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Community participation in rural water supply

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Water and sanitation projects can be effective vehicles for promoting local participation in community development. There are several reasons:

- Villagers usually assign a high priority to the introduction of potable water.
- The benefits of potable water are immediate and tangible.
- Water projects can be designed so that their benefits are equitably distributed.
- Everyone in the community can play an active role in the planning, construction, and maintenance of water and sanitation systems.

Yet most rural water agencies are not particularly interested in community participation. Their interest is the installation of water systems, as many and as quickly as possible. They normally view the extension of water service as an engineering problem—an investment in infrastructure which can be measured by kilometers of pipe laid and number of taps installed. From their point of view, the key question is not whether water projects can promote community involvement, but whether community involvement leads to more and better water systems.

Agua del Pueblo is a Guatemalan rural water and sanitation program that has made community participation its guiding principle. It believes that local involvement in development is a goal worth pursuing for its own sake, that this involvement is an essential condition for building democratic and self-reliant communities. But

it also believes that local participation is ultimately a more efficient way to install rural water systems. This article tries to show why.

What does the abstract notion of "community participation" mean when it is put into practice? Concretely, what does a community do when it is "participating"? The case of the village of Pacul, Guatemala, illustrates how community participation in rural water supply can work.

From the outset, the people of Pacul took the initiative. They knew they needed water. After discussing the matter among themselves, they appointed a delegation to seek technical assistance outside the community. When a technician from Agua del Pueblo arrived in Pacul, the town joined him at the spring to measure the flow rate and the quality of the water and to assess the feasibility of building a gravity-flow system. After

his study established that the project was technically possible, every household head put his or her signature or thumbprint on an agreement which specified the obligations of both the community and the agency.

Community members were selected at a town meeting to serve as the water committee. The committee met with the program technician to discuss the work to be done. They placed pictograms on a cloth chart to indicate the proper sequence of activities and to assign individual responsibilities. A project schedule was drawn up to coincide with the return of Pacul's men from the coast, where they find seasonal wage labor on the large plantations. The committee conducted a census and prepared a detailed map with color-coded symbols so that committee members who could not read could monitor the efforts of households under their supervision.

Simple pit latrines are a safe and inexpensive means of disposing of human waste. The committee arranged for the showing of a film on sanitary education, learned how to dig latrines, distributed construction materials, and helped their neighbors with installation. Mothers and children attended discussions and demonstrations on personal and domestic hygiene, and the technician worked with the school-teacher to plan games dealing with hygiene and latrine use. The older children learned reforestation techniques and helped the water committee plant seedlings around the spring site to prevent soil erosion that could cause the spring to shift or dry up.

As the project took shape, a meeting was held to decide what portion of the

costs the community could pay. A loan was arranged through Agua del Pueblo. The water committee treasurer visited the agency's office to learn bookkeeping and to discuss the collection of monthly maintenance fees and the terms of repayment by the users.

Actual construction of the system did not begin until the design was completed, the budget agreed upon, and the household latrines installed. The tasks of surveying, calculating pipe diameters, and designing the hydraulic system were handled by the technician, though committee members were often on hand to watch and help. Two villagers were elected to work side by side with the construction foreman and to be responsible for operating and maintaining the system.

The committee held a long meeting with the technician and the construction foreman to draw up a work schedule; select a storage site for materials and equipment; and assign each family its responsibility for contributing labor and for collecting rocks, sand, gravel, and lumber.

Construction began on April 11, 1978. The men of Pacul dug 1,760 meters of ditches, helped build storage and distribution tanks, laid pipe, and helped install 20 household connections. On May 19, the project was completed. A community meeting was held to sum up the total costs, collect signatures to the final loan agreement, and plan a festive inauguration.

Epilogue: A little over a year and a half later, an Agua del Pueblo visitor found the *acueducto* to be in excellent working condition. He also found a second piping network that had been subsequently installed. Several months after completion of the potable water system, the water committee had met to discuss taking out a loan for small-scale irrigation. They had located another spring and had sent a delegation to Guatemala City to discuss their plans with the National Agricultural Development Bank. Eventually, their loan was approved, and the irrigation system was installed.

With the irrigation system in place, the farmers of Pacul grew more vegetables for domestic consumption and also began to produce strawberries, a cash crop that brought good prices in

nearby Tecpán. The first yields looked promising, and the committee was hopeful that the extra income would permit both water loans to be paid off ahead of schedule.

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The story of Pacul illustrates how participation in rural water supply can be more than just the contribution of manual labor. Rather, it means direct involvement in every step of the process: planning, implementation, and operation. *But why do it this way?*

There are three reasons: first, to ensure that the health benefits which are possible through water and sanitation investments actually materialize; second, to guarantee that the system will keep operating after the technician has departed; and third, because it is less expensive.

Health benefits

The World Health Organization maintains that "... in most small towns and villages in rural areas, more health benefits can be gained from money spent on a water supply program than in any other way." Yet money spent does not necessarily produce the health benefits that are promised.

Why? Primarily because most water programs fail to consider the complex behavioral changes that are required if the transmission cycles of water-related diseases are to be broken.

Traditionally, water programs in Guatemala have concentrated on improving the *quality* of water by substituting the use of a protected source for a polluted one. Yet even if the family is drinking clean water, the fecal-oral pathogens that cause many water-borne diseases may still be ingested if hands are not washed and dishes are not clean. In part, this is simply a function of *quantity*. If water is abundant, people will use more of it for personal hygiene; but if it is scarce, distant, or expensive, people will use it only for drinking.

The healthful use of water also depends on information, and this is where community participation can be critically important. In most villages, children and women are the primary victims of water-related disease. The children suffer from diarrheas and par-

asites; the women must care for them. When women and children have closely involved in the water project by choosing the location of taps, for example, and taking part in health education exercises—they learn how water should be used. The process of participation can also be the process of health education.

Similarly, sanitary facilities must not only be installed, they must be correctly used if potential health benefits are to materialize. Even when the commitment to building a new water system is great, villages are rarely convinced of the need for improved excreta disposal practices. As Elmen and Buckles point out in a recent World Bank case study, "Behavioral changes in excreta disposal practices came about as a result of gaining the commitment of important community members who were willing to permanently address the issue on a daily basis within the community in a practical and persuasive manner." Members of the village water committee can see that role. They not only provide information and advocacy, but more importantly, they set visible examples by installation of latrines in their own homes.

A more reliable water supply

As many as one-third of the village water systems in the Third World are estimated to be out of commission on any given day. Reinfection with fecal-oral pathogens can take place literally overnight. One recent study found that breakdowns that force people to use contaminated water for only two percent of the time risk undoing the health benefits of drinking clean water during the rest of the year. Providing villages with clean water and changing hygienic practices are of limited value if the water system works only intermittently.

Rural water and sanitation programs that serve many dispersed communities respond slowly to system failures. Sometimes it takes days to hear about a breakdown in a remote village, and additional days, weeks, or even months for a repair team to be dispatched to the site. Yet many rural water institutions continue to use fees from client villages to finance expen-



President of village water committee.
Village of San Lorenzo, Tecpán,
Guatemala.

sive, centrally-based maintenance teams.

Transferring the skills and responsibilities for repair to the community is an effective alternative. A 1979 study of 34 Guatemalan village water projects built over the previous 15 years found that village involvement in operating and maintaining systems was essential for keeping them working. Where villagers had received practical training in operation and maintenance, there were fewer system failures and fewer days per year without clean water due to breakdowns.

To handle this responsibility, a local water committee needs to assign periodic upkeep responsibilities to community members, collect regular fees from beneficiary families, and purchase new tools and spare parts as needed. Direct community control over the fund establishes an incentive for regular, preventive care of the system. In Agua del Pueblo projects, the community is encouraged to invest part of its fund in other community improvements when the balance exceeds anticipated maintenance needs. Controlling the fund allows the community leaders to pay for outside technical assistance as needed, but it does not force them to subsidize either a centralized program or the repairs of other communities that devote less attention to preventive maintenance.

Villagers selected at the outset of the project to work closely with water program personnel can be taught skills for periodic maintenance tasks and most emergency repairs. In the simple gravity-flow water systems most common in highland Guatemala, the tasks are straightforward: periodically cleaning valves and tanks, routinely repairing

broken pipes, and replacing worn-out washers or faucets. For these purposes, an adequate supply of simple tools, lengths of pipe, washers, cement, and spare faucet assemblies should be left in the hands of the water committee when the system is completed. Although more sophisticated technologies may require more extensive training programs, the principle of user-maintenance remains valid for nearly all village water system technologies.

In Pacul, a seasonal flash flood destroyed the supports that carried the pipeline over a stream that runs through the village. The next day, villagers who had participated in the construction of the system used their supply of materials to repair the supports and the broken pipeline. Clean water was available again in a matter of hours.

Cost savings

Community participation can help to trim costs in a variety of ways. First, contributions of local materials and voluntary labor may account for a significant savings in project costs. Using prevailing market rates, a recent analy-

sis of Agua del Pueblo's projects shows that these inputs accounted for nearly 40 percent of all project costs. Second, a well-organized committee that can deliver these contributions to the project site when they are needed enables the paid technical staff to go about its work rather than wait for supplies or helpers to materialize. Third, community involvement in operation and maintenance saves money by reducing the number of expensive, post-construction site visits by outside maintenance personnel.

Finally, the most significant economic contribution can be the community's sharing of the system's capital costs. The potential for mobilizing local resources for rural water projects can be quite substantial. Agua del Pueblo uses subsidized loans to cover an average of 80 percent of the costs of purchased materials, the transportation of those materials, and the hiring of the construction foremen. The loans carry an interest rate of five percent and are amortized at \$1 per family per month.

If the community is to assume a major share of the construction costs by taking out a loan, then the water committee must be legally authorized to collect payments and be trained in bookkeeping and accounting. The community must be satisfied with the system and willing to take on the obligation of loan repayment. The committee must be able to monitor each household's payments in order to avoid communal delinquency.

Agua del Pueblo's requirement that a substantial capital investment come from the community is unusual among water programs, which normally limit the community's contribution to the



provision of labor and locally available materials. To date, 15 of the 16 loans in the program's portfolio are up-to-date—testimony that communities will pay for services that they value and helped to create.

Institutionalizing community participation

Can community participation be "institutionalized"? Can an activity that works well in a small private program be equally effective as part of a nationwide water campaign? Do participatory methods rule out the economies of scale that national bureaucracies seek to achieve?

One difficulty is that water systems installed with extensive community participation may take longer to complete. The organization and training of a village water committee, health and hygiene education, and the instruction of local maintenance personnel all require time and effort from program personnel. This time investment may be large, but it is not time lost. A local water committee can free days of a technician's time by locating alternative springs and collecting census information. A committee can guarantee that contributions of local materials and voluntary labor are available when needed so that construction can proceed rapidly. Local responsibility for operation and maintenance reduces

demands for institutional attention when breakdowns occur.

Another difficulty with institutionalizing participation is that most water agencies do not employ personnel who are able to invest the *kind* of time that is required. If the water agency is to use participatory methods to build reliable water systems and to motivate the complex behavioral changes required for health improvements, it must employ someone who can communicate effectively with village clientele. This person must be trained to make technical decisions (what size pipe) and also resolve social conflict (where to put the pipe). Someone must explain principles of hygiene and sanitation. Maintenance and repair skills must be taught. If loans are to be provided, a workable mechanism for repayment must be established.

Traditionally, water programs have employed the relatively expensive services of university-educated civil engineers and other specialized technicians for the performance of most on-site tasks. Typically, these technicians are young, urban professionals who have not had extensive rural experience. In some respects, these individuals are both under- and over-qualified for the job at hand.

The solution of Agua del Pueblo is to train multi-skilled field personnel, similar to the health workers who are now common in many primary health

Early-morning construction crew assembled by water committee, Paracoc, Guatemala.

care programs. In Agua del Pueblo program, high school graduates from rural backgrounds receive six months of instruction in surveying, basic hydraulic engineering, system design and construction, latrines, health education, community organization, and project administration. Working under the minimal supervision of a civil engineer, they provide technical advice and support as the communities work through the steps of installing their water systems themselves.

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In December, 1980, the villagers of San Juan and Chuacorral inaugurated a joint water system. Like the people of Pacul, these men and women had participated fully in each phase of their water project. Two months later the joint water committee met in a makeshift schoolroom built with materials collected by their communities. They discussed how to raise enough money to build a more permanent schoolhouse, which they hoped would attract a full-time schoolteacher.

In the long run, their talk of schoolrooms, irrigation systems, electrification, and access roads may be the most eloquent testimony to the lasting value of participatory water projects. But in the short run—it should not be overlooked—their water was clean and running.

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