UNDP - World Bank **Water and Sanitation Program**

Making Rural Water Supply Sustainable:

Recommendations from a Global Study

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The Rural Water Supply Global Study aims to:

- **clarify what is meant by "demand-responsiveness" in theory and in practice; and**
- **measure and quantify the impact of demand-responsiveness on the sustainability of rural water systems.**

The study found that employing a demand-responsive approach at the community level significantly increases the likelihood of water system sustainability. However, it also found that even projects that have adopted this approach tend to apply it inconsistently among the communities where they work. The study found that to be effective, a demand-responsive approach should include procedures for an adequate flow of information to households, provisions for capacity-building at all levels, and a re-orientation of supply agencies to allow consumer demand to guide investment programs. The study also found that the existence of a formal organization to manage the water system and training of household members are significant factors in ensuring water system sustainability. Positive correlations were also found between water system sustainability and water committee training in operations and maintenance, and the quality of construction of the system and water system sustainability, although these findings are less consistent across countries. A complete report of the study will be available in February 1998.

The Rural Water Sector and the World Bank

During the past several years, World Bank lending in rural water supply has seen a dramatic increase. The Bank finances rural water supply investments through two broad project types. The first type is the stand-alone rural water supply project, which typically provides only water or water and sanitation services, and is usually implemented by government agencies. In addition, the Bank provides resources for rural water supply as components of other project types, most notably social investment funds. Social funds are quasi-financial intermediaries that channel funds to small-scale projects for poor communities. These projects can fund a number of sub-project types (such as water supply, schools, or roads), and deserve special attention as they have gained increasing importance in the Bank's lending program (over 45 projects have been approved and more are underway), and often include large rural water supply components. Both stand-alone and multi-sectoral projects were examined in the study.

Projects in the study

Country	Benin	Bolivia		Honduras		Indonesia		Pakistan		Uganda
Project	**CFD**	**SIF-1**	**YRWSS**	**FHIS-1**	**PROPAR**	**VIP-Java**	**WSLICC**	**LGRD**	**NRSP**	**RUWASA**
Objective	Water	Employment generation, improve basic services	Water, sanitation, hygiene	Employment generation, poverty alleviation	Water, sanitation, health	Public infrastructure, employment generation	Water, sanitation, hygiene, health	Water, sanitation	Water, sanitation, agriculture	Water, sanitation, health
Source of funds	France	IDA	Dutch, UNDP-WB	IDA, KfW,USAID	Swiss	IBRD	IBRD	IDA	Government, donors	Government, DANIDA
Project type	Stand-alone WSS	Multi - sectoral	Stand-alone WSS	Multi - sectoral	Stand-alone WSS	Multi - sectoral	Stand-alone WSS	Stand-alone WSS	Multi - sectoral	Stand-alone WSS
Year initiated	1989	1990	1991	1990	1986	1995	1994	1992	1991	1991
Duration of phase included in study	4 yrs	4 yrs (FIS1)	4 yrs	5 yrs (FHIS1)	10 yrs	4 yrs	6 yrs	9 yrs	Ongoing	5yrs (phase 2)
Total project cost (millions of US$)	8.2	95.6	2.8	97.2	1.90	83.8	123.3	194.2	16.4 (GOP only)	35
Cost of water supply component (millions of US$)	8.2	16.4	2.8	21.3	1.90	about 1.7	123.3	194.2	16.4 (GOP only)	35
Intended number of beneficiaries	200,000	550,000	31,000	No info	60,000	3 million	2 million	630,000	385,273	761,400
Number of communities	33	242	520	244	139	1,200	1,400	1,600	986	2,892

Source: project documents

Study Context: Weak Sector Policies and Rules

In many developing countries, rural water supply sector policies have been poorly defined and public sector implementing agencies historically weak. This situation has been exacerbated as donors and implementing agencies bypass governments to set their own policies and rules for their projects. In addition, where the Bank has a strong presence, it has often sent inconsistent policy signals. In some cases, the Bank has financed independent multi-sectoral and stand-alone rural water supply projects in the same country that adopt different rules and objectives to build very similar infrastructure.

A Demand-Responsive Approach

Against this background, participants at the 1992 International Conference on Water and the Environment in Dublin endorsed a set of principles advocating the concept of water as an economic as well as a social good that should be managed at the lowest possible level. The demand-responsive approach to providing services is a

direct extension of these principles. It advocates that to manage water as an economic good, projects should let consumer demand guide key investment decisions. Specifically, projects should adopt clear and transparent rules that allow users to select the level of service, technology, and location of facilities that best fit their needs, with a clear understanding of the costs and responsibilities that these options bear.

An increasing number of projects are applying these principles to varying degrees. This study was designed to learn more about the nature of demand and the linkages between the demand-responsiveness of rural water supply projects and the sustainability of the infrastructure provided.

Methodology

The study was carried out over a one-year period by field-based teams in six countries: Benin, Bolivia, Honduras, Indonesia, Pakistan and Uganda. Each field team was composed of local researchers—either from nongovernmental organizations (NGOs) or universities—using a common methodology. The projects included in the study were chosen based on the high degree of demand-responsiveness they employed, and the interest of the project director (and in some cases the World Bank task manager) to participate in the study. At least one project in each country is funded by the World Bank.

The analysis was based on a set of indicators developed specifically for this study. An indicator is a group of statistical values that taken together is indicative of a particular characteristic. Indicators were used to measure both the relative demand-responsiveness of the project's approach in a particular community, from the perspective of household members and from water committees, as well as the sustainability of that community's water system. Data for these indicators was collected from primary sources, including household surveys, structured interviews with water committees and community leaders, technical assessments, and qualitative assessments. In all, the study team members surveyed 1,875 households, representing 125 communities served by 10 projects.

Eleven indicators form the core of the study's analysis. Six indicators focus on the communities' role in project implementation, measuring community involvement in project initiation, the degree to which the community made an informed choice about the type of water system constructed, and levels and quality of household and water committee training. Identical indicator categories allow for comparison of the project approach as perceived by household members and water committees (or community leaders).

Five other indicators measure the performance of the water system, in terms of physical condition, consumer satisfaction, operations and maintenance, financial management, and willingness to sustain the system. In the analysis, these variables, along with 75 additional background and project-specific variables, were subjected to statistical tests (including correlation and regression analysis) to determine which factors were most important in ensuring water system sustainability.

Major Findings

1. Demand-responsiveness increases sustainability.

Sustainability is higher in communities where a demand-responsive approach was employed. However, most projects do not apply their rules consistently among the communities where they work.

The study found that sustainability was markedly higher in communities where household members made informed choices about whether to build a system and what type and which level of service they preferred. This relationship proved statistically significant, even after controlling for the effects of independent factors such as poverty level and distance from a major city, and project-related factors such as training, technology type, and the per-capita cost of the system.

Although sustainability is higher in communities where project staff employed a demand-responsive approach, the study revealed that project staff apply the approach inconsistently. Community and household surveys indicated that projects were sometimes supply-driven (not offering community members options or informing them of expected costs or responsibilities), and at other times were demand-responsive (spending time informing communities about their options and giving them a lead role in the decisionmaking process). The survey reports similar findings on the issue of training—projects conducted training in some villages and not in others. These findings illustrate that project rules

adopted in a central headquarters office do not always lead to consistent operations in the field, especially when a wide range of intermediaries are involved. The projects included in the study varied significantly in how they implemented their work, ranging from implementation by project staff to implementation by independent contractors or NGOs. However, the inconsistency in approach was common to all projects, suggesting a need for better implementation procedures across projects.

2. Household demand should guide investment decisions.

Sustainability is higher when demand is expressed directly by household members, not through traditional leaders or community representatives.

The study found that the relationship between the demand-responsive approach and sustainability is strongest when household members, rather than community representatives (such as water committees, traditional leaders, or local governments) are involved in project initiation and in decisions that need to be made about the water system. The study found that large gaps often exist between the perceptions of households and the community leaders with which project staff or intermediaries work.

Numerous examples emerged in which community representatives co-opted project benefits, either placing the water system on their own property, excluding certain segments of the community from using the system, or selecting a design option that other community members did not want. In other cases, community representatives failed to consider the demand of certain segments of the population, such as women or the poor, leading to a design that did not reflect the preferences of the community as a whole. In such cases, community members often expressed dissatisfaction with the service, possessed a low sense of ownership, and had little willingness to pay for the maintenance of the service. The study found that quality improves when projects, NGOs, or other intermediaries employ well-trained extension staff to help ensure that all members of the community have the opportunity to participate in the decisionmaking process.

Households were not aware of options in multi-sectoral projects.

Multi-sectoral projects can provide funding to communities for any number of small-scale projects. While such a design should optimally allow communities the broadest expression of demand (they can select not only service types and levels but between sectors), most households served by these projects reported that they did not know they had the option of another type of project.

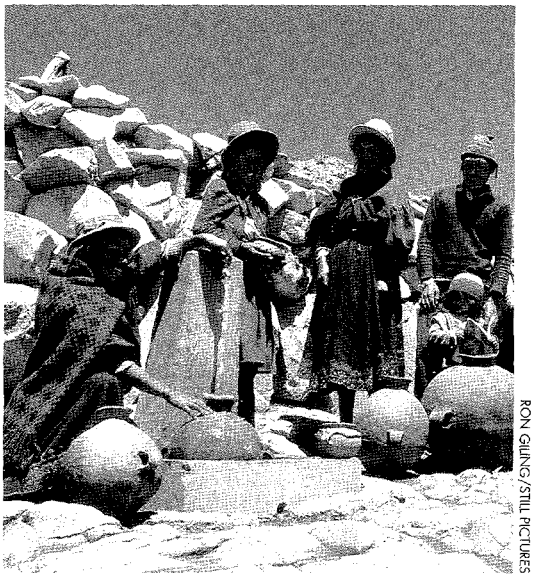
3. Training, community organization, construction quality, and technology also contribute to sustainability.

Training for household members and for water committees improves sustainability by building capacity and commitment.

One of the most conclusive findings of the study was that both household and water committee training played an important role in ensuring the sustainability of water systems. This finding supports the notion that even when communities have high demand for water, they may lack the capacity to operate and maintain the system on their own. In addition to providing knowledge on how to operate and repair the water system, training informs people of what expectations they should have for their water system and how to identify and address minor problems in the system before they become major. Providing people with information about the potential health benefits of an improved water supply affects how they value their water source and thereby improves their willingness to sustain the system.

A designated community organization is a necessary component of success.

The third factor (together with a demand-responsive approach and training) affecting the overall sustainability of a water system was the existence of a formal community organization that operates the system. In most cases the water committee manages and oversees the system's operation, which includes conducting preventive maintenance, collecting tariffs or payments for repairs, keeping records of financial transactions, manuals and blueprints, sanctioning people for non-payment, and ensuring that repairs are made. The study found sustainability to be significantly lower in communities that lacked such an organization.



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Quality of construction is crucial in ensuring sustainability.

The study found that construction quality had a major impact on sustainability. Qualitative assessments revealed that even when a demand-responsive approach was used, poor construction quality lowered the chances that the system would be sustained. Construction quality and sustainability were not linked to per-capita costs, and systems built by private contractors were not consistently better or worse than those built by community members. Poor construction quality was more likely to occur when supervision was lacking and where contractors or project staff were accountable to a distant project manager rather than directly to communities. In community-built systems, construction quality was often linked to the provision of adequate technical support to communities by the project.

Inflexibility in technical options and service levels puts systems at risk.

Many of the projects applied design standards that promoted over-design and did not allow much service level flexibility, regardless of project rules that allow for community choice. Gravity systems are often considered the most reliable technical option and are the easiest to maintain by communities. Many projects in Asia and in Latin America and the Caribbean were found to have a bias toward gravity systems rather than giving communities a choice. The study showed that users had a strong preference for house connections and there was a strong willingness to pay the additional costs of these connections. However, some projects were designed to provide only a minimum service level and did not take this incremental demand into account. If users expanded the water system on their own, the technical viability of the system was often jeopardized. The study found no relationship between technology type, or age of the system (most systems included in the study were between three and five years old), and sustainability.

4. A demand-responsive approach requires appropriate financial policies and accountability to community members.

The lack of accountability and transparency in some government agencies led to higher costs, delays in implementation, and lack of trust by community members.

The study found that construction of water systems often rests in the hands of non-responsive agencies even in demand-responsive projects. Communities have no way to ensure that contractors or government agencies will honor the choices they have made or to hold project staff accountable if a system is poorly constructed, incomplete, or if construction is delayed. Furthermore, the study revealed a lack of financial accountability, particularly in government agencies. Most projects surveyed kept no records of system costs or how much communities contributed to the water system. The study found evidence that, as a result, many users did not trust that the agencies would use their contributions well, and that willingness to pay for investment costs increased dramatically when communities have control over how funds are spent.

Financial policies failed to link service level to costs, and did not provide incentives for projects to reduce costs.

The study found that the financial policies of most projects were not well prepared. Frequently there was no clear rationale for financial policies, and no incentives to promote more cost-effective investments. Most projects required very small

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contributions from communities that are not linked to the costs of providing services. The study found that per capita costs were lower where there were higher community contributions, strict cost control measures, a defined per capita subsidy ceiling, and when construction contracts were managed by NGOs rather than government agencies.

When choices are not linked to prices, households view contributions as a tax rather than an expression of demand.

In a demand-responsive approach, the choices that people make should be linked transparently to prices so that people can make informed choices about their participation. Most projects did not make this link explicit, so that many household members perceived their contribution as a tax, rather than a price they were paying in exchange for a service. In most cases, the costs of different options were not presented when communities were making decisions. The required contributions were usually so low or so vague that communities did not perceive that they faced an economic trade-off for a higher level of service. In addition, project staff or community leaders did not always give individuals a choice on whether or not they would contribute. However, the study did find that regardless of the established contribution level (ranging from no contribution up to 40 percent of costs) there was a consistent willingness to pay for services by community members in all projects. In order for contributions to be used as an indication of demand these linkages must be more clearly established.

Implications for Projects

The most important lesson of the study was that project rules matter, and their design and implementation can profoundly affect water system sustainability. These rules—which define the eligibility criteria for communities, decisionmaking roles, financial policy, service levels, and technology options—set the framework and incentives that will determine the success of a project. The study also found that care must be taken to ensure that these rules are implemented consistently. Specifically, the study suggests that:

1. Adopting a demand-responsive approach will improve the sustainability of water systems.

The study found that sustainability is higher in communities where projects employ a demand-responsive approach. The study provides evidence that the definition of the approach should be expanded and refined as follows:

- *Household-level demand should guide key investment decisions.*

Sustainability is increased when the role of project initiation and selection of service level options, technology, and siting are placed in the hands of well-informed household members rather than traditional leaders or water committees. If representatives are used, project staff should take active steps to ensure that community representatives are truly representing all members of the community.

- *Focus on information flows before, during, and after implementation.*

Because the success of a demand-responsive approach depends on people making informed choices, project staff should place greater emphasis on providing information at the household level. Before communities are selected, project staff should inform community members of the type of assistance they offer and the

eligibility requirements that must be met. During the design phase, project staff must ensure that people are aware of what is being offered, the costs and benefits of each option, and their expected roles in operating and maintaining the systems. Before deciding whether to participate in the project, communities should be informed of where they will be able to find technical assistance and where to locate tools and spare parts for the system.

• *Community mobilization is important to facilitate the aggregation of demand.*

Demand theory assumes that individuals will express their preferences if the incentives are correct. Since a water system is a good to be shared by individuals with very different priorities and needs, being demand-responsive at the community level requires an aggregation of individual demand to formulate a single, community demand. Projects should employ staff or intermediaries to facilitate this process and ensure that the community demand is representative of all members of the community. Such mobilization may take the form of town-hall meetings and may include gender-sensitive techniques to ensure that women's voices are heard.

The aim of community mobilization in this context should be to ensure that there is a demand for service among all potential users, to identify the preferences and priorities of the community, and to ensure that users are committed to operating and maintaining the system before a decision is reached to build a water system. When community mobilization is weak or absent, projects risk having their benefits appropriated by community leaders or dominant ethnic groups, excluding women and other user groups from decisionmaking processes and project benefits, and jeopardizing a community's commitment to sustain the water system.

• *Communities should be able to choose how, when, and who will deliver and maintain services in addition to selecting service levels and technologies.*

Projects often stop short of being truly demand-responsive by giving communities choices on their participation and service levels, but not on how services are delivered. Supply agencies should be accountable to communities by providing agreed-upon services in an efficient and effective manner. Communities should participate in contractor selection, when appropriate, and have greater control over supervising works and authorizing payment when works are completed (even if services are provided directly by government agencies). Once construction is completed, communities need flexibility in deciding how they want to manage the water system. While most projects require communities to establish a separate water committee, communities may prefer alternative arrangements such as contracting a water system operator or using existing community organizations.

2. Better focus on implementation of rules by project staff, intermediaries, contractors, or NGOs will improve performance.

To improve sustainability, project staff need to ensure that the rules are well communicated and understood by those who are expected to implement them, especially with regard to community mobilization activities. In addition, staff need to be appropriately trained and have adequate resources available to them. Supervision mechanisms should be established to ensure that project rules are implemented correctly.

3. Investing in household and water committee training pays off in terms of sustainability.

Projects should include training as part of their project design. Communities that receive household-level training are more satisfied with their systems, more willing to pay the costs of maintenance, keep the system in better physical condition, and carry out better operations and maintenance. At the same time, training members of the water committee will lead to better operations and maintenance and financial management.

4. Adopting flexible design standards will prevent ad-hoc modifications that jeopardize water system integrity.

Projects should adopt flexible design standards that allow communities that prefer higher levels of service to bear the cost of household connections as part of the original design. Projects should also provide the option of lower service levels for communities that prefer to pay less. Without this flexibility, project staff run the risk of over-designing systems that people are not willing to maintain, or under-designing them and running the risk of ad-hoc modifications to the water system.

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