction Board rather than on guidance and best practice on integrating poverty objectives into projects (World Bank 1994).

tional analyses to work together, and to link these analyses to the PREM poverty analyses relevant to the project (poverty assessment, poverty maps, etc.). All this calls for effort and creates risks for which the reward in terms of internal incentives is not usually commensurate. In addition, the extra effort will have a budgetary cost (although this can be limited by management of synergy between the analyses).[35]

4.1.2 Overall Conclusion

It is certainly possible to improve poverty reduction impacts in Bank-financed agricultural water projects through better analysis and design, and the poverty reduction impacts 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 a sharper strategic focus, and by better analytical techniques—or by the 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. There are cost implications but these can be limited by better use of existing resources.

4.1.3 Outlook

Change is not without cost and risk, and so it has to be asked whether the change matters enough to justify it. In the case of agricultural water projects there are three reasons why change is worthwhile:

1. The agricultural water sector is capable of a significant contribution to poverty reduction but that contribution is dependent on the political will to increase investment. Improving and demonstrating poverty reduction impacts would revive and reposition the sector and be a powerful argument for increased investment.
2. Agricultural water investment can be more pro-poor than at present and can demonstrate its poverty reduction results more convincingly than it now does. Improved design and results measurement would add value and contribute further to poverty reduction.
3. The changes required are more in terms of better linkages and synergy than a wholesale change in the way of doing business, so that although lead time, training requirements and costs are inevitable, they need not be excessive, and results could be expected in the nearer term.

Table 6 Actual Performance of Poverty Analysis Tools in the Project Review

Level	*Tools*	*Assessment of the use of tools for poverty analysis*
Macro and sectoral level analysis	PRSP, Poverty Assessment, PSIA, CAS, CWRAS, ESW sector studies	Not generally very specific linkages to agricultural water sector reforms or investment and generally little focus on agricultural water and poverty reduction
Project and farm level analysis	Economic and financial analysis	Potential to assess distributional aspects and other poverty impacts of design options is significantly under-used
	Technical analysis	Focused more on overall productivity and economic rate of return than on distributional impacts or pro-poor choices
	Social analysis and social assessment	Rather supply driven. Somewhat heterogeneous methodologies. Not generally well integrated with other analyses or overall appraisal. Sometimes more an add-on.
	Results Framework	Poverty related targets usually not set, and monitoring and evaluation of poverty-related indicators particularly problematic.

[35] Or by use of Trust Funds: for example, GEF grant funds were used for the social assessment in Turkey.

4.2 Improving the Pro-poor Design of Agricultural Water Projects

"Pro-poor" is generally used to mean an intervention where net benefits accrue more to the poor than to the non-poor, i.e., a progressive intervention. Ways in which the pro-poor impact of agricultural water projects could be improved will be evident from the discussion in Chapters 2 and 3 above. Designing pro-poor projects requires consideration at the sectoral, scheme, and farm levels of the ways to improve impacts on the poor; looking at policies, technology and farming systems, institutions and management, and indirect impacts and externalities. Several checklists for improving pro-poor design have been prepared: there are two in the ADB/IWMI study. The checklist prepared for the Directions in Development study *Reengaging in Agricultural Water Management* (World Bank 2006) is reproduced here for illustrative purposes (Box 7). In addition, the checklist sketched out in Section 2.1 Table 3) provides a framework for pro-poor analysis at the different levels of: macro/sectoral, project, and farm level.

Box 7 A Checklist for Improving rhe 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 domestic water supply and sanitation in rural areas included as specific objectives of the agricultural water project?
- Are other possible income-generating uses of irrigation water (for example, aquaculture, livestock) enhanced by the project?
- Are complementary services (credit, education, extension, for instance) included in the project and do they particularly target the poor?

Pro-poor technologies

- Is the entry price affordable? Do investment and operation costs of the 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 facilitate the creation of groups of poor farmers, which can strengthen their cooperative negotiation power and make their access to water rights and other complementary services (microfinance, 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 extensive 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.

4.3 Improving Pro-poor Targets and Results Measurement

As discussed in the Introduction, Phase One of this review is designed to look at existing approaches and practices to poverty issues in selected Bank projects. In-depth exploration of further applicable approaches and methodologies for improving pro-poor targets and results measurements will be undertaken in Phase Two. The discussion below is therefore only illustrative of possible frameworks and tools that could be developed for setting targets and measuring results.

4.3.1 Targeting and Measuring Benefits in Agricultural Water Projects

Table 7 sets out five types of impacts that may result from an agricultural water project, ranging from the most direct and easily quantifiable and measurable (production, incomes, and employment) to the least direct (growth impacts on the broad economy). Typically benefits at levels 1 and 2 can be quantified in money terms and measured through M&E. Benefits at levels 3–5 may be measured quantitatively and translated into money terms, or they may be measured by proxy indicators: typically routine M&E would not be sufficient to capture these benefits and specific impact evaluation studies would be used.

4.3.2 Targeting and Measuring the Distribution of Benefits

Table 7 above sets out a hierarchy of benefits and impacts expected from agricultural water projects. To target and measure poverty reduction impacts, a methodology is needed to target and track distribution of benefits by income class. For this, standard financial analysis needs to be extended to capture: (1) the distribution of beneficiaries between different income groups, and in particular the proportion of poor people amongst the beneficiaries; and (2) the distribution of quantified net benefits amongst income groups (see Table 8).

Table 7 Measuring Net Benefits and Their Distribution

Level of benefits	*Typical way in which the benefit is measured: in money terms or through a proxy?*	*Typical way of measuring the distribution of benefits to the poor*
1. Direct farm level productivity benefits	Monetary measurement through M&E	Benefit incidence by income group measured through regular M&E or impact evaluation
2. Direct farm level employment and (dis)placement impacts	Monetary measurement through M&E	Benefit incidence by income group measured through regular M&E or impact evaluation
3. Local community level productivity-induced employment, income and consumption	Multiplier calculated through impact evaluation	Benefit incidence by income group measured through impact evaluation
4. Other local level impacts from the project, e.g., benefits from multiple use of the water, public health and environmental costs and benefits, impact on water resources etc.	Proxy indicators measured through impact evaluation	Select key indicators related to the livelihoods of the poor measured through impact evaluation
5. Broader impacts on the non-agricultural sector and on the overall economy, and trade offs (e.g., between water and environment at the basin level).	Impact evaluation	Impact evaluation

(*adapted* from ADB/IWMI 2005)

Table 8 Setting Poverty Reduction Targets and Measuring Impacts

What needs to be measured	*Source of baseline information*	*Way of tracking results*
The distribution of beneficiaries between different income groups, and in particular the proportion of poor people amongst the beneficiaries	Poverty Assessment or Mapping Records of land holding by size Household surveys Agricultural census Social Assessment Baseline Survey	M&E or Impact Evaluation
The distribution of quantified net benefits amongst income groups.	Project financial analysis	M&E or Impact Evaluation

Distributional targets and indicators might include:

- Poverty headcount e.g. the number of farmers and others raised above the poverty line
- Poverty impact ratio: e.g. the sum of all net benefits going to the poor, divided by total economic net benefits

Poverty reduction may take many years and, as discussed in Section 2.3, intermediate targets and indicators may need to be set. In addition, poverty reduction may involve a number of variables outside direct project control.[36] In these circumstances, a project may target intermediate results related to increasing incomes or improved distribution of benefits. Some of these can clearly be part of the causal chain leading to poverty reduction, in particular: increased reliability of water, equitable distribution of water, inclusion of the vulnerable in water users associations, increases in agricultural output and incomes, distribution of income increases, increases in employment opportunities (see Section 3.4 above; also, Box 8 gives a range of poverty related intermediate outcomes cited in some new agricultural water projects in FY03–05).

Box 8 Example of Intermediate Outcomes or Related PDOs In Agricultural Water Projects, FY03–05

- *Reliability*: actual water supplied to demand planned (Drainage, Irrigation & Wetlands Improvement Project, Uzbekistan)
- *Equity*: farmers on tail-end watercourses receive due water share 80 [percent of the time (Sindh On-Farm Water Management Project, Pakistan), satisfaction with equity of water distribution (Irrigation Distribution System & Management Improvement Project, Azerbaijan)
- I*ncrease in farm output value, in on-farm income* (Jiangxi Integrated Agricultural Modernization Project, China)
- *Number of employment opportunities generated* (Second North-East Irrigated Agriculture Project, Sri Lanka)
- I*nclusion of the vulnerable*: Recognition and enhancement of role of women in sector governance institutions; stakeholders, especially poorer and traditional water users feel better served (Water Resources & Irrigation Sector Management Program, Indonesia)
- *Distributional benefits*: Improved incomes of targeted stakeholders in head, middle and tail reaches (Maharashtra Water Sector Improvement Project, India)

[36] This may be the reason why many projects do not list poverty reduction directly as the PDO—although it may be a higher-level objective.

Household level data are crucial to understanding linkages between agricultural water and poverty, and to setting and monitoring indicators. Although data hurdles in countries with limited M&E capacity might prevent cost-effective data collection on household incomes and poverty levels, many countries are now conducting household surveys, and it could be possible to introduce a suitable irrigation module in the survey.

Another promising thread to explore would be the risk-reduction story: with increased reliability in water supply, farmers are able to plan, invest, and diversify their agricultural activities. They are also able to engage more in non-farm rural activities. Landless laborers and other whose livelihoods are linked to farming activity will also benefit from risk reduction that improved water control brings. Reduction in risk will allow more productive investments to be made, and will also lessen the periodic liquidation of capital (e.g., livestock) to tide over times of crises. Globalization and climate change may increase risks, and poverty reduction analysis of agricultural water investments can explore the way in which these risks are factored in to project design and monitoring.

Agricultural water projects may also bring significant benefits to the poor beyond incomes and jobs (see Box 9). These may include both non-monetary benefits that can be quantified, for example, access to health services and to clean water, or human and social development indicators. They may also include benefits that require a more qualitative evaluation but for which indicators may nonetheless be derived, such as security, risk reduction, and empowerment.

4.3.3 Results Measurement

Some of the sources of baseline information and ways of tracking results are set out in Table 8 above. One important tool to emphasize here would be the development of participatory M&E methods to address the poverty/distributional impact issue. This should involve going beyond gathering 'people-based' data (as opposed to use of published statistics or output-type indicators) to putting people at the heart of designing the M&E system: what is being measured, for what purpose and with what tools. Approached properly, this can yield a number of advantages with regard to measuring poverty/distributional aspects. It can provide:

1. A relevant local definition and classification of poverty (or, equivalently, ranking of well-being) which can side-step much tortuous discussion about how to establish poverty lines.
2. Measures of welfare impact (i.e., marginal improvement in welfare of the less well-off) according to notions more in line with people's perceptions and local circumstances, than according to some exogenously determined indicator.
3. The basis for a deeper understanding of local constraints and factors that determine poverty/distributional impact. This, in turn, can feed into improved design for pro-poor projects.

Box 9 Income and Non-income Poverty

Participatory poverty assessments have found that poor people define their poverty in terms of material deprivation (e.g., not enough money, employment, food, clothing and housing), of inadequate access to services such as health services and clean water, and of non-material factors such as security, peace and power over decisions affecting their lives (Robb 1999, cited in IFAD 2001).

These components of poverty are usually divided into two groups, namely income poverty and non-income poverty. Income poverty is generally easier to target and measure, and it has a strong influence on non-income poverty. Reducing income poverty enables households to achieve food security, accumulate assets, reduce vulnerability to external shocks and provide for the future. Reduction of income poverty often also improves access to health services and clean water.

Source: Adapted from: World Bank 2007, draft.

4.4 Next Steps and the Proposed Phase Two

A draft of this report was issued on November 8, 2006. Findings were presented during Water Week in February 2007. The draft report was then circulated to peer reviewers and to the regions, and a considerable number of comments were received. On the basis of these comments, the report has been finalized, in preparation for the start of Phase Two, which is to recommend ways to improve pro-poor results of agricultural water projects and to prepare tools and methodologies that could help achieve this.

Based on the analysis in this paper and on reviewers' comments and recommendations, it is proposed that Phase Two be devoted to the preparation of a *Sourcebook on Improving Poverty Reduction Performance of Agricultural Water Investments*, comprising guidance notes, case studies and other documentary resources. The objective of the sourcebook would to help task teams in assessing the poverty reduction role of agricultural water and in designing and implementing agricultural water operations to maximize poverty reduction impacts and to measure results more effectively. This proposal is based on two considerations that emerged from the present report and the discussion on it.

Poverty reduction in Bank agricultural water work can be improved by the better use of largely existing knowledge and tools. The findings of the present report confirm that with the right knowledge, tools and organization, task teams could improve the consideration of agricultural water in relation to poverty reduction at the macro and sectoral level, increase poverty reduction impacts in agricultural water projects, and target and measure project poverty reduction impacts better. In addition, the report showed that the conduct and presentation of poverty related analysis could be improved. The rationale for the Phase II proposal is therefore that an improvement to poverty reduction work in agricultural water can be largely achieved by improving the way in which task teams use what already exists. The next step does not require empirical or analytical work but the documentation of approaches and tools and the design of a dissemination and education plan to equip task teams with the necessary knowledge and skills.

The needed knowledge and tools can be captured in a user-friendly document, and this provides the rationale for proposing the sourcebook format. Overall, there was agreement among reviewers of the draft of the present report that a well-structured "sourcebook" to guide task teams would be the best way to put the required knowledge and skills at the disposal of task teams. More normative approaches such as "guidelines" were felt to be less appropriate as the objective would be to empower task teams rather than to burden or trammel them. A sourcebook would:

- Capture all aspects of the subject in a comprehensive way;
- Explain the importance of poverty reduction in agricultural water, and the potential for its application across the broad spectrum of the Bank's work, from PRSP to project design and implementation;
- Provide a series of notes on tools and techniques that would provide specific guidance to task teams; and
- Contain a range of documentary resources to assist users in the design and implementation of poverty analysis and its use to enhance poverty reduction outcomes.

In pursuing Phase Two, it would be useful also to establish contacts with the broader agricultural water community to gauge interest in collaborating or sharing the work: IWMI, the CGIAR Challenge Program, FAO, IFAD, ADB and other agencies may be interested. BNWPP could be interested in supporting the development of the sourcebook and the piloting of its use.

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ANNEX 1

Poverty analysis in I&D Projects: Questionnaire used

1. Fit with poverty strategy

1.1 Is there a discussion of how the project fits into the country poverty reduction strategy as set out in the CAS

1.2 Is the fit with the national PRSP discussed e.g. is there a discussion of I&D as a poverty reduction tool in the PRSP

1.3 Is the specific relation to MDG 1 discussed e.g. is there a consideration of how the project will specifically reduce income poverty

(see the first part of the PAD)

2. Is poverty alleviation mentioned as an explicit development objective? (same as IEG Q2[37])

This could refer to the whole of the results framework, and be rated by adding some bullet points:

— is there an explicit formulated indicator related to this objective ?

3. To what extent is the project design explicitly pro-poor?

Related to project components

3.1 Are the specific sub-components or interventions that would improve the lives of the poor discussed and included in project design e.g. choice of technology that is accessible to the poor, distribution of land and water rights in favour of the poor?

Related to institutional arrangements

3.2 Is the effect of institutional arrangements on the poor analyzed e.g. do institutions such as WUAs empower the poor or are they dominated by larger landowners or traditional leaders, what is the effect of changes in management arrangements such as IMT on the poor, what is the effect on the poor of improved water service combined with higher water charges etc.

Related to beneficiaries

3.3 Is the project targeted at poor farmers and if so how e.g. special attention to tail enders or poor production systems

3.4 Are gender aspects adequately factored in to project design?

3.5 Proportion of poor in beneficiary total (same as IEG Q1), former a.

(see beneficiaries section in the PAD)

4. Was a social assessment carried out?

(same as IEG Q7)

[37] The references to IEG Q… are to the questions in the questionnaire developed for the poverty analysis in the IEG report *Water Management in Agriculture: Ten Years of World Bank Assistance, 1994–2004.*

5. Analysis of impact on poverty in the project

5.1 Is the way in which the project is intended to reduce poverty explicit e.g. through direct increase in incomes and employment, or indirect employment creation, or local and national multiplier effects...?

(see economic and financial analysis in PAD)

5.2 Are the risks of negative impacts on the poor analyzed e.g. negative impacts on tail enders, elite capture, disadvantages to rainfed farmers ...? Resettlement and rehabilitation...

5.3 Is the risk that poor people may not benefit the most explicitly analyzed e.g. the risk that benefits will simply accrue proportionally to existing land and water ownership patterns?

(see risk section in PAD)

5.4 Is the choice of the project explicitly discussed and justified as being the best poverty reducing investment available in the project area? Is the type of agricultural water project analyzed in terms of its pro-poor potential (e.g. large scale irrigation, small scale, decentralized CDD model?)

(see alternatives considered and lessons learned in PAD)

5.5 Is public subsidy in the project explicitly discussed as justified by poverty reduction and is it clear that the subsidy will go predominantly to the poor?

(see fiscal analysis in PAD)

5.6 Are environmental and health impacts on the poor (both internal to the project and externalities) assessed?

(see environmental assessment in PAD)

5.7 Are any trade offs between poverty reduction and growth identified and analyzed?

5.8 Are gender impacts assessed?

6. Analysis of benefits and distributional aspects

6.1 How are the benefits defined?

6.2 Are distributional aspects analyzed? (same as IEG Q6) i.e. who gets the benefits?

(see economic analysis section in PAD)

6.3 Are project employment impacts analyzed and substantively discussed? (same as IEG Q8)

7. Measuring and monitoring, M&E

7.1 Does the Log Frame set poverty reduction, income and gender targets?

7.2 Is there provision for an M&E system that captures poverty reduction impacts? E.g. does M&E capture: (1) the results of any targeting of benefits; (2) analysis of the distribution of benefits; (3) impact on employment and incomes; and (4) broader impacts on the local and national economy, including forward and backward linkages and multiplier effects.

7.3 Does the M&E system capture environmental and health impacts on the poor?

7.4 And also might be interesting to comment on what specific elements/ methods are included in the M&E system: baseline ? participatory M&E...?

7.5 Is there provision for any specific research on poverty impacts in the project?

ANNEX 2

The projects selected for review

A. Recently appraised projects (FY04–FY05)

Region	*Country*	*Approval (fiscal year)*	*Project Title*	*Dedicated?*	*I&D as % of total*
ECA	Albania	2004	Water Resources Management	Yes	60
ECA	Armenia	2004	Irrigation Dam Safety II	Yes	53
SAR	Bhutan	2005	Decentralized Rural Development	No	18
AFR	Chad	2004	Agricultural Services and Producer Organizations	No	20
MENA	Egypt, Arab Republic of	2005	Integrated Irrigation Improvement and Management	Yes	94
AFR	Ghana	2005	Community-Based Rural Development	Yes	20
SAR	India	2005	Madhya Pradesh Water Sector Restructuring	Yes	80
SAR	India	2005	Maharashtra Water Sector Improvement	Yes	84
EAP	Indonesia	2005	Initiatives for Local Governance Reform	No	15
MENA	Iran, Islamic Republic of	2005	Alborz Integrated Land and Water Management	Yes	90
AFR	Mauritania	2005	Integrated Development Program for Irrigated Agriculture II	Yes	25
LAC	Mexico	2004	Integrated Irrigation Modernization	Yes	87
SAR	Nepal	2004	Poverty Alleviation Fund	No	26
AFR	Nigeria	2004	Second National Fadama Development	Yes	30
SAR	Pakistan	2004	Second Poverty Alleviation Fund	No	5
SAR	Pakistan	2004	Sindh On-Farm Water Management	Yes	80
ECA	Romania	2004	Irrigation Rehabilitation	Yes	94
ECA	Turkey	2004	Anatolia Watershed Rehabilitation	No	13
LAC	Uruguay	2005	Integrated Natural Resources and Biodiversity Management	No	20
EAP	Vietnam	2004	Water Resources Assistance	Yes	80
MENA	Yemen, Republic of	2004	Groundwater and Soil Conservation	Yes	68

B. Completed projects (add completion year)

Region	*Country*	*Approval (fiscal year)*	*Project Title*	*Dedicated?*	*I&D as % of total*
EAP	Indonesia	1996	Nusa Tenggara Agricultural Area Development	No	20
SAR	India	1997	Andhra Pradesh Irrigation III	Yes	85
LAC	Brazil	1995	Rural Poverty Alleviation - Ceara	No	22
LAC	Peru	1997	Sierra Natural Resources Management and Poverty Alleviation	Yes	42
SAR	India	1999	Uttar Pradesh Sodic Lands Reclamation II	Yes	60
AFR	Niger	1995	Pilot Private Irrigation	Yes	85

Other Water Working Notes

Water Working Notes are published by the Water Sector Board of the Sustainable Development Network of the World Bank Group. Working Notes are available online at *www.worldbank.org/water*. Working Notes are lightly edited documents intended to elicit discussion on topical issues in the water sector. They disseminate results of conceptual work by World Bank staff to peer professionals in the sector at an early stage, that is, "works in progress." Comments should be e-mailed to the authors.

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No. 2 Assessment of Resource Flows in the Water Supply and Sanitation Sector: Ethiopia Case Study. Peter L. Watson, Joseph Gadek, Eyob Defere, and Catherine Revels. January 2005.

No. 3 Pro-Poor Subsidies for Water Connections in West Africa: A Preliminary Study (full report). Donald T. Lauria, Omar S. Hopkins, and Sylvie Debomy. January 2005.

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No. 5 Consumer Cooperatives: An Alternative Institutional Model for Delivery of Urban Water Supply and Sanitation Services? Fernando Ruiz-Mier, and Meike van Ginneken. January 2006.

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