

This is part of a series of project briefs discussing the activities, research findings, and field experiences of PATH's Safe Water Project.

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## Activities and Stakeholders in the Global Water Sector: A Preliminary Analysis

PATH's Safe Water Project is one of eight learning grants on water, sanitation, and hygiene awarded by the Bill & Melinda Gates Foundation in 2006. PATH's project is working to catalyze the commercial market to provide a family of safe and effective household water treatment and storage (HWTS) products in developing countries. The project is initially focusing on India—both because the country faces high rates of disease related to unsafe water and because it is home to a robust consumer economy and established industrial base.

Water scarcity and contamination are global issues that threaten both developed and developing countries. This paper explores the global water sector industry as well as associated issues such as market drivers,



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access to water treatment products, consumer perspectives, and systems issues. Because commercial efforts will be influenced by issues and opportunities in developed countries, these factors are included in the analysis. A case study featuring the Indian water sector illustrates how these issues take shape on the national and local levels.

*In both developed and developing countries, access to safe water relies on the participation of public, private and community collaborators.*

## Global industry analysis

The global water treatment industry generates an estimated US\$400 to \$600 billion per year. It encompasses an assortment of products and services such as wastewater treatment, construction and repair of infrastructure for central treatment, household water treatment systems, water treatment technologies, chemical production, and consulting services.<sup>1</sup>

Point-of-use (POU) water treatment products are a relatively small but growing segment of this sector. In 2005, the global market for POU products was estimated at \$15 billion per year, with less than a quarter of all households having some form of water treatment. Household

penetration was expected to double by 2008 and approach saturation by 2011. Annual growth of the segment was forecast at 16.5 percent.<sup>2</sup>

### Market drivers

The global household water treatment sector is largely driven by water issues and markets in developed countries. Parts of the United States, much of Europe, Japan, and Australia offer large, affluent, and relatively untapped markets for POU products. The combination of increasing water scarcity and contamination, high disposable income, and low POU-product penetration makes these markets very desirable to the global water treatment industry.

Developing and developed countries have similar discrete contamination issues. Disparities in income distribution and infrastructure differ considerably between the sectors, however. Many developing countries are characterized by dualistic economies in which comparatively small population segments enjoy relative affluence, while large segments live in relative poverty without access to electricity or tap water. The presence and size of a middle class varies significantly between individual developing countries.

PATH's preliminary industry analysis suggests that, while some efforts are being made to specifically target developing-country markets,<sup>3</sup> commercial firms are likely to initially

PATH (Glenn Austin)



*Traditional water storage vessels adapted with taps are currently being sold in Indian markets.*



focus on countries with significant middle- and higher-income segments in pursuit of higher margins. Until developed-country and upper-income developing-country markets approach saturation, it is unclear whether many global participants can be attracted to lower-income markets in developing countries.

These factors indicate that responsiveness to developing-country constraints must be a fundamental component of safe water efforts. For example, POU products designed for developing-country markets must account for intermittent electrical and water service (at best). Products intended for lower-income markets in developing countries should therefore include both a storage function and a means of dispensing water in a manner that does not contaminate the water remaining in the storage compartment. Such products are referred to as HWTS products.

### Water contaminants

Stressed water sources and industrial and agricultural waste contribute to discrete water challenges in both developed and developing countries. The populations of developed countries, conditioned by generations of ample water supply, typically consume 20 to 35 times more water per capita than those in developing countries. Decades of industrial and agricultural growth are contributing to water scarcity, however, and aquifer depletion has exacerbated certain contaminant issues in developed countries, such as salinity and arsenic, which are worsened by poor water-management practices.<sup>4</sup> Although developing countries

## Where does our water come from?

Only 15 percent of the US population obtains household water from private wells, with the balance obtaining household water from some form of central system. In contrast, large segments of developing-country populations obtain household water from unsafe wells and surface sources.<sup>7</sup>

face similar discrete contamination issues, disparities in sanitation infrastructure, industry and agriculture-related contamination, and co-occurring contaminants result in more severe water issues in these settings.

In particular, chloride, fertilizer, and pesticide residues; industrial waste; mining waste; and arsenic are among the most severe contaminant issues in developed countries.<sup>5</sup> Expected increases in coal mining, natural gas harvesting, and petroleum extraction from tar sand and oil shale are expected to increase the stress on water supply and quality.<sup>6</sup>

Discovery of the health impacts of “new” pathogens—such as *Cryptosporidium* and cyanobacterial toxins, which are becoming more prevalent—is ongoing.<sup>4</sup> In the short term, global POU product research and development can be expected to focus largely on the treatment of increasing levels of known contaminants and the relationship between water and health in developed countries. PATH’s challenge is determining the extent to which these efforts can be channeled toward commercial

marketing of appropriate HWTS products in developing countries.

### Aesthetic issues

Apart from contaminants, water’s appearance, taste, and smell are observable characteristics of concern to people. In some cases, solutions involve treatments that remove chemicals introduced by community water treatment systems.<sup>5</sup> Many HWTS systems marketed in developed countries to address aesthetic issues are not designed for comprehensive treatment of health-related water issues.<sup>8</sup>

### Product access and related market issues

PATH’s initial industry analysis suggests that an array of commercial entities is already targeting middle-class segments in developing countries. Few are focused on lower-income segments.

PATH has identified two primary barriers to sustainable commercial provision of HWTS products to low-income, base-of-the-pyramid (BOP)\* segments: price and distribution. These issues play out on numerous levels.

\* According to Cornell University, the “Base of the pyramid” (or “bottom of the pyramid”) is a socioeconomic designation for the 4 billion people who live primarily in developing countries and whose annual per capita incomes fall below \$1,500 (PPP). See <http://www.johnson.cornell.edu/sge/bopininitiative.html> for more information.



*Children using an outdoor water pump in Zambia.*

### Price

Most HWTS products are priced at levels that are inaccessible to low-income, BOP segments, even with the benefit of financing. In addition, developing-country markets present economic, logistical, and regulatory obstacles that differ markedly from developed-country markets. Price points must be far lower, particularly if products are targeted to low-income segments. Price considerations, durability requirements, shipping considerations, and tariffs may also limit the range of materials that can be used.

### Distribution

Commercial HWTS distribution models tend to extend to geographies where upper- and middle-class populations are concentrated, typically ending at urban centers. While urban centers may include low-income populations, these populations do not always have access to formal markets. Large, rural, low-income

segments are not served by these distribution models.

Because low-income, BOP populations have limited access to formal competitive markets, these populations are often exposed to exploitative practices. Examples of this dynamic include the sale of ineffective or poor-quality HWTS products or the offer of tanked or bottled water at prices many times higher than prices paid by more affluent populations. These “unorganized” markets present a competitive threat to any HWTS initiative directed toward BOP markets.

### Systems issues

The availability and quality of community water systems and sanitation infrastructure vary dramatically between developed and developing countries and between individual developing countries. A number of institutional or system-level factors come into play.

While developing countries may enact water-quality regulations

similar to those imposed by developed countries, enforcement of water-safety regulations varies substantially among countries as well as among municipal and state authorities. Levels of regulation and tariff structures also vary substantially between individual countries. Individual country tariff structures may ultimately influence whether HWTS products should be imported as finished goods, assembled in country, or manufactured in country from local materials.

Water sources and seasonality also affect access to water and demand for water products. Developing-country populations suffer from both a greater dependence on untreated surface water and more polluted ground sources. They also face more variability in their water supply than do populations in developed countries. Combined with disparities in sanitation infrastructure, this variability creates prolonged periods of scarcity and short periods of severe contamination.

### Emerging models

Several new models for providing safe water are emerging in low-resource settings.

**Commercial community water systems**, for example, are designed to provide water that meets regulatory requirements in India and other countries. In these settings, for-profit organizations install treatment systems and train operators and maintenance technicians. Treated water is sold to community members far less expensively than bottled water but at a sufficient price to sustain the system. This approach, along with water dispensing at kiosks

and the sale of bottled water, offers an alternative to HWTS and may influence HWTS uptake and impact.

A cooperative or **self-help group (SHG)** model is also emerging in developing-country markets. The model is based on distributing health-related products through members of small local groups. Borrowing from an approach that has proved successful with artisans and farmers, these groups pool resources for health-related objectives. SHGs often work in conjunction with a nongovernmental organization (NGO), a microfinance institution, a commercial supplier, or some combination of the above.

**Microfinance institutions (MFIs)** have recently received considerable attention. A well-known example is the work of Muhammad Yunus and Grameen Bank, which facilitate a financing model for low-income, BOP segments. Awarded the 2006 Nobel Peace Prize, Yunus and Grameen Bank provide loans to poor people without any financial security.<sup>9</sup> PATH's review suggests that MFI-based financing could play a critical role in making effective HWTS products accessible to low-income, BOP populations. Microcredit may enable individuals to purchase a product or provide financing that covers start-up costs to a potential distributor or retailer.

## Decentralized water treatment

Developed countries face a troubling combination of aging centralized water treatment and delivery systems and growing water scarcity and contaminant issues. Many countries lack the public funding necessary to address looming infrastructure issues.<sup>1</sup> In the United States, the Environmental Protection Agency (EPA) anticipates that smaller, centralized water treatment systems may have difficulty meeting the rigorous standards imposed by the Water Safety Act. The agency has provided guidance as to when and how implementation of POU products

## An innovative, community-driven solution: the self-help group

The term "self-help group" is most common in India, although similar cooperative efforts can be found throughout the developing world. Recent examples include the following:

- In India, the **KanChan** project distributes a slow-sand filter device through local entrepreneurs trained by the Massachusetts Institute of

Technology and the Environment and Public Health Organization. The entrepreneurs gather materials locally, assemble the slow-sand device, and sell the finished product at a 10-percent profit margin.

- In both Uganda and Bangladesh, **Living Goods** is developing a network of village-based health promoters who borrow from the Tupperware, Avon, and Amway models. Living Goods markets goods provided by a variety of vendors.
- In Pakistan, **SaafWater** markets a HWTS system based on the US Centers for Disease Control and Prevention Safe Water System. SaafWater's design includes a liquid-chlorine cartridge that is inserted into a branded water dispenser through a special fitting. SaafWater promotes sales through education and a novel, free water-quality testing service provided by trained "SaafWater ladies." Because of their high-touch sales and distribution model, SaafWater seeks to work in urban settings.



*Self-help groups in India empower women with increased financial flexibility and support.*

might be an efficient supplemental approach to compliance.<sup>5</sup>

As governments and consumers weigh the costs and benefits of decentralized water treatment approaches, these factors may signal a trend toward increased use of POU systems. Such changes could take the form of centrally planned and approved decentralization, as in the case of the EPA, or consumer-driven decentralization based on a pragmatic reaction to poor water quality provided by aging systems.

If decentralization does increase, the demand for POU systems in developed countries may exceed projections. This could have both favorable and unfavorable implications. On the one hand, POU technologies developed for affluent markets could be adapted for HWTS products in developing countries. On the other hand, higher demand in developed-country markets may prevent commercial efforts from focusing on developing-country opportunities.

### **Consumer awareness and perspectives**

PATH's literature review and initial industry analysis indicate that consumers are predisposed to judge water on observable or aesthetic factors such as appearance, smell, and taste. In both developed- and developing-country markets,

consumers react adversely to smell and taste introduced by health-related chemical purification such as chlorine. Developed-country consumers may invest in HWTS products that deliberately remove health-related chemicals added to community water supplies. Consumers in developing countries may not invest in or use HWTS products that add undesirable smell or taste.

Consumers have complex and occasionally inconsistent views on the value of safe water. In both developed and developing markets, a growing number of consumers have accepted bottled water pricing many times greater than the cost of water from HWTS products. Awareness of water issues and types of contaminants is increasing in middle- and upper-income segments, and affluent consumers may choose to drink only bottled water.

Lower-income consumers may pay a premium for bottled water for at-risk family members. In addition, low-income populations in developing countries have developed traditional HWTS practices that include boiling, filtration through folded cloth, use of alum or moringa seeds for flocculation and clearing of turbid water, and settling. None of these methods is ideal, however. Boiling can be effective from a health standpoint, however it is time and energy intensive and the water is

vulnerable to recontamination upon cooling.<sup>10</sup> Folded cloth filtration, flocculation, and settling address turbidity-related aesthetics, but they do little to address health issues.

### **Educating consumers**

Consumers in both developed- and developing-country markets require education on the need to correctly treat water to address the health risks posed by contaminants. The distribution of comprehensive water treatment products typically employs direct sales models in both settings. The sales cycle requires consumer education on the need to treat water and instruction on the proper use and maintenance of the HWTS system.

Sanitation and hygiene conditions in many low-income developing-country environments—together with water collection, transport, treatment, and storage practices—create a significant threat of recontamination of treated water. The major causes of recontamination are well understood, and specifications for safe storage have been developed (e.g., by the US Centers for Disease Control and Prevention<sup>11</sup>). Messages on safe water handling practices are needed in marketing or educational materials that discuss HWTS products to ensure safety of the water following initial treatment or during storage.

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*In urban areas, 85 percent of the population has access to drinking water, but only 20 percent of available drinking water meets current health and safety standards.*



## India's use of HWTS products

Decades of increasing population, industrial and agricultural production, and sanitation-related pollution have led to the creation and use of various HWTS methods. For example:

- Nearly one-fifth of India's population uses folded cloth filters to remove sediments and larger contaminants.<sup>12</sup>
- In 1999, more than 8 percent of India's households purified water through boiling, and almost 6 percent were using candle filter drip pots.<sup>12</sup>
- Recent studies suggest that 20 percent of urban and periurban residents boil their water, 34 percent filter through cloth or net, 21 percent use a candle filter, 13 percent have a high-tech filter, and 9 percent have a tap filter.<sup>13</sup>

## Case study: the water sector in India

While India shares many characteristics with other developing countries, it is home to a growing middle-class segment that is already attracting commercial HWTS initiatives. By revenue, India is the fifth-largest consumer of HWTS products in the world, after the United States, Japan, South Korea and China. From 1995 to 2005, annual unit sales of household water treatment products grew threefold, to almost 3 million units.<sup>12</sup>

### Challenges to water safety

India faces major groundwater issues including saltwater intrusion, fluoride, heavy metals, nitrates, chlorides, pesticides, and microbiological contaminants.<sup>12</sup> Nitrate pollution in groundwater is a severe problem in parts of the country, and microbial pollution

resulting from untreated sewage contributes to high levels of waterborne disease.

Ninety percent of India's wastewater is discharged into surface water without treatment.<sup>12</sup> Much of the country's domestic water needs are met by surface water, which is replenished in a very short monsoon season that results in flooding that exacerbates sanitation-related pollution.<sup>12</sup> Aquifers along India's 7,000-mile coastline are threatened by saltwater intrusion, and groundwater resources are stressed by industry, agriculture, and domestic demands.

Declining water tables<sup>14</sup> and increasing populations have reduced per-capita availability of water dramatically, from 5,000 cubic meters in 1950 to 2,000 cubic meters in 2007, to an expected 1,500 cubic meters by 2025.<sup>12</sup> These forces also stress water sources and further contribute to contamination. As a

result, even populations with access to water do not have access to safe water. In urban areas, 85 percent of the population has access to drinking water, but only 20 percent of available drinking water meets current health and safety standards.<sup>14</sup>

## Products and manufacturers

Indian consumers may choose from a range of HWTS products. For example, low-efficacy drip pots are offered by the unorganized market; these sell for an average price of approximately \$14.50 and use replacement candles that cost about \$0.63. High-quality stainless drip pots sell for substantially more. Higher-efficacy products using the drip-pot form factor have recently been introduced by large commercial interests. Use of products based on drip pots is forecasted to increase dramatically as fast-moving consumer goods firms enter the market.<sup>12</sup>

Within the organized market, Indian consumers may choose from a robust line of HWTS products. These are targeted to middle- and upper-income households and manufactured in country by a small number of large companies such as Eureka Forbes Ltd., Hindustan Lever Ltd., Usha Shriram Brita Pvt. Ltd., Ion Exchange (India) Ltd., Ravi Domestic Appliances Pvt. Ltd., and Bajaj Electricals Ltd. These and other companies sell products ranging from low-cost stainless steel drip pots to sophisticated products that use iodinated resin or ultraviolet (UV) purification. The cost of the higher-end UV products starts at \$144 plus optional service agreements and can be much higher.<sup>12</sup>



*Workers assembling water purification devices in India.*

### Manufacturing sector

India's manufacturing sector is large for a developing country, although it is only one-fifth the size of China's by revenue. India's government is considering a number of reforms to improve competitiveness, including lower corporate tax rates, investment tax credits, and a tiered import duty structure.

In terms of manufacturing processes and materials, India is particularly strong in the chemical manufacturing sector<sup>15</sup> and has a large number of manufacturers that produce relatively inexpensive stainless steel goods. Although the plastics industry in India is less mature than it is in China, India's plastic molders are becoming more sophisticated, and virtually all emerging mid-range HWTS

products are made of plastic. In addition, small-scale producers make earthenware vessels and distribute them in areas close to the producer.

### Market penetration and sales

India, like much of the world, relies on direct sales for HWTS product distribution. Eureka Forbes currently uses a direct sales model for their Aquaguard product line. Other companies have explored third-party direct sales models.

PATH has observed a trend toward collaboration among manufacturers, NGOs, MFIs, and SHGs for distribution of safe water products in India. The basic elements of the model are as follows: NGOs target consumer populations for HWTS products, MFIs develop financing

models, and SHGs perform selling, training, and maintenance services.

### Self-help groups

India's National Bank for Agriculture and Rural Development indicates that India has 3 million SHGs, averaging 15 members each, and 600 MFIs.<sup>16</sup> These SHGs represent affinity groups that may offer a platform for direct sales models. The Academy for Educational Development, a US-based NGO, has initiated a safe water project funded by USAID called Point-of-Use Water Disinfection and Zinc Treatment that uses SHGs to sell a range of HWTS products.<sup>17</sup>

### Retail sales

Organized retail distribution is in its nascent stages in India. Large stores and malls account for only 3 percent of retail sales, compared to 30 percent in China and 80 percent in the United States. A number of multinational corporations and large India-based retailers have aggressive plans for expansion, with commitments for building more than 300 new shopping malls in the next year.<sup>16</sup> However, past attempts at reaching middle-class consumers through retail for water-treatment products have performed poorly, suggesting that a direct sales model may be required in the short term.<sup>12</sup>

BOP retail models are emerging, however. For example, the ITC Limited e-Choupal system—designed to sell agricultural products and supplies to rural farmers and assist with distribution of their crops—has established information kiosks within 1.5 kilometers of target farming communities. Rural farmers can use the kiosks to learn best practices, obtain weather forecasts,



and shop for ITC products. The kiosks are supplied by distribution point hubs within 30 kilometers of the farming communities.<sup>16</sup>

## Microfinance mechanisms

MFIs are critical both within and beyond these collaborations. Numerous MFI models that combine some level of training and support for the creation of BOP-targeted, health-related distribution businesses are starting to emerge. For example, some MFIs:

- **Combine micro-lending and knowledge transfer.** Groups such as BASIX are expanding across India and into selected urban slum settings. Their approach combines micro-lending with knowledge transfer and aggregation to spread risk among members of a group.
- **Incorporate education into microfinance.** Entities such as Ujjivan are developing educational modules for their customers. Such groups could provide information on water treatment practices and products to their customers and include HWTS distribution in micro-franchising initiatives.
- **Fund community-based water systems.** The Acumen Fund, Water Health International, and other groups are using microfinance mechanisms to fund community-based water treatment systems in which the treated water is sold to consumers or delivery people for cost recovery and sustainability.
- **Mainstream microfinance into other services.** Some MFIs provide multiple services (including health-related services and products) and have agreements with drug wholesalers

to secure lower prices for their consumers. Groups such as ACCION, a US-based NGO/MFI, suggest that HWTS products could be introduced into these income-generation systems.

## Industry competition

In India, HWTS products face competition on a number of fronts.

### Bottled water

India ranks tenth worldwide in consumption of bottled water, and bottled water is one of India's fastest growing industrial sectors. Between 1999 and 2004, the Indian bottled water market grew at a compound annual growth rate of 25 percent—the highest in the world. India has more than 1,000 bottled water producers and more than 200 brands, although market share is concentrated in a few large companies.<sup>1</sup>

Still, annual per-capita consumption of bottled water, at less than five liters, is only 20 percent of the global average.<sup>12,18</sup> The bottled water industry presents a number of negative issues for India's BOP populations. First, these populations pay for more per liter of bottled water than they do for water treated with HWTS products. Second, large quantities of bottled water are produced locally, which creates stress on ground water sources. Finally, disposal of single-use containers creates a waste-management issue.

### The unorganized market

India's unorganized market for HWTS products creates competition for high-efficacy products. Unorganized markets supply 50 percent of the HWTS market

and frequently offer low-quality or ineffective HWTS products to low-income populations.<sup>19</sup> Participants in the unorganized market occasionally make false or misleading claims that are difficult to sort out at the consumer level. Products may include fraudulent endorsements, approvals, or performance representations.<sup>12</sup>

Collectively, these factors could confuse consumers and harm the market for legitimate products. Particularly at risk are those technologies using traditional drip pot form factors, which are at a higher risk from low-quality manufacturing or misleading effectiveness claims. Under the Indian Consumer Protection Act, if a complaint is lodged against any company alleging false or misleading claims, the Bureau of Indian Standards or other relevant authorities will investigate it.<sup>20</sup> Such companies are heavily penalized if found guilty.

## Stakeholders

Water is a sensitive political subject in India, and a growing number of stakeholders are concerned with water management and equitable access to safe water. PATH's initial review of the actors in India's water sector revealed many public-sector and multilateral entities, some of which are highlighted below. In addition, the team connected with numerous NGO, private-sector, and donor organizations.

### The Indian government

India's national government is a key stakeholder in access and quality of water across the country. Relevant government groups include:

- The **Department of Drinking Water Supply** in the Ministry of Rural Development, which provides scientific, technical, and financial assistance to the states in the drinking water and sanitation sectors. It conducts research and development activities to develop technologies for improved implementation.
- The **Ministry of Health and Family Welfare** and its National Rural Health Mission, which emphasize access to safe drinking water and reduction of waterborne disease in India's rural areas. The mission is instrumental in policy decisions and can influence the states' budgetary provisions.
- The **Ministry of Panchayati Raj**, which builds the capacity of local self-governing bodies to secure economic development and social justice in their respective areas.
- The **Ministry of Small-Scale Industries** and the **Ministry of Agro and Rural Industries**, which design and monitor policies, programs, and projects to assist the promotion and growth of small and micro-enterprises.

### National groups

The largest national groups involved in India's water sector include:

- The **Indian Council of Medical Research**, which acts as the apex for the formulation, coordination, and promotion of biomedical research in India. The council's research priorities are governed by national health priorities, including safe water.
- The **Bureau of India Standards**, which seeks to encourage greater participation of consumers in

formulating and implementing national standards regulating consumer and nonconsumer goods. Through product certification, the bureau provides a third-party guarantee of quality, safety, and reliability of products.

### State governments

State governments in India usually play a major role in regional politics and can have major influence on a variety of initiatives.

- The directorate of the Institute of Preventive Medicine's **Department of Water & Waste Water Analysis**, which is routinely involved in water quality mapping in the states, is governed by the Department of Health and Family Welfare.
- The directorate of the Institute of Preventive Medicine's **Public Health Laboratories and Food [Health] Administration** provides diagnostic services, including biochemistry, microbiology, and pathology; analytical services, including food analysis, water analysis, and testing of certain drugs; and monitoring of water quality in fluoride-affected. This directorate can also influence state-level policy.
- The **Public Health Engineering Department** is in charge of investigation, design, and execution of water supply and sewerage schemes in all municipal towns in a state and six municipal corporations (Visakhapatnam, Vijayawada, Warangal, Kurnool, Guntur, and Rajahmundry). They also have technical control over all engineering works in these municipal towns and corporations.

### District-level groups

Within the states, there are a number of district-level administrative bodies that also influence water efforts.

- **District magistrates** are the administrative heads at the district level. They are decision-makers and can help facilitate projects at the district level.
- **Chief and district medical officers** are responsible for managing public health services, conducting disease surveillance, and managing activities at the district level.
- Both **municipal corporations** and **municipalities** play a role within districts. In metropolitan cities, the municipal corporation is the key stakeholder, while in smaller towns the municipalities are key players in ensuring the supply of tap water for household use.

### Multilateral entities

Globally and in India, a number of United Nations organizations contribute to safe water efforts.

- The United Nations Development Programme (UNDP) and its predecessor organizations have been actively involved in supporting India's national development priorities for the last five decades. UNDP advocates and builds local capacities for rainwater harvesting and effective management of water resources.
- United Nations Children's Fund (UNICEF) helps India's state governments and partners implement community-based, water-quality surveillance systems to screen contaminants. UNICEF recently initiated a project in India to address fluoride-affected areas.



*Contaminated source water in the Philippines.*

- World Health Organization (WHO), along with UNICEF, tracks progress on global water and sanitation goals through the Joint Monitoring Program. This program monitors trends in coverage; helps countries monitor their own capacities; develops questionnaires, indicators, and definitions; and informs policymakers.
- The UNDP-World Bank Water and Sanitation Program is a global program is supported by

the world's leading water agencies and executed by the World Bank. The program's mission is to assist poor people in gaining sustained access to improved water and sanitation services. It focuses on two main themes: rural water and sanitation, and urban water and waste services. It works with several levels of government and has entered into a strategic alliance with the Rajiv Gandhi National Drinking Water Mission.

## Looking ahead

India offers great opportunities and challenges for PATH's Safe Water Project. The combination of severe water issues and a rapidly growing middle class will likely draw an array of commercial initiatives. A number of factors—including price, durability, usability, and distribution infrastructure—could limit the benefits of these initiatives for India's BOP populations, however.

Based on this analysis, PATH appears to face three main challenges:

- Understanding the obstacles to distributing HWTs products to BOP populations—and addressing them through innovative business models.
- Determining the extent to which the safe water needs of BOP populations can be met by current commercial products if access issues are addressed.
- Determining whether existing and emerging technologies can be adapted to meet the safe water needs of a broader segment of India's BOP households.

If these issues are successfully addressed, PATH and its partners could catalyze the products, systems, and behavioral changes that could bring safe water within reach of low-income populations around the world.



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