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Monitoring and Evaluating the Poverty Impacts of Agricultural Water Investments

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Agricultural water projects contribute in several ways to achieving the Millennium Development Goals of eradicating extreme poverty and hunger and ensuring environmental sustainability. Increased yields and cropping area and shifts to higher-value crops help boost the incomes of farm households, generate employment, and lower consumer food prices. They also stabilize incomes and employment. Community participation and the creation of water user groups have become integral parts of these projects, which have empowered users and made them self-reliant. Mainstreaming monitoring and evaluating (M&E) will help generate the data to establish the cost-effectiveness of projects in reducing poverty and propose ways to improve it.

Monitoring and evaluating (M&E) the poverty impact of agricultural water investments may allow some conclusions about returns on different types of investments and their contributions to poverty reduction. M&E of the poverty impact should receive attention early in project preparation to ensure adequate data collection capacity, collection of the right type of data, and a system set-up that allows analysis and interpretation. Broad consultations and early user involvement in the design and implementation of the M&E system are important to build consensus and ownership.

POTENTIAL AREAS OF INVESTMENT

M&E systems are usually based on four steps:

1. Deciding what information is needed
2. Assessing the availability and requirements of tools for collecting and analyzing the data needed
3. Deciding on outputs of the M&E system, who will produce them, and how they will be used
4. Determining the resources needed to set up and run the M&E system

Each step of M&E agricultural water projects should focus on poverty, but the first two steps are especially important: defining the indicators (the types of data) and the procedures for analyzing and evaluating them.

INDICATORS. In addition to the standard indicators for inputs (resources assigned to project activities) and outputs (for example, the length of irrigation canals upgraded or built), outcome and impact indicators are needed to monitor welfare dimensions such as health status, consumption, and income levels (Box 1).

These data, collected for different groups of project beneficiaries, measure which target groups receive the most benefits and these groups' satisfaction or dissatisfaction with the benefits. Beneficiary groups may be distinguished according to income status (sometimes proxied by landholding status, if adequate data on income status are unavailable), ethnicity, indigeneity, and gender. Good assessments have also collected indicators on interventions complementary to agricultural water–related projects (such as the establishment of marketing infrastructure and processing facilities)

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Box 1: Some Outcome and Impact Indicators for Monitoring Poverty in Agricultural Water Projects

Outcome indicators

- Crop yields, cropping patterns, and production levels
- Output and input prices
- Fisheries and livestock production
- Employment rates and wages

Impact indicators

- Share of population below the nationally established rural poverty line or share of population with less that $US1 a day pre- and postproject
- Prevalence of underweight and stunted children (measured by height for age and weight-for-height) pre- and postproject.

Source: Mona Sur, World Bank.

and have monitored the quality of services affecting the impact of investments. Because projects do not take place in isolation, the inclusion of quantitative and qualitative information on intervening and/or external influences on the selected indicators is recommended. As shown in box 1, one would include anything else that might influence the output/input prices or the prevalence of child malnutrition.

TYPES OF DATA. Well-designed baseline surveys are an essential tool for collecting data for investment planning purposes, monitoring, and evaluation. Poverty maps have also proved valuable tools for targeting and monitoring poverty (Box 2). Depending on the project interventions, baseline surveys usually collect data at several levels (such as the village, watershed, household, plot, and individual) through a combination of household and individual surveys and participatory methods. To allow statistically significant inferences from the data, the sampling framework must be appropriate. Surveys have been done in-house by implementing agencies, but they are frequently contracted out to a research or survey firm or an institution. This approach is generally preferred. A rigorous "with/without" design may be justified to evaluate the impact of an investment that is critical to poverty reduction but which suffers from substantial knowledge gaps about which approaches work best or when a new approach should be tested. With/without evaluation helps determine whether reductions in poverty result from project interventions or other causes. Controlled impact evaluations are demanding in terms of the analytical capacity and resource requirements, and not all investments warrant them.

PROCEDURES FOR ANALYZING AND EVALUATING MONITORING AND EVALUATING (M&E) OUTPUT. Initial planning for M&E includes developing the management information system. It should allow disaggregation of key data by social and economic groups to allow monitoring of the poverty impact of activities. It should also enable an assessment of the inclusiveness of project activities.

Emphasis on poverty M&E early in project preparation can ensure that data collection capacity is adequate, that the right type of data is collected, and that a system is set up that allows analysis and interpretation. Broad consultations and early user involvement in the design and implementation of the M&E system are important to build consensus and ownership.

Early involvement of potential data users (typically the project implementing agency) and broad consultations with researchers, beneficiaries, donors, and imple-

Box 2: Poverty Maps

Poverty maps are spatial representations of poverty assessments. They combine survey with census data and graphically present indicators of poverty (such as per capita income or daily subsistence levels) or well-being indicators (such as life expectancy, child mortality, and literacy).

In the Peruvian Social Fund project, FONCODES, poverty maps, in conjunction with community poverty assessments, helped target community-based projects, including small irrigation projects. Superimposing remote sensing data (publicly available satellite images) with poverty maps provides enormous scope for better water resources planning, poverty targeting, and impact assessments.

Sources: Mona Sur, World Bank; World Bank 1998.

menters during the initial design stage have been helpful in building consensus on what to monitor and how to do it, and in generating a sense of ownership among the various stakeholders.

RESOURCE REQUIREMENTS. The resources needed for poverty M&E vary from project to project, depending on the scope of project activities and systems set up for M&E. For example, conducting a full-fledged household survey to collect data on welfare measures may be costly, but alternative rapid assessment methods could provide a more affordable alternative for measuring poverty impacts. Alternatives include approaches such as collecting "core welfare" indicators (typically assets) that help trackchanges in consumption and income.

Box 3: India: An Example of an Impact Evaluation of Watershed Development Projects

An example of an impact evaluation that also attempted to examine the poverty impact of agricultural water-related projects is a study by the International Food Policy Research Institute (IFPRI) evaluating watershed development projects in India. The primary objectives were to assess the following: (1) Which watershed projects were most successful in raising agricultural productivity, improving natural resources management, and reducing poverty? (2) What approaches enabled projects to succeed? (3) What nonproject factors contributed to achieving these objectives? The study evaluated projects funded and implemented by several donors and state governments, including the World Bank.

The study used mainly quantitative analysis, but also drew on qualitative information about the effects on interest groups (such as farmers with, and without, irrigation, landless people, shepherds, and women). The study used a nonexperimental design, relying on an instrumental variable approach to correct for the endogeneity of program placement. Instrumental variables were first used to predict program participation, and then the variation of outcome indicators with predicted values of program participation was examined.

The study covered a 10-year period and relied on baseline survey data from the World Bank and the Indian Council of Agricultural Research villages. The postproject situation was captured through a 1997 survey of 86 villages in Maharashtra and Andhra Pradesh conducted by IFPRI. The survey collected quantitative data at the village, plot, and household level for econometric analysis of the conditions that determined changes before and after the project. Qualitative information on project impacts was collected from interest groups through open-ended discussions. Control villages were selected and roughly matched geographically (data were insufficient for rigorous matching). The authors measured the impact on household welfare through proxy indicators including the perceived effects of the project on the household, perceived changes in living standards, changes in housing quality, change in percentage of families migrating, perceived changes in real wage, and the availability of casual employment opportunities. Lack of adequate baseline and monitoring data in the projects was a major limitation to the study.

The study found that participatory projects performed better than top-down approaches. Projects where participation was combined with sound technical inputs performed best of all. The authors also found that equity issues remained a problem and respondents perceived that project benefits rose with landholding size, and that the landless and near-landless people were most likely to report negative effects from projects. For example, across projects while 45 percent of households with 2 or more hectares claimed they had benefited from watershed projects, only 12 percent of the landless and 19 percent of farmers with less than 1 hectare claimed to have benefited. On the other hand, 19 percent of the landless felt that they were harmed by the projects compared to 7 percent of larger farmers. The authors also found that projects run by nongovernmental organizations (NGOs) were associated with higher net returns; however, the econometric results for the model were insignificant.

Source: Kerr, Pangare, and Pangare 2002.

POTENTIAL BENEFITS

Agricultural water-related projects that monitor poverty impacts have improved poverty targeting and tailored activities to maximize benefits during implementation. They have made end-of-project assessments of the returns and impacts from different types of investments, allowing more cost-effective planning and implementation of future investments.

IMPLEMENTATION

CONDUCTING AN IMPACT EVALUATION. The objective of an impact evaluation is to measure the results of the project interventions on dimensions of poverty (Box 3). Establishing causality is important and necessary for impact evaluation. To do so requires identifying a comparison or control group that does not receive the project intervention and comparing this group to the treatment group. The control group must match the treatment group in terms of its socioeconomic aspects and the physical characteristics of its site.

Experimental or quasi-experimental designs are generally used to effectively show the results of project interventions on poverty. In experimental design, the intervention is allocated randomly among all eligible beneficiaries. Experimental designs need to be set up prior to the investment. Quasi-experimental designs, in contrast, attempt to generate control groups after the intervention by means of statistical and econometric methods, such as propensity score matching, computing double differences, or using instrumental variables (Baker 2000).

QUANTITATIVE VERSUS QUALITATIVE DATA: Integrating qualitative and quantitative approaches in monitoring and evaluating poverty impacts has proven very effective. Quantitative analysis results in more generalizable results, but qualitative and participatory methods allow in-depth study of selected issues, cases, or events, and can provide critical insights into beneficiaries' perspectives, the dynamics of a particular reform, or the reasons behind results observed in a quantitative analysis. A special attempt can be made to monitor the satisfaction of the poor with the project through focus group or other qualitative methods.

RECOMMENDATIONS FOR PRACTITIONERS

- Involve beneficiaries early in the M&E process. Broad consultations and early involvement of users in the design and implementation of the M&E system will do much to build consensus and ownership.
- Use beneficiary self-assessments and other participatory approaches so that assessments can be made mid-course. There may be a long time lag in realizing a reduction in poverty from agricultural water-related projects, and the poverty impact often cannot be evaluated until well after a project ends.
- Keep the number of indicators collected within manageable proportions.
- Ensure that a good baseline survey is undertaken. Without a proper baseline, it is difficult to monitor progress and evaluate the impacts of investments.

REFERENCES CITED

Baker, J. L. 2000. *Evaluating the Impacts of Development Projects on Poverty: A Handbook for Practitioners.* Washington, DC: World Bank.

Government of Karnataka. 2003. *Operation Manual: Sujala Watershed Project.* Bangalore: Government of Karnataka Watershed Development Department.

Kerr, J., G. Pangare, and V. Pangare. 2002. "Watershed Development Projects in India: An Evaluation." IFPRI Research Report No. 127. International Food Policy Research Institute, Washington, DC.

World Bank. 1998. "Implementation Completion Report." Peru Social Development and Compensation Fund Project, Report No. 18016. World Bank, Washington, DC.

World Bank. 2005. *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management.* Washington, DC: World Bank.

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The note is based on Investment Note 9.1 in the larger volume *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management.* The book documents a range of solutions and good practices from World Bank and worldwide experience, concentrating on investments in policy and institutional reforms in technology and management to improve water productivity and farming profitability. You can download a copy of the full report at www.worldbank.org/rural or email ard@worldbank.org.