COMMUNITY-BASED APPROACHES TO WATER AND SANITATION: A SURVEY OF BEST, WORST, AND EMERGING PRACTICES

By John Oldfield

Unsafe water and inadequate sanitation and hygiene in small rural communities throughout the developing world are some of the world's most important, timely challenges. This review of small-scale and rural water, sanitation, and hygiene projects incorporates case studies that highlight best, worst, and emerging practices in the sector. Based on research and interviews with senior leaders at leading NGOs, this report recounts lessons learned primarily over the past two decades; illustrates these lessons by using case studies from the surveyed organizations; and concludes with a brief discussion of breakthrough practices identified by the surveyed NGOs. Although the environments, villages, and projects examined differ widely, initial findings reveal:

- Community-based small-scale solutions work well if designed, built, and maintained effectively;
- The most successful projects (measured primarily by time saved and health benefits to communities) focus not just on supplying water, but also on sanitation and hygiene, which often are more immediate causes of death or illness;
- Social marketing—deploying commercial marketing tools to promote habit change and health benefits—often reduces the time necessary to change poor health habits;
- The projects and their results often do not meet the initial expectations of the communities, donors, or NGOs (but this does not necessarily reflect project success or failure);
- Project management and ownership—including financial management—should be decentralized as much as possible;
- Government involvement, although frequently not necessary in small rural projects, becomes essential—and potentially beneficial—when NGOs scale their work up or move into peri-urban or urban areas;
- Substantial women's involvement is important to project success, particularly for sanitation and hygiene programs;
- Lack of financial support, caused by a lack of political will (in both the developed and developing world), is slowing progress; and
- It is not easy: Sustainable development for water, sanitation, and hygiene requires thoughtful design, well-managed project implementation, and extensive local capacity building.

METHODOLOGY

This report's findings are built on two primary sources of information:

1. *Literature Review*: I reviewed relevant literature, primarily online. While a great deal of literature addresses the challenges of small-scale, rural projects on water, sanitation, and hygiene, there is a dearth of accessible research bringing together the work of multiple organizations, highlighting the strengths and weaknesses of differing approaches to the task; and
2. *Phone Interviews*: I surveyed leaders from six nonprofit NGOs (five in the United States, one in the United Kingdom) over a period of three months from late 2004 to early 2005. The interviews began with a standard set of questions, and I gave each respondent the opportunity to comment on related issues.

I selected WaterPartners International, Water For People, WaterAid, Living Water International, CARE (see Box A), and the Hilton Foundation due to their current leadership positions in the field and because they have operated for at least 15 years, thus facilitating a longer-term look at operational practices.[1]

Much of this research is anecdotal, as I did not have the resources to investigate these claims on the ground. Also, it is difficult to gather accurate data in this sector, as definitions vary, and countries use different sets of indicators. As WaterAid (n.d.) notes on one of its factsheets, "statistics tend to understate the extent of water and sanitation problems, sometimes by a large factor. There are not sufficient resources available for accurate monitoring of either population or coverage" (page 1).

DEFINITIONS

How much water and for what period of time: This report does not address industrial or agricultural water usage. Although the linkages among agricultural, industrial, and household water usage are manifold, I am chiefly concerned with the amount of water each person needs for daily survival: the amount of clean water necessary for drinking, cooking, and bathing without dying or becoming ill from unsafe water.

Although the Millennium Development Goals (MDGs) do not explicitly define what constitutes access to safe drinking water, the World Health Organization (WHO)/UNICEF Joint Monitoring Programme describes reasonable access as "the availability of at least 20 liters (c. five gallons) per person per day from a source within one kilometer of the user's dwelling."[2] All of the organizations surveyed design projects to meet or exceed these basic requirements, taking into account growing populations through and beyond the life cycle of the system, ranging normally from 5 to 15 years.

Size and scope of projects: This report tackles challenges relevant to small-scale—predominantly rural—water, sanitation, and hygiene development projects. Projects range in size and scope from a $500 repair to a broken handpump in Africa, to several hundred thousand dollars for multifaceted peri-urban activities in Latin

1. This report does not include, for the most part, the experiences of multilateral and bilateral organizations.
2. For further guidance on what constitutes "improved" water supply and sanitation, please refer to "Water Supply and Sanitation Technologies Considered to be 'Improved' and Those Considered To Be 'Not Improved'" as presented by the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (2000); see http://www.who.int/docstore/water_sanitation_health/Globassessment/Global1.2.htm#BOX%201.5

America, and from one day to 1–2 years in length.

NGOs vs. nonprofits: Although these words are often used interchangeably, I prefer to use NGOs. Although predominantly nonprofit, NGOs can—and do—include for-profit enterprises doing development work.

Community-based: A community-based solution involves decentralized (village-level) decision-making, village-level ownership, locally appropriate technology, and locally sustainable business and financial models as much as possible. A truly successful community-based project will require no external inputs once the project is completed. For the purposes of this report, community-based projects range in size from a few hundred to several thousand individuals.

IMPACT OF SAFE WATER (RETURN ON INVESTMENT)

Current research shows that the economic returns on successful water projects are very high, both on a macroeconomic level and a project/household level. Of the NGOs surveyed, WaterAid (UK) has most extensively evaluated the economic return on water projects. Based on an assessment of WaterAid projects in Ethiopia, Ghana, India, and Tanzania, the economic returns range from US$2 to US$52 for each US$1 invested (Redhouse, Roberts, & Tukai, 2005).

Another recent evaluation by the WHO concluded that the returns range from US$5 to US$28, strongly stating: "The results show that all water and sanitation improvements were found to be cost-beneficial, and this applied to all world regions" (Hutton & Haller, 2004, page 3*)*. These results hold steady on global, national, regional, village, and individual levels, and vary based on the design and cost of the project and the type of benefits that accrue (e.g., time savings, calorie-energy savings, water purchase savings, improved health, and more). In some cases these benefits put cash directly in people's pockets—for example, by enhancing agricultural productivity. In other cases, the connection is less direct. The biggest impact from these projects often comes from the time savings for villagers who no longer have to walk miles to get unsafe water, then boil it to make it potable. Although there are uncertainties associated with the initial data from which these findings are derived, the Hutton and Haller report stated that "even under pessimistic scenarios the potential economic benefits generally outweighed the costs" (page 3).

WaterAid draws the following conclusions from its research (Redhouse, Roberts, & Tukai, 2005):

- The clearest impacts were improved livelihoods and education attendance;
- Women and children received more benefits;
- There were positive and significant environmental impacts;
- Technical quality and effective management were equally important in operating water systems; and
- Ongoing support for communities increased their ability to sustain both supply systems and hygiene behavior changes.

THE FACETS OF SUSTAINABILITY

Although the global drinking water, sanitation, and hygiene field continues to advance rapidly, it is not too early to draw some preliminary conclusions about best, worst, and breakthrough practices. This report intends to shorten the learning curve for new and growing water-related organizations (and their supporters) in both the developed and developing worlds.

Handwashing in Guatemala
(courtesy Nancy Haws, Water For People)

BOX A: NGOS SURVEYED

WaterPartners International
- Founded 1990, based in Kansas City, Missouri (USA)
- Active in Central America, Africa, Middle East, Asia
- In 2005, WaterPartners expected to spend US$2.5 million on water, sanitation, and hygiene projects
- WaterPartners has helped more than 60,000 people in 70 communities develop safe water supplies and improved sanitation systems
- Slogan: "We envision the day when everyone in the world can take a safe drink of water."
- http://www.water.org
- Respondent: Gary White

Water For People
- Founded 1991, based in Denver, Colorado (USA)
- Active in Latin/Central America, Africa, Asia
- In 2003, Water For People spent US$1.3 million, and completed 58 projects in 12 countries
- Slogan: "Water For People helps people help themselves."
- http://www.waterforpeople.org
- Respondent: Steve Werner

WaterAid
- Founded 1981, based in London (UK)
- Active in Africa, Asia
- WaterAid spends £12 million per year (approx. US$22.6 million), providing water to about 700,000 people and sanitation to 500,000, averaging £15 (US$28.25) per person
- http://www.wateraid.org
- Respondent: Stephen Turner

Living Water International
- Founded 1990, based in Houston, Texas (USA)
- Global operations, US$4.6 million in 2003
- Close to 3,000,000 people currently being served, pumping 15 million gallons a day.
- Per capita costs (water supply only) from US$1 to US$50
- Slogan: "A cup of water in Jesus' name."
- http://www.water.cc
- Respondent: Gary Evans

CARE's Water Program
- Founded 1945, based in Atlanta, Georgia (USA)
- Operations in more than 70 countries
- In FY 2003, CARE spent US$16.3 million on water and sanitation. Nearly 3 million people in 29 countries gained access to clean water, sanitation, and hygiene education.
- Slogan: "Where the end of poverty begins."
- www.care.org
- Respondent: Susan Davis

Water projects in the developing world fail as often as they succeed. Despite best intentions, projects often are not sustainable for the long run, especially after the donor leaves the country. Historically, sustainability has often been an afterthought. Traditionally, more effort has been put into constructing new systems than into making sure the old ones continue to work.[3] Well-thought-out, sustainable design has the best chance of enabling stakeholders to achieve the scale needed to significantly reduce the number of people without water and sanitation. More fundamentally, sustain-

3. For more on this topic, see the WHO's "Sustainability and Optimization of Water Supply and Sanitation Services," available online at http://www.who.int/docstore/water_ sanitation_health/wss/sustoptim.html

able design will lower the rates of mortality and morbidity due to unsafe water, and create opportunities for related social development.

Although normally the technology involved is—or should be—quite straightforward, additional systems need to be instituted to ensure that each project is sustainable on technical, social, and financial levels. All of the leading water-related nonprofit organizations now focus on the following facets of sustainability throughout the life cycle of their projects:

1. Technology;
2. Social sustainability or "soft skills";
3. Finance/business models;
4. Management/ownership; and
5. Gender.

Technology

The oft-debated 1981–1990 International Drinking Water and Sanitation Decade[4] was criticized for focusing too much on large-scale technical infrastructure and capital expenditures, and too little on designing and institutionalizing systems that would build local capacity and ensure permanence. Although most conversations with NGOs in this sector include discussions of the technology of water and sanitation, the nature of those discussions has changed. The best planners and project developers address not only which technology is most *appropriate*, but also consider technology as a subset of the overall requirements for a successful water system, and include an in-depth appreciation of "soft skills." In short, it is increasingly rare for the sector to *solely* focus on technology.

With that said, the phrase "appropriate technology" encapsulates what is widely perceived as best practice today among leading nonprofits: technology that is locally derived and managed, and that meets needs in the most simple, efficient manner possible. Examples of appropriate technology include technical solutions designed so that local communities can obtain replacement parts for a pump and repair it themselves, and, at best, ensure that communities have the capacity to craft or manufacture the part locally.

The water supply hardware used by the respondents to this survey includes but is not limited to:

- Gravity-fed water supply systems;
- Boreholes with manual or electric pumps;
- Rainwater harvesting systems with storage tanks;
- Village-level sand filtration systems for surface or groundwater;
- Microdams and catchment basins; and
- Point-of-use (household) filtration systems (e.g., buckets with cloth/charcoal filters or chlorine disinfection systems).[5]

Additionally, to ensure adequate sanitation, pit latrines may be constructed locally.

Living Water International (LWI) asserts that there are five major components to a successful water project:

1. Access to safe water;
2. Access to safe water;

4. For more information about the 1981–1990 International Drinking Water and Sanitation Decade and other United Nations water resources, see http://www.unesco.org/water

5. For example, see the CDC's Safe Water System at http://www.cdc.gov/safewater/index.htm; for a discussion of this and other point-of-use systems, see the accompanying chapter in this volume, "Household Water Treatment and Safe Storage Options in Developing Countries: A Review of Current Implementation Practices," by Daniele S. Lantagne, Robert Quick, and Eric D. Mintz.

3. Access to safe water;
4. Health and hygiene training; and
5. Sanitation.

LWI has thus historically focused the majority of its efforts on water supply solutions, arguing that without the foundation of safe water there is little hope of making effective or sustainable gains in hygiene, sanitation, or health (Gary Evans, personal communication, January 14, 2005).

The lower end of LWI's technical projects may be a simple 100-foot borehole and handpump serving 500–1,000 rural villagers in India for five years. On the high end, the system may entail a 1000-foot borehole drilled through granite, with a generator, storage tank(s), and distribution system of kiosks and taps in a peri-urban area outside Nairobi, Kenya, designed to last 15–20 years.

LWI only infrequently incorporates soft skills training (health, hygiene, and sanitation) into its projects.[6] They do, however, train and equip local people to drill and maintain boreholes and pumps. To achieve permanent capacity and scale, and create full-time jobs, LWI has also instituted a "circuit rider" approach, whereby a small number of workers service a series of water systems.[7] The benefits of this approach are:

- Creating full-time jobs for engineers (instead of relying on village-level volunteers who may be called into service only once in five years);
- Keeping these engineers' skills current due to more frequent installation and maintenance projects; and
- Cost-effectiveness.

The overall capital cost of a LWI water-only project ranges from US$2,500 to more than US$50,000, with per capita costs ranging from under US$2 to more than US$50. These costs depend on many variables, including but not limited to:

- Country/region;
- Terrain and depth of the well(s);
- Number of people served;
- Pump model and other hardware;
- Whether storage and distribution systems are built; and
- Who performs the work (local or overseas contractor).

LWI seeks to train and contract with local organizations as much as possible to achieve cost reductions and economies of scale. Local contractors, using in-country equipment, are particularly important for larger-scale projects. LWI also repairs existing handpumps and boreholes instead of drilling and installing new ones, which may cut capital costs by up to 80 percent, but does little to improve local capacity to maintain the equipment without outside intervention and support.

Even if a particular technology is appropriate in one place, it may be ineffective—even if quite simple—in another. For example, the Northern Region of Ghana remains one of the last few regions of the world where Guinea worm disease is endemic. Safe drinking water is the best long-term solution to the disease.[8] While drilling boreholes has been the tradi-

6. Since my initial conversations with Living Water International, the organization has made a concerted effort to increase the sanitation and hygiene components of its projects (Jerry Wiles, personal communication, June 9, 2006).
7. For other examples of the "circuit rider" approach, see http://www.newforestsproject.com/ English/cwigeneral.html and http://www.ruralwater.org/irwa/
8. For more on Guinea worm disease, see the Carter Center Guinea Worm Eradication Program, http://www.cartercenter.com/health programs/program1.htm

tional solution, boreholes are not, in fact, the best solution in the Northern Region of Ghana, as the wells are frequently dry due to hydrogeological conditions. In this instance, the Carter Center has found that the appropriate technology may be a more complex—yet still straightforward and locally sustainable—water filtration system for surface water held in catchment basins (Don Hopkins, personal communication, December 21, 2004).

NGO leaders I surveyed consistently asserted that the technical solution that is often most visible, tangible, and therefore appealing to donors is not necessarily the right solution, even if it meets the appropriate technology criterion. Like other consultants, global NGOs should work with a particular village's leadership to consider the solutions to its water problems. The consultant NGO then steps back and lets local people make the final decision, enabling (rather than insisting) that they do the majority of the work themselves, and pay for it. A well-designed water project can be implemented locally in a sustainable, self-sufficient fashion—and not simply satisfy the technical or financial requirements of an overseas partner. The best practice thus combines local knowledge with innovative technology and sound sustainable design. These critical elements can be found, for example, in arsenic-removal projects in Bangladesh and water-quality testing throughout the world (see, e.g., United Nations, n.d.)

Social Sustainability

Most respondents strongly asserted that the best technological solution in the world will achieve very little unless it is grounded in *social* sustainability. In water projects, this typically means adding culture-specific sanitation and hygiene components to the water supply work. Donors, implementing organizations, and recipients of assistance are increasingly attentive to this concept. It is vital that donors, in particular, incorporate social concerns into each project for two reasons:

1. Donors are often more aware than their local partners of the long-term benefits that accrue to communities that properly implement the sanitation and hygiene aspects of a water project; and
2. Local partners are historically accustomed to—and have come to expect—purely technological solutions; today's donors and NGOs must in some cases lead them to a more sustainable solution.

Most respondents also consistently pointed out that the most immediate, tangible life-saving impacts of a water project may not come from the technical water supply solution alone. Often, in fact, these impacts come from simply teaching community members, especially women, to more effectively and frequently wash their hands. For example, the *Lancet Infectious Diseases Journal* reported that 42–47 percent of all diarrheal transmission could be stopped by handwashing with soap (Curtis & Cairncross, 2003). Respondents also pointed out that the Water Supply and Sanitation Collaborative Council is devoting more resources to sanitation and hygiene issues through a wide array of literature and marketing campaigns, such as the "Water, Sanitation and Hygiene for All" (WASH) campaign.[9]

Each NGO interviewed for this report brought up the issues of sanitation (primarily pit latrines) and handwashing, and the difficulty of changing

9. For more information on the WASH campaign, see http://www.wsscc.org/dataweb. cfm?code=26

habits deeply ingrained in local cultures. Donors and implementing organizations know that without attention to sanitation and hygiene, projects will not achieve health benefits. How do project planners ensure that the recipient communities agree to use latrines and appropriate handwashing? Respondents pointed to social marketing tools such as theater performances, board games, house-to-house education programs, formal hygiene committees, and training schoolchildren to teach their parents to adopt these new habits.

In the overall nonprofit/health space, respondents singled out the thought-provoking social marketing work of Population Services International (PSI), which "deploys commercial marketing strategies to promote health products, services, and other types of healthy behavior that enable low-income and other vulnerable people to lead healthier lives."[10] In many cases, respondents are integrating similar efforts into their own water projects; for example, a joint CARE-PSI-Centers for Disease Control and Prevention (CDC) project in Madagascar used social marketing and community mobilization to combat the spread of cholera (Dunston et al., 2001). CARE projects combine social marketing with capitalism by training vendors of water filtration systems and products to educate their customers about health and hygiene (Susan Davis, personal communication, December 13, 2004).

Respondents unanimously agreed that no matter how well-designed a pit latrine might be, its use and the concomitant health benefits require significant changes in habits. Individuals may not readily accept the "improvement"—even if they do, their culture may not allow them to use latrines—in the absence of targeted and culture-specific education and social marketing programs (often led by women). Or, as Water For People (WFP) warns, villagers may find a better use for the latrines once built, like storing crops (Steve Werner, personal communication, January 8, 2005). Yet once the benefits of the program become clear over time (e.g., fewer cases of diarrhea), the intended habit change will stick.

Successful handwashing does not come naturally in many rural communities, especially in the absence of ample supplies of clean water. In Guatemala, WFP partners with the U.S. Peace Corps to not only bring safe water supply to the schools, but also to teach students about washing their hands. WFP gives the schoolchildren tools (primarily posters) to teach their family members, and uses Peace Corps volunteers to reinforce the lessons over the long term. (Before WFP helped provide safe water to the schools, Peace Corps volunteers had been *miming* handwashing techniques.)

On the other hand, LWI asserted that habit change takes a generation to become ingrained, meaning that it also takes a generation before such projects achieve sustainable health benefits. LWI therefore suggested that the sector focus predominantly on water supply in order to meet the Millennium Development Goals. However, every other NGO I surveyed stressed that they will no longer consider any project without a primary focus on education before, during, and after implementation.

Project Management/Ownership

Top-down, centralized decision-making for water projects of all sizes is no longer seen as an acceptable approach. Instead, many NGOs support decentraliz-

10. For PSI's mission, see http://www.psi.org

ing ownership and management of development projects to the lowest possible level. NGOs consider this a good idea objectively, but occasionally get themselves in trouble by responding too willingly to solutions that, although chosen by the local communities, may in fact be unsustainable over the long run. NGO leaders aim to work themselves out of a job by building the local capacity to operate and maintain projects for the long term. They must remain cognizant that even if local people want a particular solution, it may not be the right answer for that particular situation.

Small-scale rural water systems supported by NGO leaders interviewed for this report are typically led by village water committees or water user associations that report to village leaders or local government. Operations are often handled by unpaid members of the water committee trained in the technical and financial skills necessary to maintain the system and collect user fees. Multi-village systems often benefit from a circuit rider, a full-time paid employee who maintains several systems. The size of communities and projects covered by this report rarely attracts large private-sector operators, thus creating few full-time jobs.

Decision making should be decentralized, engaging all community stakeholders, as decentralization increases a project's speed and transparency. However, as demonstrated by the controversy surrounding (real or perceived) unfunded federal mandates in the United States, decentralization does not automatically result in increased technical or financial capacity, nor does it guarantee project success. Respondents suggested that decentralization for the sake of decentralization can doom a project to failure.

Respondents also insisted that the key to management of each project is keeping track of both process and outcome measures: Does the project save lives? Does it reduce morbidity risks? Will it function effectively 10 years down the line? Will local people have the technical and financial capacity to maintain, repair, replace, and/or upgrade the system?

Village Water Committees: The NGOs surveyed reported that during the early stages of each project, communities, local NGOs, and the donor typically form and support a village water committee—often accompanied by a hygiene promotion committee—of 5–9 villagers, including a:

- Project manager;
- Technical manager;
- Financial manager;
- Sanitation leader(s);
- Hygiene promoter(s); and
- Volunteer leader(s).

This committee consolidates local support for the project; identifies and trains responsible laborers, trainers, and managers; and makes sure the entire project meets the community's self-identified needs. On an ongoing basis, the water committee:

- Identifies water supply infrastructure, sanitation, and hygiene needs and solutions;
- Collects fees from communities to at least partially support the capital costs of the initial water project, and also to support ongoing maintenance costs;
- Identifies local leaders for advanced technical and social training;
- Organizes training programs in community organization, maintenance, watershed management, sanitation, and related matters; and
- Follows up on water, health, sanitation, education, and other social development opportunities.

For each project, the water committee assembles drillers, hydrogeologists, mechanical engineers, environmentalists, businesspeople, volunteers, and local workers (as necessary) to design, implement, and assess projects. Depending on the size and scope of the project, the committee and donors may also choose to work with local women's groups, other NGOs, local government agencies, or additional international partners.

Note, however, that communities may also choose not to manage the project themselves, and instead hire an experienced operator. Villages are advised to approach this relationship carefully, with clear information about pricing, service-level agreements and contract management expertise.

Hygiene Promotion Committee: This committee comprises 1–3 women leaders responsible for training their peers in hygiene techniques. NGOs work with these leaders to design hygiene training materials and techniques appropriate to the local culture.

Government and Project Management: NGO leaders interviewed about government involvement in small-scale, rural water projects consistently replied with a knowing groan, adding an admonition to avoid it as much as possible. According to those surveyed, government involvement above the village water committee level politicizes both the planning and implementation process, tending to detract rather than contribute.

On small-scale rural water projects, it is possible—and arguably beneficial—to avoid extensive government interaction. The key is to depoliticize the situation by making the project's communications as public and transparent as possible. Transparency leads to a distribution of water points (boreholes with handpumps, for example) based more on the needs of the population than on local political exigencies (Stephen Turner, personal communication, December 13, 2004). If or when projects scale up, however, it becomes advisable and even necessary to cultivate productive relationships with governments.

WaterAid's Hitosa Water Supply Scheme in Ethiopia incorporated local government structures when scaling up a large gravity-driven water supply project (Silkin, 1998). The project effectively created a cooperative—a mini-utility—which is owned by an elected Water Management Board comprised of an equal number of men and women from village water committees. The board employs tap attendants and enjoys a surplus on its operations and maintenance budget. The next challenge for the cooperative is to move to a viable business model that serves the poorest households, which are unable to pay anything for their water (Shivanathan-Beasty, Gelpke, & Jarman, 1998).

A WaterAid project of similar size and scope, completed in Bale, Ethiopia, in 2001, incorporated regional government structures before work even started. The rural Water Management Board (comprised of representatives from rural village water committees) was initially supposed to manage the entire rural/urban project, including water, sanitation, and hygiene promotion activities for small villages and for citizens of Robe, a town of 35,000 people. However, the government's Water Bureau lacked confidence in the Water Management Board's ability to manage such a large project, and was hesitant to hand over control of its water supply work in Robe. They agreed to a compromise in which the Water Bureau manages the town's water supply, while the rural Water Management Board manages all other aspects and retains overall responsibility for the entire project. Although this project is

arguably successful, many questions remain about its long-term sustainability.

Project Financial Models

Water may fall from the sky for free, or be available in the form of a stream or other surface water reservoir, but it is often not potable, much less delivered to a village standpipe or a house at no cost. WaterPartners' Gary White (personal communication, December 10, 2004) describes the evolution of the water sector as evolving through the "4 C's":

- Compassion (post-World War II foreign assistance, starting with the Marshall Plan); to
- Competency (engineers, advanced technology, long-term capacity-building projects focused on water supply); to
- Common sense (community participation and collaboration, including sanitation and hygiene systems); to
- Capital (tools that enable local communities to afford their own water projects, and therefore ensure sustainability).

In the near and medium term, capital questions will remain at the forefront. There are far more questions than answers about financing small-scale rural water projects, especially when considering the sheer number of people needing water and sanitation.

It is relatively simple to address the costs associated with maintaining a borehole and handpump, and perhaps a small filtration system. But consider:

- How should the project address the capital costs of installing the system in the first place?
- How can it ensure that the poorest of the poor have access to water regardless of their ability to pay?
- How should it incorporate the costs of sanitation and hygiene, which experience suggests have more impact on mortality and morbidity than does water supply per se?

Local communities are already paying for their water supplies, directly or indirectly. In many cases, the poorest communities are in fact paying above-market rates for unsafe water that is killing and sickening them through the spread of waterborne diseases. It should be the goal of those communities, governments, and the development sector to rationalize the costs paid for drinking water, to ensure that the water is safe, and to finance adequate sanitation and hygiene training in order to decrease waterborne mortality and morbidity.

Even though each water project surveyed in this article differs, the NGOs surveyed assert that initial capital costs for a rural, small-scale project encompassing water supply, sanitation, and hygiene training should normally be US$25–50 per person. These projects should be self-financed after the donor leaves, and self-sufficient both technically and socially. It is important to highlight that the above figures include only the initial capital costs.

WaterAid (2006) states that US$25 will "provide a person with a lasting supply of safe water, adequate sanitation and knowledge of good hygiene practices" in Africa and Asia (Stephen Turner, personal communication, December 13, 2004). WaterPartners agrees with the US$25 figure in Africa, but cautions that costs double to $50 in Latin America. Almost singularly focusing on technical water supply projects, LWI has refurbished handpumps for villages for as little as US$1–$2 per capita (Gary Evans, personal communication, January 14, 2005).

All of these figures should be used with caution. One of the field's biggest private donors, the Conrad N. Hilton Foundation (see Box B),

has explored cutting costs by hiring fewer contractors from the United States and more from the developing world. This may save money in airfare and salaries, and augment local capacity in some cases. Yet it may render monitoring and evaluation more difficult, and may actually reduce the overall efficacy of a project. Choosing to fund a local nonprofit directly can work well, but by doing so, a donor loses the technical expertise and capacity in monitoring and evaluation provided by an international NGO. Relatively small donors like the Hilton Foundation (with 17 full-time staff) would be hard-pressed to provide the implementation and monitoring and evaluation skills typically offered by an international NGO.

On the other hand, even if donors choose to finance projects through a large international organization or use U.S.-based consultants, they will always have to work at the local level with the village water committees, government agencies, village elders, etc. Regardless of the donor's business and financial models, unless ownership of the project lies squarely in the community's hands, no project will be sustainable (Steve Hilton, personal communication, January 10, 2005 and June 29, 2006).

Community Contributions: Leading water NGOs now insist that local communities pay at least the maintenance costs of their water projects, and in many cases, part or all of the capital costs as well. The NGOs' argument is two-fold:

1. Communities are already paying for their water, and for the most part can afford to do so; and
2. Communities will not respect or maintain water systems unless their pocketbooks are directly affected.

In a World Bank project in Ghana, for example, the World Bank finances 90 percent (through a grant), the community pays 5 percent, and the district government pays 5 percent (World Bank, 1999). The community and district government percentages vary from community to community according to the cost of the project and the community's ability to pay.

Anecdotal evidence points to a divide between the philosophy of donor organizations and the local partners implementing the projects. In some cases the community's financial contribution may not come directly from each household but from the village leadership or local government. This removes project ownership from the individual household level, thus arguably reducing its sustainability. Sector leaders advise donors to pay close attention to this potential divide to ensure the permanence of their projects (Gary White, personal communication, December 10, 2004).

As the water sector has advanced, pressure to include sanitation and hygiene components in projects has increased. Traditional financial accounting systems are hard-pressed to quantify the return on an investment in sanitation and hygiene, thus making it difficult to set a price that will reflect both cost and benefit. Until the costs and

Handwashing in Nepal
(courtesy WaterAid)

BOX B: A BRIEF CONVERSATION WITH THE HILTON FOUNDATION
(Steve Hilton, personal communication, January 10, 2005)

- The Hilton Foundation (http://www.hiltonfoundation.org) supports small-scale, rural water projects for two reasons: 1) unsafe water is one of the world's biggest killers of children, and therefore arguably the most vital development issue; and 2) safe water opens doors to numerous other social development opportunities, including education, health care, and job creation.

- The most important contributors to the success of the Hilton Foundation's projects, as evidenced by its West Africa Water Initiative, are competent local managers and a holistic approach accomplished by partnering with complementary international and local NGOs. For its work, Hilton focuses not necessarily on the least expensive implementing organization, but on those organizations that (alone or in a consortium) can achieve the greatest financial and operational leverage—and therefore the most positive outcomes.

- Quantifiable process measures are important to Hilton (e.g., number of latrines, boreholes), but they also know that technical water solutions are inseparable from the "soft skills" of sanitation and hygiene.

- The Hilton Foundation's biggest frustrations are also held by the other nonprofits surveyed:
  - A lack of awareness of the problem of unsafe water and inadequate sanitation; and
  - Potential donors' hesitation to get involved because the situation seems intractable, especially considering the ambitious targets set by the Millennium Development Goals.

the benefits of sanitation and hygiene are clear to governments and communities, subsidizing capital costs—for sanitation in particular—will continue to be necessary in many cases.

Regardless of the model, respondents argued that the project must be self-contained financially. The project managers may approach an outside lending agency to pay for capital expenditures, but they themselves must reach that decision based on their ability to manage debt repayment and a more complex project.

Gender

Water, sanitation, and hygiene are unquestionably gender issues. In many cultures, women and children bear primary responsibility for collecting water and making it safe to drink. In addition, women and children suffer severe opportunity costs since they spend so much of their lives dealing with water issues or caring for family members sickened by unsafe water. The NGOs surveyed widely acknowledged that women should assume prominent roles on village water committees—especially when the issue at hand is sanitation or hygiene. The impact of their participation may extend beyond health benefits: women could see greater economic opportunities and girls could achieve higher levels of education.

Water For People's small-scale, rural projects are each managed by a village water committee. Normally, 2 of the 5 members are women. This is logical because women often bear the primary

responsibility for the health of their families, and adolescent girls arguably have a greater need for sanitation and hygiene than boys. Water For People's experience also suggests that women manage money better and are more attentive to the required reporting. They may also make better decisions when it comes to dealing with villagers who can not or will not pay. Water For People's projects rely on women to constantly reinforce hygiene messages throughout the community, such as forbidding children to drink directly from the tap and keeping animals away from it. (Steve Werner, personal communication, January 8, 2005).

Several organizations caution against pushing the role of women too far. Many societies in the developing world remain highly patriarchal and do not look kindly on women in leadership positions. If the male leaders of the community do not at least "believe" they are in charge, projects may face serious obstacles. As CARE puts it, the goal is to "pull women in, but not push men out" (Susan Davis, personal communication, December 13, 2004).

EMERGING PRACTICES

Despite all of the water sector's progress, the problem is still massive. What is holding back the solution, and what are the surveyed NGOs planning next?

Respondents universally acknowledged that the two major obstacles to continued progress are lack of finances and a lack of scale. Breakthrough practices that address these constraints are rarely new technological solutions; they will likely continue to be new ways of applying old technologies, creative business or financial models, or new ways of designing and implementing water projects that are more holistic and more easily scaled up. It is too early to tell if the practices discussed below will prove effective in the long run, but I believe that they are important to consider and, in many cases, already worth replicating.

Improved financing for water projects

WaterPartners' WaterCredit initiative combines microcredit with best practices in water supply projects.[11] Through this facility, communities will have access to credit to pay for the capital costs of a water supply project. WaterCredit decisions are made by local water supply and grassroots organizations, and repayment rates are expected to be high. If managed properly, WaterCredit will become a small revolving loan fund, increasing the financial reach of limited donor support.

Improved management

The franchising model for managing small-scale water supply systems, and sometimes sanitation initiatives, is very similar to traditional for-profit franchised businesses. Some respondents argued that this system provides incentives for good management and operations, and helps to solve the lack of institutional capacity (too few engineers and middle managers) throughout the developing world.

Collaboration with governments

It is impossible to achieve the scale necessary to succeed in this effort without effectively tackling the peri-urban and urban challenge. Operating in an urban environment requires the active support of government. Urbanization is not going away; more and more individuals are moving to larger

11. For more information on WaterPartners' WaterCredit initiative, see http://www.watercredit.org

cities for economic reasons, and many of these newcomers are legally "off the grid" and lack infrastructure. Thus, many suffer from a lack of water and from waterborne maladies. As water NGOs scale up their projects, and as cities continue to expand into formerly rural areas, they need to know how to address this issue.

Under a U.S. Environmental Protection Agency grant, Water For People is actively working to research this problem, stating that the world has no chance of meeting the MDGs unless the urban water situation is addressed. WaterAid's community-management project in Dacca, Bangladesh, recently experienced a breakthrough. The city of Dacca had said that it could not supply water to illegal squatters. WaterAid negotiated with the city so that community organizations registered as NGOs could purchase drinking water in bulk for the new communities. The city's water corporation realized it could get new customers through the use of trusted local NGOs. Until these new communities benefit from permanent water infrastructure, there will continue to be reliability and pricing challenges, but this is a good start toward addressing a seemingly intractable problem (Steve Werner, personal communication, January 8, 2005).

Reviving an underappreciated "technology"

Rainwater harvesting is a millennia-old method of meeting water supply needs. Many of the NGOs surveyed suggested that rural villages should take a new look at this proven practice. It lessens the stress on groundwater tables, almost entirely removes the need to treat water, and solves the problem of rural communities whose traditional water supplies disappear during the dry season.[12]

Advocacy

Nonprofit leaders unanimously expressed their concern that the global drinking water sector suffers from a lack of awareness—and therefore funding—compared to other development sectors. Naturally, none is interested in shifting money away from other high-priority concerns, but all expressed interest and support for third-party organizations pushing the safe drinking water and sanitation agenda from a public relations or awareness-raising standpoint.

A new organization addressing this issue is Water Advocates, a Washington, D.C.-based lobbying and advocacy NGO targeting five constituencies: the U.S. federal government, civic organizations, faith-based organizations, corporations, and traditional philanthropies.[13] Water Advocates aims to triple financial and other support for the sector over the next several years through a combination of lobbying, advocacy work, and matchmaking.

CONCLUSION: POLITICAL WILL, FINANCING, AND SCALE

The question remains: Why are there still billions of people without safe drinking water and sanitation when there are so many talented individuals and organizations working on the problem throughout the world? At the Commission on Sustainable Development's 12th meeting in New

12. For more information about rainwater harvesting, visit the Centre for Science and Environment's website at http://www.rainwaterharvesting.org
13. Note: The author joined Water Advocates' staff in March 2006. For more information on Water Advocates, see http://www.wateradvocates.org

York in 2004, the Chairman's Summary concluded that, regardless of progress being made on all fronts, "the [Millennium Development] Goal can only be met if efforts are scaled up" (United Nations, 2004, page 35). This article seeks to increase the level of activity by providing easily accessible, neutral, reliable, and actionable guidance for all stakeholders, thus shortening the learning curve for international NGOs, donors, and local people who are designing, funding, and/or implementing water projects.

As the United Nations Under-Secretary-General for Economic and Social Affairs noted, "a lack of political will at both international and national levels had hampered progress, notably in resource mobilization" (United Nations, 2004, page 23). By highlighting the feasibility immediacy, and notable economic multiplier of water-related development work, this article hopes to contribute to generating the political will necessary to increase funding levels. As evidenced by my interviews with nonprofit leaders of water-related organizations, water projects are rarely simple. They are, however, eminently doable. If designed properly, they contribute almost immediately to saving lives and reducing, if not eliminating, the myriad opportunity costs attributed to unsafe water, inadequate sanitation, and poor hygiene.

The next decade is vital. Gro Harlem Brundtland, former director of the WHO, said: "Simple, inexpensive measures, both individual and collective, are available that will provide clean water for millions and millions of people in developing countries—now, not in 10 or 20 years" (WHO, 2001). Ambassador John McDonald, one of the driving forces behind both of the World Water Decades, stresses that 2005-2015 is the time to make those commitments real, and use water as the foundation for progress in other fields of social development (personal communication, January 12, 2005).

All of the leaders surveyed for this article support Ambassador McDonald's assertion that water ranks high—if not first—in the hierarchy of needs in the developing world. As discussed earlier, clean water, sanitation, and hygiene have an impressive multiplier effect at both macroeconomic and household/village levels. Above and beyond the health benefits, proponents avow that safe water contributes positively to the challenges of population, urbanization, and economic development, and is a powerful starting point for environmental protection and/or remediation.

This article concludes that small-scale, rural, community-based water projects can and should be simple, sustainable, and scalable. They can be started quickly with limited resources. Bottom-line responsibility should rest with the local end-users. Yet I remain cognizant of the dangers: projects cannot be oversimplified, as many individuals and organizations have seen water projects fail because of unsustainable technical, social, or financial design.

Most importantly, NGOs cannot afford to lose focus on the goals: saving lives and reducing water-related illness through sustainable development. I hope this article will motivate individuals, organizations, and governments to act quickly, decisively, and in a sustainable manner.

BIOGRAPHY

John Oldfield is the director of Partnership Development at Water Advocates. Prior to joining Water Advocates, he was vice president at a private equity buyout group focused on turnaround

opportunities and corporate divestitures. He has also been an executive at The Conference Board, a New York-based economic research firm which produces the Leading Economic Indicators and Consumer Confidence Index. He has launched two water-related nonprofits, and also has several years of international experience leading USAID-funded projects, including training programs for election officials and foreign media, as well as civil/military communication projects in post-conflict countries.

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