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PSI: Social Marketing Clean Water

In 2006, Population Services International (PSI) was a leading non-profit/NGO with a $325 million budget and a proven track record of addressing health issues in the developing world. Having recognized the importance of safe drinking water in the late 1990s, PSI pioneered a point-of-use water purification program with a presence in 21 countries. Its inexpensive, easy-to-use approach developed by the U.S. Centers for Disease Control and Prevention (CDC) had three elements: treatment of water at point-of-use by the consumer, safe storage of the purified water to prevent re-contamination, and behavior change communications stressing the importance of water treatment, handling, and hygiene and sanitation at users' homes and communities. In 2005, PSI estimated that its products had prevented about 11 million instances of diarrhea and the deaths of over 33,000 children. Yet, its water program, with funding of over $8 million in 2006, had not gained the momentum of PSI's other more successful initiatives. (See **Exhibit 1** for PSI's funding history of its water program.)

In April 2006, the Gates Foundation had solicited proposals from PSI and several other organizations about how to best address this health issue. The proposal had generated hope and enthusiasm with the belief that interest from the Gates Foundation would jump start funding for the issue. PSI had tentatively requested $17 million in funding, but learned in October 2006 that it was not selected. The Gates Foundation had decided to focus on research into new technologies, rather than on methods for scaling up existing water treatment programs.

As early as the winter of 2005, Sally Cowal, Senior Vice President of PSI, who had responsibility for the water initiative, had wondered about its future. She reflected,

> Our success to date is based on the limited funding we have been able to raise. As a non-profit, we do not have the internal resources to bring this program up to scale. Donor funding has lagged for a variety of reasons. For example, some donors do not support point-of-use solutions because they believe the appropriate answer is in-country civil engineering projects to pipe in clean water. But the reality is that it would take about $80 billion per year to pipe in clean water to the home of millions without such access, and years to build the pipes and wells. We can deliver cheap, clean water now to prevent illness tomorrow. We have a solution!

Professors V. Kasturi Rangan and Nava Ashraf and Research Associate Marie Bell prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Going back to the drawing board, Cowal met with her small team of two persons and came up with three options for consideration:

- Make a realistic assessment of water's fit with the rest of PSI's portfolio. As it is, it was one of PSI's least successful programs if measured by health impact (DALY) or funds received from donors. Perhaps PSI's competencies and talents were better utilized elsewhere in other programs. In short, make a strategic move to withdraw from water.
- Having gained a foothold in point-of-use water purification, work even harder to convince PSI's traditional donors, US and other governments and foundations to scale their investments. In spite of being rebuffed by the Gates Foundation, keep the faith. Attempt to garner support from other development minded funds, charities, and foundations.
- Look to new sources of money, such as private money from the corporate sector. Build on the initial corporate partnership with Procter & Gamble; seek other similar arrangements.

Sally Cowal, with two decades of a distinguished career in U.S. Foreign Service followed by a stint with the Joint United Nations Programme on HIV/AIDS program (UNAIDS) as a director, was a pragmatist and knew the downfall of clinging to ideas that would no longer benefit the goals of the organization. She thought that brainstorming with her team would help her gain clarity regarding the path she should advocate for water in the forthcoming top-management strategy retreat for the organization.

The Problem of Clean Water

In 2000, the United Nations established eight Millennium Development Goals (MDGs) designed to alleviate poverty, disease, and increase the pace of socio-economic development. From these goals, quantifiable targets for 2015 were set to eradicate extreme hunger and poverty, reduce childhood mortality, improve maternal health, and combat HIV, AIDS, malaria, and other diseases. The water-related target was "to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation."[1] Progress toward achieving the water target was to be measured by the proportion of the population (urban and rural) with sustainable access to an improved drinking water source. Improved drinking water was just that – water whose state had been improved. These water sources included: piped water into dwelling, a public tap/standpipe, a tubewell/borehole, a protected dug well, a protected spring, and rainwater collection.

Water is fundamental for human health and survival. The ability to turn on a tap and access safe drinking water is a given in developed countries; a service so basic that it usually comes without asking. But in 2006, the mere access to safe water, much less clean (treated) water piped into a home, was beyond the reach of more than 1 billion people. In the developing world overall, 20% of the population lacked access to an improved source of drinking water, with only 44% receiving access through a household connection or piped system. The situation was most dire in Oceania[2] and Sub-Saharan Africa, where 50% and 44% of the population respectively lacked access to an improved source of drinking water. Only about 17% of the people in these two regions received water through a household connection or piped water system. The World Health Organization (WHO) estimated

[1] "Meeting the MDG Drinking Water and Sanitation Target, World Health Organization, UNICEF, p. 2.

[2] Oceania included the regions of Melanesia, Micronesia, and Polynesia. Representative countries were Fiji, Papua New Guinea, Guam, Samoa, and the Cook Islands.

that meeting the MDG target for water would require providing services to an additional 300,000 people per day over the next decade.[3] According to the 2006 Human Development Report, diseases and productivity losses linked to water and sanitation in developing countries amounted to 2% of GDP, rising to 5% in Sub-Saharan Africa – more than the region gets in aid.

The primary impact of unsafe water is water-related diseases. (See **Exhibit 2** for estimates of water-related diseases by region). Dehydration from diarrhea was the leading cause of death, with approximately 1.8 million deaths annually, primarily in Africa and South Asia. Children were at especially high risk with approximately 90% of deaths from diarrhea occurring in children under the age of five. An estimated 4,000 children died each day from the effect of dehydration brought on by diarrhea. Surviving children were often stunted and underweight due to diarrhea-induced malnutrition. On average, each child under five in a developing country suffered from three serious bouts of diarrhea per year

Projections estimated that an improved water supply could reduce deaths from diarrhea by 25%. Improved sanitation would reduce it by 32%.[4] (**Exhibit 3** summarizes the relative costs and benefits of access to improved water and sanitation).

There were three general ways to clean and deliver improved water.

- Clean the water at a central source (such as a water purification plant) and deliver it via a piped system to a home or yard. This was the standard operating procedure in place in most developed countries. It was, however, not fail-safe. For example, in some developing countries, improved water was piped into the house or yard using surface plastic pipe (as opposed to underground copper pipe). But, because of poor sanitation practices, there was much room for recontamination, as these pipes often ran along channels where waste water and other contaminants could accumulate. Moreover, it was quite easy to illegally tap into such surface pipes, increasing the chances of contamination. Water purification systems also suffered from lack of regular maintenance and lack of money to buy essential supplies such as chlorine.

- Clean the water at a central source (such as a village well) where water was treated and quality was monitored. This practice worked well in many developing regions but consistent monitoring was required to maintain water quality. Constant equipment break-downs also led to quality problems. Those drawing from the wells needed to ensure that the collection containers were clean and that water collected did not become re-contaminated during the long journey home, or in storage once there.

- Clean the water at the point-of-use. As its name suggests, a point-of-use water improvement system cleaned water prior to consumption. The process was independent of the means by which the water was drawn (surface water, well water, or tap water), with the individual taking responsibility for improving the quality of the water (by adding cleaning agents).[5] Here, too, there were challenges that included ensuring consistent use and the need for safe storage.

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[3] "Meeting the MDG Drinking Water and Sanitation Target, World Health Organization, UNICEF, p. 6.

[4] "Making water part of economic development," p. 13

[5] Boiling the water was another possibility, but because it was relatively more expensive (because of fuel costs) and more cumbersome, it was not widely practiced.

In addition to improved water, increased hygiene and sanitation was vital – to prevent re-contamination of water and to prevent disease. Studies suggested that improved hygiene (with education and hand washing) could reduce cases of diarrhea by 45%. However, "hygiene depend[ed] on the quality of water that people have available, and one has to realize that in many areas, hand-washing after defecation or before preparing foods seems like a luxury when the water has to be fetched from a water point far away."[6]

PSI

PSI was founded in 1970, with a mission to address the consequences of high birth rates in less developed countries (LDCs) through the dissemination of family planning information and products.[7] In 1976, following projects in Kenya and Sri Lanka in the early 1970s, PSI signed an agreement to conduct a social marketing project to market birth control products in local retail outlets in Bangladesh. The project was almost entirely funded by the US Agency for International Development (USAID) which donated the contraceptives, paid PSI a managing agency fee, and subsidized operating expenses in the country.

PSI's social marketing approach was unique; a non-profit model that relied on the commercial sector to educate very low income customers and deliver products to them. PSI described its social marketing mission as follows,

> We are here to create the climate in which socially desirable products become part of the daily life of the marketplace. We would like to assure their distribution in an efficient fashion so that their availability becomes routine and expected. The fundamental purpose is to facilitate the exchange between the buyer and the seller so that the transaction is fruitful for both. The person who practices family planning with contraceptives purchased in a social marketing program is not a patient or client nor a recipient or acceptor. He or she is a consumer making a careful and prudent choice among the many options available in the marketplace.[8]

PSI found that established retail channels were generally able to reach higher income people in LDCs, but often were unable to reach lower income groups. So, PSI "priced, packaged, and placed" products so that they were accessible to the poor. Donor funds substantially subsidized the pricing, but PSI rarely distributed free products. PSI believed that when customers paid for products, even if only a small amount (equivalent to the price of a cup of tea or coffee), products were more highly valued. Moreover, charging a price allowed for the development of a sustainable commercial distribution channel because of the margins involved for middlemen.

PSI packaged its products to create demand for them in low income markets with meaningful national brand names, appropriate packaging, and product use inserts (incorporating graphics to communicate to low-literacy consumers). PSI's channels included non-traditional outlets such as small grocery stores, street kiosks, gas stations, barber shops, and more recently in the age of HIV/AIDS, bars and brothels in the case of condoms. PSI supported its products with mass communication messages targeted to the poor. In addition to highlighting a particular product or brand, PSI's messages created awareness regarding a given health issue and provided further

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[6] "Water a Shared Responsibility," p. 231

[7] See Population Services International: The Social Marketing Project in Bangladesh, HBS Case #586-013.

[8] Population Services International: The Social Marketing Project in Bangladesh, HBS Case #586-013, p. 2.

information. PSI was well known for using innovative platforms such as street-theatre, traveling cinema, and the services of opinion-leaders and influencers.

PSI under Richard Frank

Richard (Dick) Frank became CEO of PSI in 1987.[9] In his earlier experience, Frank had been a partner in a law firm specializing in international and government agency law and had also served as an undersecretary of Commerce, and Administrator of the National Oceanic and Atmospheric Administration. Soon after his arrival, Frank recognized that PSI needed to diversify on several dimensions. "We were then a one product company (family planning) operating in a limited area (Bangladesh) with funding from a single source (USAID)," he noted. Based on that assessment he sought to diversify PSI's funding, products, and people. With 90-95% of PSI's funding dependent on USAID, Frank broadened its funding base by targeting foundations and non-US government agencies and moving into new health areas. His other initiative entailed entering new country markets and new disease areas where there was a good fit with its social marketing model. PSI's dramatic growth in terms of revenues over the years is shown in **Exhibit 4.** PSI received 83% of its funding from governments within and outside the U.S. Major PSI donors included the governments of the United States, United Kingdom, Germany, Netherlands, The Global Fund, UNICEF, the Bill and Melinda Gates Foundation and other private foundations. Earned revenues from individual programs generated approximately $36 million in 2005, and these were usually used by the respective country organization to off-set program expenses.

HIV/AIDS: In 1988, PSI embarked on its first HIV prevention program initially focusing on condom marketing. By 2006, PSI had created a four-pronged strategy that included: abstinence programs targeted at younger people not yet sexually active, mutual fidelity for the sexually active in stable relationships, condom marketing programs, and voluntary counseling and testing and condom use among higher risk populations. PSI was fighting a disease that infected increasing numbers: about 4.3 million people worldwide became infected with HIV in 2006 (in addition to the 36 million already infected and living with AIDS), including 530,000 people under 15 years old. PSI's sales of condoms grew to 1 billion and its impact grew; PSI estimated that it had directly prevented 212,000 HIV infections in 2005.

Malaria: In early 1994, PSI's HIV work in HIV/AIDS was followed by a malaria initiative. PSI was at the forefront of the effort to increase malaria awareness and bed net usage among the most vulnerable populations (pregnant women and children under age five). Specifically, PSI promoted the use of insecticide treated bed nets (ITNs) with two different types of products. The first was a polyester bed net (sold under the brand names *Supanet, Moustiquaire*, and *Chitetezo*) packed with an insecticide treatment kit that lasted approximately 6-12 months. To complement this product PSI also distributed an easy, inexpensive, re-treatment kit to use once the original treatment was no longer effective. PSI's other product was a long-lasting ITNs. In these products, the insecticide was bound to the net during its manufacture making the insecticide treatment last roughly as long as the net and

[9] PSI was founded in 1970 by Philip Harvey and Timothy Black, when they were graduate students at the University of North Carolina's Public Health Program. Harvey had earlier worked for CARE (a non-profit American agency involved in relief and development). Dr. Black had practiced medicine in New Guinea and Nigeria, specializing in family planning and rural health. PSI was first led by Phil Harvey, and then by Robert Ciszewski and William Schellstede all three who had strong backgrounds in international development and/or public health before Richard Frank's appointment in 1987.

making re-treatment unnecessary. In addition to the nets, PSI sold brands of pre-packaged malaria treatment.[10]

By 2006 PSI operated programs in 30 malaria endemic countries. PSI estimated that its malaria control products had prevented about 21 million episodes of malaria and saved the lives of 45,000 children in 2005. In doing so, PSI had become the largest procurer and distributor of ITNs in the world.

PSI found it needed to adopt different tactics in its ITN marketing efforts. Typically, when PSI entered a geographic or product market, it built its social marketing programs aimed at motivating consumers to voluntarily buy the product for a small price through commercial channels. In urban areas with existing distribution, PSI provided dealer incentives to achieve its goals. In rural areas, PSI created innovative distribution options such as kiosks and village agents. Often sales to these vendors were on a cash only basis and lot sizes were small as vendors lacked space and capital to carry inventory. Prices were generally lower in rural areas (where incomes were typically lower) than urban areas. To prevent subsidized products from seeping into urban markets, PSI marketed different brands and physically packaged them differently.

In the case of malaria nets, however, PSI's efforts had fallen short of its goals, especially in rural areas. Recognizing a need to increase distribution, PSI had adopted a blended model of public and private channels. In urban areas, PSI continued to sell ITNs using its traditional model, but in rural areas PSI set up distribution through a network of ante-natal clinics that distributed nets at prices that were 25% to 50% below the urban rate. Leakage into the traditional market was controlled through the clinic where nurses only distributed nets to mothers with legitimate health services cards.

YouthAIDS: In 2001, PSI created YouthAIDS, a worldwide initiative to engage the support and participation of the private sector in the US and Canada in an effort to reduce the spread of HIV/AIDS among 15-24 years-olds. The YouthAIDS initiative and brand was created as an umbrella brand for PSI's youth-oriented HIV programs in more than sixty developing countries as PSI, despite its global reach, was virtually an unknown brand in the U.S. The initiative enabled PSI to promote the engagement and participation of corporations, celebrities, artists and media in efforts to raise awareness, promote risk reduction and to diminish the spread of HIV/AIDS. Celebrities, including YouthAIDS Global Ambassador and PSI Board Member Ashley Judd, worked with YouthAIDS to create public service campaigns and messages to change the behavior of youth worldwide. In addition, YouthAIDS created active grassroots fundraising and awareness programs in the US, mobilizing tens of thousands within the university and other youth communities to support its efforts. The majority of funds for YouthAIDS came from corporate partnerships where celebrities, musicians and corporations (such as the Canadian shoe retailer ALDO, America On-Line, Levi's, etc.) engaged in high profile fundraising events and/or cause-related marketing campaigns. The initiative raised over $4 million in 2006 for PSI's HIV prevention programs.[11]

By 2006, PSI's mission had expanded to the delivery of affordable health care products and services to millions of lower income people through the use of 400 product brands in 69 countries

[10] Initially treatment products contained blistered chloroquine together with low literacy instructions in the local language to improve accurate dosing for different age groups and compliance with the full course. More recently, malaria endemic countries had switched their malaria drug policy to artemisinin-based combination therapy (ACT), consequently PSI brands of prepackaged malaria treatment contain one of the ACTs.

[11] The impetus for YouthAIDS was provided by Kate Roberts, who had spent much of the first decade of her professional career in marketing and advertising in Europe, Russia and Romania. Since joining PSI, she ran YouthAIDS as an independent stand-alone entity within PSI.

around the world. PSI had four significant programmatic areas: HIV, Reproductive Health, Malaria Prevention, and Child Survival (Clean Water was part of this program). In 2005, PSI prevented an estimated:

- 212,000 HIV infections
- 6.5 million unintended pregnancies
- 117,000 child deaths from malaria and diarrhea and;
- 21 million malaria episodes.

These impressive results had been achieved with efficient use of resources. PSI estimated that in 2005, it spent 50% of its budget on HIV, 11% on Reproductive Heath (non-condom family planning), 24% on Malaria and 4% on Maternal and Child Health. The remaining 11% was spent on other activities not readily classified and included new work in tuberculosis, certain behavior change communications, some YouthAIDS costs, and pilot programs in new health areas. **Exhibit 5** provides an overview of the global reach PSI's programs, and **Exhibit 6** provides an overview of its global activities.

PSI Organization

Headquartered in Washington, DC, PSI operated either directly or through affiliate organizations in 69 countries. Some offices were direct branch offices of PSI. Where regulation prohibited direct ownership, the affiliate was an independent entity that worked closely with PSI. Such an independent registration also enabled the local PSI entity to apply for grants from other bi-lateral donor countries, such as the UK, Germany, and the Netherlands. Each country was headed by a PSI country manager who reported to a regional director. The typical PSI affiliate employed about three dozen local professionals and spent about $2 million to $4 million per year to source, package, promote, and distribute it products. The in-country professional staff was responsible for advertising and promotion, and for recruiting local retailers and wholesalers to create the distribution channel for its products. PSI's headquarters led fundraising efforts, provided expertise, training, and technology and support for research and fundraising. By 2005, the organization had 151 U.S. staff, 112 overseas expatriate staff and 7,000 local PSI affiliate staff.

Exhibit 7 provides a chart of the organization's structure. The stated mission of the organization in 2006 was:

> To measurably improve the health of poor and vulnerable people in the developing world, principally through social marketing of family planning and health products and services, and behavior change communications. Social marketing engages private sector resources and uses private sector techniques to encourage healthy behavior and make markets work for the poor.

Frank noted, "One of the things that makes PSI special is the quality of staff and our philosophy of giving them plenty of discretion, but holding them accountable for producing measurable health impact." PSI's people reflected its entrepreneurial nature. In its early days, PSI's staff had been drawn from USAID, development assistance, and health fields. However, as it expanded under Richard Frank, it attempted to create a spirit akin to the Peace Corps. "We bring in talented but yet un-resuméd individuals who desire results-based, non-profit development work. We give our overseas staff a great deal of latitude and that attracts and retains the best talent available," stated Frank.

Measurement

PSI prided itself on its business discipline, noting in its biennial report,

> We measure incessantly. Our measurement models, designed by health experts, are among the best available, and we work constantly to refine and improve them. . . Efficiency is another element of doing development differently. More than 93 cents of every dollar of PSI revenue goes directly to programs.

For programmatic purposes, PSI had developed three levels of measurement. The first was sales volume. The second was "person years of protection;" a metric developed by PSI to estimate annual protection that PSI provided through the sale of a particular product or service. For example, the 'couple years of protection' measured the amount of contraception necessary to protect one couple from unintended pregnancies for one year. For example it was estimated that 150 condoms per year would protect a couple from unwanted pregnancy (or HIV/AIDS). Similar such measures were developed for "person years of malaria protection," and so on.[12] (**Exhibit 8** summarizes PSI's measurable health impact in the last five years.)

Most recently, PSI was attempting to measure its efforts in terms of Disability Adjusted Life Years (DALY). (**Table A** below provides a comparison of performance figures for each of PSI's major programs.) Used the by the WHO, the World Bank, and other leading health organizations, the DALY represented the loss of one year of equivalent full health (the sum years of life lost due to premature mortality in the population and the years lost due to disability caused by the health condition). As Will Warshauer, Executive VP, Resources and Strategy (and with responsibility for metrics and measurement) explained,

> As we measure the effectiveness of our programs, we are constantly balancing the precision of the measurement and its usefulness in measuring the health impact of the program. The goal of the DALY is to allow for fair and accurate comparisons across initiatives. The WHO benchmarks $100/DALY as the outer threshold for undertaking health initiatives. All our programs are considerably below the threshold, and our average of about $25/DALY makes us one of the more efficient health NGOs in the world.

Table A. Performance Comparisons for Major Programs

	Global DALYs Lost per Year	# of deaths	PYPs addressed by PSI in 2005	DALYs* addressed by PSI 2005
Family Planning	115,991,000	2,996,000	11,414,458	2,258,326
HIV/AIDs	70,796,000	2,552,000	543,106	4,838,988
Malaria	39,961,000	1,207,000	22,625,854	1,715,553

[12] Couple Years of Protection: The amount of contraception necessary to protect one couple from unintended pregnancies and HIV infections for one year: Number of branded condoms sold divided by 120; number of generic condoms divided by 240; cycles of oral contraceptives divided by 15; number of vaginal foaming tablets divided by 100; number of intrauterine devices (UIDs) divided by .285; number of 3-month injectables divided by four; number of two month injectibles divided by six; number of 1 month injectables divided by 12; number of voluntary surgical contraception performed divided by 0.1; number of implants divided by 0.285; and number of emergency contraceptives packs divided by 13.

Person Years of Malaria Protection: The amount of insecticide treated and untreated bed nets, insecticide retreatment and pre-packaged treatment necessary to protect one person for one year from malaria: Number of insecticide-treated nets divided by 0.451787; number of untreated nets divided by 0.515331; number of long-lasting insecticide nets divided by 0.35624; retreatment kits divided by 4.44 and number of malaria pre-packaged therapy packages divided by 6.5.

Person Years of Treated Water: The amount of safe water solution necessary to disinfect the drinking water of one person for one year and protect that person from water-borne diseases, based on the assumption of 4 liters of water per person per day.

Water-related disease**	58,697,000	1,777,000	4,348,489	182,722

* Note: DALY estimates come from a beta version of a DALY calculator created by PSI. These estimates are preliminary and it is likely that they will change, perhaps substantively.

**Accounts for PYPs and DALYs from PSI's safe water programs only; excludes other PSI diarrhea interventions

Source: PSI estimates, DCPP Project II, 2006.

Water Purification Products

Following its successes in diversifying away from family planning to HIV and malaria, PSI decided that diahrreal disease was another health area where it could add value using its model of making attractive low-cost, low-technology, life-saving products available to poor people through the market.

PSI marketed three water purification products: safe water solutions (SWS), PUR in sachets, and Aquatabs.[13] **Exhibit 9** provides illustrations of the various products, their brands and their product labels. Products treated different quantities of liters, and were thus most easily compared using liters of water treated. In 2005, SWS accounted for 98.4% of PSI's liters of water treated, PUR for 0.4% and Aquatabs for 1.2% respectively. **Exhibit 10** provides sales and performance data for PSI's water purification business by country. In addition to using PSI's products, disease prevention also required that the vessel containing the water be clean and that any unused water be discarded after 48 hours. PSI supported its products with an educational campaign designed to increase hygiene and sanitation practices. Sally Cowal of PSI noted,

> Creating behavior change is an essential part of avoiding diarrhea. For example, children could drink untreated water at school and get sick or an adult could drink untreated water at a work site. The program is about creating clean, safe water at home, at work, everywhere, and building awareness about how to avoid contamination, and doing it on a daily basis.

PSI measured the impact of its water program based on person years of treated water (PYTW). For SWS, the calculation was based on the number of bottles of safe water solution necessary to disinfect the drinking water for one person for one year. (Assuming an average consumption of four liters per day per person, 365 days per year, it would result in approximately 1,460 liters consumed per person per year.)[14] The figure varied by country due to different bottle sizes, solution concentrations, and dosages. The PYTW (person years of treated water) figures were discounted by 12% to adjust for spillage, wastage, and lack of need. The figure for PuR was based on the number of sachets necessary to disinfect the drinking water of one person for one year, assuming that one 4 gram sachet of PuR treated 10 liters of water, and a consumption rate of water per person of 1,460 liters per year. The PYTW per sachet was .006028. For Aquatabs, the PYTWs per tab was .01288.

[13] Aquatabs were effervescent chlorine tablets that dissolved rapidly in water, sanitizing it. Tablets had some advantages over liquid products: they were easier to transport, had a longer shelf life (five years instead of one), and were easier for dosing, as they did not require pouring. Tablets were slightly more expensive per unit than the liquid solution, and it was not known if customers would use tablets as consistently as liquid formula. PSI had initiated a pilot program for Aquatabs in Tanzania in 2005 with plans to expand it into other countries if the pilot proved successful.

[14] It was estimated that a person would need about 20 litres of water a day for all purposes, including washing, bathing etc., the requirements for drinking water were set at 4 litres per day.

SWS

Distributed by PSI since 1998, SWS was shown to reduce incidence of diarrhea by 30-50%. In 2006, PSI had SWS programs in 15 countries under two primary brands (Sur'Eau and Waterguard) as well as a few secondary brands (such as Clorin, Safe Wat, Certeza). A bottle of SWS (250 ml units) provided safe drinking water (about 20 liters) to a typical family of six for $0.01 US (one cent) or less per day. Simply, SWS was a bottle of diluted chlorine bleach that disinfected water at the point of use by killing the bacteria that contaminated the water. The customer drew water from the local source, poured in the required amount of solution (1-2 drops or a capful depending on the product's concentration), agitated it and waited 30 minutes rendering the water safe for drinking. The water could be stored for at least a 24 hour period. The residual chlorine protected the water over the stored period.

While a significant amount of the start-up funding for SWS originated with PSI's internal seed capital, PSI received support from the CDC, USAID, UNICEF, CARE, and the WHO. Zambia and Madagascar's in-country programs had been initiated subsequent to emergencies – a cholera epidemic in Zambia and a cyclone in Madagascar. In Kenya, the program was first funded by PSI seed money and later supported by a USAID program. To bring SWS products to market, PSI contracted for production with local manufacturers who produced the product using a variety of methods (chlorine gas injection, electrolytic generation, HTH powder generators, and so on) in a range of solutions. Package sizes also varied depending on local needs. Beginning in 2004, PSI began to standardize both size and concentrations, but each country manufactured and distributed its own product.

PSI sold its SWS products through pharmacies, retail shops, and health clinics. For example, in Zambia the price/bottle through the clinic was 500 kwa (11 cents-US) compared to the retail price of 800 kwa (17 cents-US). Additionally, other NGOs (like the Red Cross) purchased SWS from PSI and distributed it for free or at a marginal cost. Even with a 30% margin at wholesale and a 23% margin at retail, the average SWS product selling price was 25 cents (US) per 250 ml bottle (usually sufficient for a family's need for 20-30 days) and within reach of the poor.

Among the 20 countries, Zambia, Kenya and Madagascar were PSI's larger programs of operation for the SWS product. In general, PSI used its traditional distribution methods supplemented by new approaches on a country by country basis. For example in Kenya, traditional water distribution methods were complemented by community sales representatives, who traveled by foot or on bike to sell WaterGuard and educate the public on the importance of safe water and hygiene. In Madagascar, in addition to PSI's distribution of Bureau through regular retailers and vendors, PSI distributed SWS through small restaurants in urban areas called "hotelys." In that country, many people eat all of their meals in hotelys rather than cooking at home, because it is more economical to eat at a restaurant. The hotely program encouraged restaurant owners to use Sur Eau in their cleaning and preparation of foods, and to sell Sur Eau to their customers.

A brief description of the Zambia program follows to provide a more complete insight into the challenge of social marketing "clean water."

Zambia

PSI's program in Zambia was based on funding from the CDC and USAID (that began at approximately $280,000 per year and grew to $400,000 in the latest fiscal year). The program, which began in 1998, promoted and marketed SWS under the Clorin brand in Zambia, one of the world's poorest countries (ranking 165 out of 177 in the UN's Human Development Index). Approximately

45% of the population was under the age of 14, and life expectancy was about 40 years of age. The literacy rate was 80% for those over age 15. Zambians faced a high risk for disease; including bacterial diarrhea, hepatitis A, typhoid fever in addition to malaria in some regions. Estimates suggested that the prevalence rate of HIV/AIDs was 16.5%.

Overall, 35% of Zambia's 11 million people lived in urban communities, with 64% residing in rural areas. Only 27% of the rural population had access to improved water. Even in urban areas, where 86% of the urban population supposedly had access to improved water and 53% to a household piped connection, most of those water sources were contaminated as a result of faulty pipes and leakage. Every year 20,000 children under five died in Zambia from water-related diseases.

One 250-ml. bottle of Clorin cleaned sufficient drinking water for a family of six for 20-30 days. Sales of Clorin had been increasing steadily, reaching over 1.8 million bottles in 2005 alone, nearly enough for one bottle per household per year. Sales were cyclical, peaking in the rainy season, when water-borne disease was more prevalent and promotion of health practices more aggressive.

PSI had also managed to engage several distribution channels for Clorin. Approximately, half of Clorin sales volume went through private sector channels (such as retail shops and pharmacies), 25% was distributed the non-governmental organizations (NGOs) with the remaining 25% through public health clinics. PSI faced a major challenge of increasing purchase and use of SWS, not only around the world, but also in their model program in Zambia. For example, although almost 93% of households in Zambia surveyed in 2004 had heard of Clorin, only 16% of households were actually using it—and only 44% of those were using Clorin consistently.[15] Table B below provides information on consumer attitudes toward Clorin.

Table B Consumer Attitudes toward Clorin

Reason	Why Haven't you Used Clorin? % (n=299) (A)	Why Aren't you Using Clorin Now? % (n=578) (B)
Bad smell	20	12
Bad taste	8	7
Can't afford	30	40
Water is safe	27	12
Don't know much about Clorin	17	3
Not diarrhea season	1	7

(A) is the population of people that has never used Clorin.
(B) is the population of people that has used Clorin at least once but are not currently using it.
Shares do not add to 1 because multiple responses were possible.

Source: Adapted from Zambia National Evaluation of Safe Water Systems, 2006.

Critics argued that charging for such life-saving consumer goods such as Clorin was impeding take-up of important health products. Despite the fact that Clorin was inexpensive, even in Zambian terms (retailing in 2006 for approximately 800 kwa per bottle ($0.17) compared to a bottle of coke which retails for 2000 kwa), the price of Clorin had been increasing over time, in part to improve retail margins and give retailers extra incentive to stock the product and have it available even in remote areas. Clorin's shelf life of less than one year also made rural distribution problematic.

[15] Zambia National Evaluation of Safe Water Systems, 2006.

PUR

In 1995, the CDC signed an agreement with Procter & Gamble (P&G) that led to the development of PUR, a next generation point-of-use water purification product that reverse-engineered the purification process of a large scale water treatment plant. SWS was effective in killing the bacteria in clear water, but proved less effective in turbid water that contained solid contaminants. Since it is estimated that at least 30% of people in rural areas draw their drinking water from rivers and streams, which are always turbid, PUR, which disinfected water and removed sediment, arsenic, and other contaminants, had a significant benefit over dilute chlorine alone. PUR was sold in sachets costing about 10 cents-US each that treated 10 liters of drinking water. The sachets were shelf stable for three years and could be used for daily consumer use and in critical health care situations, after natural disasters or a cholera epidemic where lack of access to clean water could spread the disease. Although more expensive than SWS, an additional advantage of the PUR process was that customers could visibly see the improvement in the water's condition thereby assisting in the crucial task of education and behavior change.

Using the PUR method, the customer added one sachet to 10 liters of water. The water was stirred for five minutes and then left to stand for five minutes until the precipitate settled to the bottom and the water became clear. The water was then filtered though a clean cloth and left to stand for 20 minutes for disinfection before use. The filtered material (precipitate) was biodegradable and was discarded. PSI estimated that each adult would require 146 sachets to disinfect his or her drinking water for one year, with fewer sachets needed if the treated water were reserved for child consumption.

After the development of PUR, P&G had taken the product to market in several developing countries. Although successful in emergency disaster situations, P&G had failed to obtain sufficient repeat purchase to create scale for commercial success. But not wanting to abandon PUR as a part of its corporate social responsibility (CSR) efforts, P&G approached USAID's GDA (Global Development Alliance) program. GDA provided funding for public-private partnerships that promoted business solutions in areas such as health and education.[16] As part of that effort, P&G approached PSI about opportunities for collaboration, but PSI's water team at that time had concerns about the viability of a partnership. PUR was more expensive than SWS and more importantly PSI had consistently avoided being the distributor of some other entity's branded products "We were uninterested in being a distributor of someone else's products and interested in supporting our own water purification brands," Richard Frank had said. "But the one appealing aspect was the quality of the P&G brand," he noted.

For its part, P&G was not interested in co-branding, with PSI. For, despite the lack of commercial success, P&G was committed to PUR, positioning it as a focal point of its global CSR program. The initiative called, Live, Learn, and Thrive, focused on the development of children (through age 13) in need in communities around the world. A significant part of the 'Live' component of the initiative was Children's Safe Drinking Water that featured the PUR product. Despite the impasse, discussion continued between P&G and Cowal, the new leader of the safe drinking water initiative.

Cowal, also PSI's regional director for Latin America and the Caribbean, found a way to work the three way partnership between USAID, P&G and PSI in launching a pilot social marketing program in Haiti. Nearly 90% of Haiti's people were without access to piped water and 42% of deaths of infants in rural areas were attributable to water borne diseases. The program was launched in

[16] See website for more details- http://www.usaid.gov/

November 2004, with P&G transferring the product to PSI at cost, and USAID GDA funding PSI to mount a behavior change education and communication program. PSI used its own resources to build a social marketing distribution strategy through retail channels. Although the product proved useful in emergency efforts after flooding affected large parts of the country in 2005, it failed to achieve its sales target in the retail market where it was sold at 3 gourdes (7 to 8 US cents).

In late 2002, P&G agreed to supply PUR sachets to PSI at a guaranteed price of 3.5 cents (US)/ sachet for five years.[17] Although PSI had tried to negotiate a lower price point, so as to be able to sell PUR to the end consumer at a lower cost, P&G refused citing its commitment to a "sustainable model not a charitable one" for the product. P&G, however, supported PSI in other ways, In early 2003, PSI received $500,000 from the P&G Foundation to pursue water and safe hygiene in Uganda and Kenya, where PSI had ongoing water programs.

Later that year P&G exited the commercial market entirely, opting to sell PUR directly to emergency relief organizations, such as Red Cross, CARE, for disaster relief and to PSI for social marketing purposes. A considerable amount of PUR was distributed by NGOs during the Asian Tsunami of December, 2004. Shortly after the agreement, P&G donated nine million PUR sachets to PSI's affiliate, Greenstar, in Pakistan. The revenue from the sale of donated sachets was to be used to formulate a business plan and build a market in Pakistan. The PUR packets were labeled in Urdu (the local language), and Greenstar had readied the distribution logistics, when in October 2005, a devastating earthquake struck the region. Greenstar, with relationships with 14,000 franchised health care providers, was able to quickly distribute PUR to affected areas. Although this product was distributed for free along with buckets and cloths provided by USAID, the publicity gained and the habit change among those populations affected by the earthquake paved the way for a social marketing campaign after the disaster had passed.

PSI had already taken PUR to seven countries and was scheduled to market it in an additional three counties by the end of 2006. Further in 2006, P&G acquiesced to PSI's co-branding request. As a result, in Ethiopia and Malawi PUR was positioned in the market as a line extension to the liquid WaterGuard and promoted heavily in areas where consumers draw their water from surface (i.e. turbid) sources.

Future Direction for Water and PSI

Cowal's first priority was to create a robust marketing strategy for the SWS and PUR products. Product distribution and associated pricing by channel was an emerging issue. As seen below, there had been recent high profile challenges to the social marketing model endorsed (and created) by PSI that affected water as well as PSI more broadly.

> PSI pioneered the concept of "social marketing" in the 1970s … The aim, embraced by the United States and many international donors, is to create a market that can sustain itself after outside assistance goes away. This approach has its critics. Jeffrey Sachs, the Columbia University economist and author of "The End of Poverty,"[18] is the best-known advocate of giving the [mosquito] nets away. He argues that charging even a token amount puts this lifesaving intervention out of reach for Africans who live in rural villages and urban slums on

[17] In 2004 P&G agreed to co-branding with PSI, the first time that the world's leading consumer products company allowed an outside organization to a handle its brand. As a result, PuR in Malawi is branded as Waterguard Powder; a brand extension.

[18] *End of Poverty*, Jeffrey D. Sachs, December 30, 2005.

less than $1 a day. Sachs supports nationwide campaigns such as the one in Togo, which in one week in December gave away 1 million free nets with measles vaccinations.

PSI, for its part, points to Malawi, where it sold 1 million subsidized nets last year and which is now on track to meet net-use targets. It also argues that paying even a token sum has a value that goes beyond building a sustainable system. When people decide to buy a net, they commit to using it and signal that they understand why and how it's used, which has not always been the case when nets were given away free, only to be used as wedding dresses and fishing nets.[19]

Given the success of the ITN clinical channel some wondered if PSI should consider using blended channels for other products, and perhaps even considering free distribution in certain cases. Yet the success of the clinical channel marked a significant change for PSI and remained controversial. "From our inception, PSI has focused on the private sector channel. It was a major effort for us to work with a public channel." Many were concerned that the incorporation of public channel partnership threatened PSI's key point of difference – the ability to operate in the private sector.

When it came to water purification, Sally Cowal was concerned that point of use would never become a major intervention of the public health community on the scale of mosquito nets. There were great options out there: liquid chlorine, PUR, Aquatabs, all had been shown to reduce diarrhea by 50%, but would donors fund them, or like the Gates Foundation continue to prioritize the search for new and more effective technologies? And would consumers buy them? And use them correctly and consistently? On a more strategic note, she wondered if there was a systematic way to think of how the multiple products would line up by market segments in different countries.

Now that the relationship with P&G was taking root, she considered how to optimize the relationship with P&G. The collaboration with P&G was a first for PSI, which had previously not had such corporate relationships. The relationship had created new levels of exposure and opportunity. P&G's former CEO, John Pepper became a member PSI's board and further deepened the relationship. Cowal had addressed a gathering of the top 100 P&G managers at an external relations event speaking about the collaboration. A subsequent meeting with a small group of P&G retired officers raised $600,000 to support PSI's PUR projects in Malawi and lent their financial and marketing expertise to create sustainable results. P&G also created a cause related marketing campaign and agreed to donate 1.5 cents to PSI for each PUR faucet filter sold in the US. Celebrities were being brought on board to lend more visibility to the effort.

Although PSI had received over $4 million directly or indirectly from the P&G Foundation, the corporation itself, and the company's employees, many at PSI wondered if PUR continued to be too expensive to reach the really poor in LDCs. More broadly many wondered about the role of the corporation in furthering the water program and PSI's mission – what was the best role for a corporation – donor, collaborator, or partner? The YouthAIDS program in PSI had successfully brought in funds for AIDS education- can water be much different, she pondered?

No matter how important these external issues were, Cowal faced a significant internal challenge, that of raising the profile of water within PSI. As she explained, "PSI has been working with water for some time and has never had the break-through in outside funding to give it the attention it deserves. The DALY's addressed from water are lower than for PSI's other leading programs like HIV and family planning (see earlier Table A). One has to place this in the context of PSI's aggressive

[19] "Net Gains for Africa," L. A. Times, August 7, 2005.

goal of attaining 25 million DALYs by 2012. The organization has done very well in 2006 growing to 11 million DALYs from 9 million in 2005, but in six years our goal is to more than double our impact. Surely there will be questions regarding what avenues and programs will best enable us to do that?" she concluded.

Adding to the urgency, CEO Richard Frank had retired at the end of 2006 and PSI had just announced that Karl Hofmann would become the new president and CEO. Hofmann, 45, came to PSI from a brilliant career at the highest levels of the State Department. He had served as acting ambassador in Lesotho, ambassador to the Republic of Togo and most recently, Deputy Chief of Mission at the U.S. Embassy in Paris. Hofmann was expected to take office in February and Cowal knew she needed a strong water strategy in place to win the support for the program that it deserved. She looked at her notepad once again, at the three options for water:

- make a strategic withdrawal
- stay the course, but with greater effort to consolidate past learnings and apply them to ongoing programs
- look for alternate funding sources from the corporate sector

Exhibit 1 PSI Safe Water Funding by Source - 1999-2006 ($US)

Year	Total Funding	US Government	PSI	Procter & Gamble	Other
1999	280,849	280,849	0	0	0
2000	947,426	947,426	0	0	0
2001	1,309,739	981,295	138,169	0	190,276
2002	2,957,212	1,143,768	1,623,169	0	190,276
2003	1,712,837	752,680	767,651	0	192,506
2004	4,374,395	2,428,903	1,457,187	187,500	300,805
2005	7,511,219	3,824,958	1,974,209	1,438,373	273,680
2006	8,054,020	3,876,779	1,261,251	1,762,885	1,153,105
Total	27,147,697	14,236,658	7,221,635	3,388,757	2,300,647

Source: PSI records

Exhibit 2 Global Burden of Water-Related Diseases (2002)

Cause	Total Deaths (000s)	0-4 yrs. %	Male %	Female %	AFR %	SEAR %	WPR %	EMR %	AMR %	EUR %
All causes	57,029	18	52	48	19	26	21	7	10	17
Water:										
Diarrhea disease	1,798	90	52	48	39	34	9	14	3	1
Malaria	1,272	90	48	52	89	5	1	5	0	0
Schistosomiasis	15	0	65	35	8	2	23	61	6	0
Dengue	19	22	45	55	1	63	20	5	11	0
Japanese encephalitis	14	36	49	51	0	61	21	17	0	0
Intestinal nematode infections	12	23	50	50	32	36	10	8	13	0
Protein energy malnutrition	260	27	50	50	40	26	5	10	16	2
Drowning	382	15	69	31	17	26	35	7	6	10

WHO defined the regions of the world as: AFR Africa south of the Sahara; SEAR South East Asia (includes India); WPR Western Pacific (includes China); EMR Eastern Mediterranean (includes Sudan, Afghanistan, and Pakistan); AMR the Americas; EUR (includes Central Asian republics.)

Source: Adapted from "Water a shared responsibility," The United National World Water Development Report 2, p. 209.

Exhibit 3 Cost and Benefits of Improved Water Alternatives (millions $US)

Region	Cost Benefit Ratios & Total Economic Benefit by Intervention											
Selected countries within:	*Halving the proportion of people with access to both improved water supply and improved sanitation. Meeting the MDG Target.*			*Access for all to improved water and improved sanitation services.*			*Access for all to improved water and sanitation services plus household water treatment at point of use.*			*Access for all to regulated in-house piped water on sewage connection.*		
	Cost/ Benefit	Annual Cost	Annual Benefit	Cost/ Benefit	Annual Cost	Annual Benefit	Cost/ Benefit	Annual Cost	Annual Benefit	Cost/ Benefit	Annual Cost	Annual Benefit
Africa	11.33	2,021	22,908	10.89	4,043	44,036	14.30	4,360	62,214	4.39	24,729	108,441
America	10.21	157	1,607	10.59	315	3,334	13.77	368	5,074	3.88	2,320	9,007
Europe	3.4	71	242	6.55	143	934	5.82	266	1.551	1.27	4,206	5,337
E. Mediter-ranean	34.95	100	3,505	42.50	201	8,523	61.47	250	15,355	14.49	3,275	47,431
S. E. Asia	3.16	3,628	11,457	7.88	7,257	57,155	9.41	7,704	72,478	2.90	35,074	101,643
W. Pacific	3.36	3,828	11,013	6.63	6,563	43,487	7.89	6,957	54.885	1.93	28,129	54,426
Rest of the World		2,046	33,668		4,087	43,487		4,744	132,549		38,782	229,616
Total	7.5	11,305	84,400	11.63	22,609	262,879	13.96	24,469	344,106	4.07	136,515	555,001

Source: "Making water a part of economic development," Commission on Sustainable Development, p. 34.

Exhibit 4 PSI Financial Report ($ Thousands)

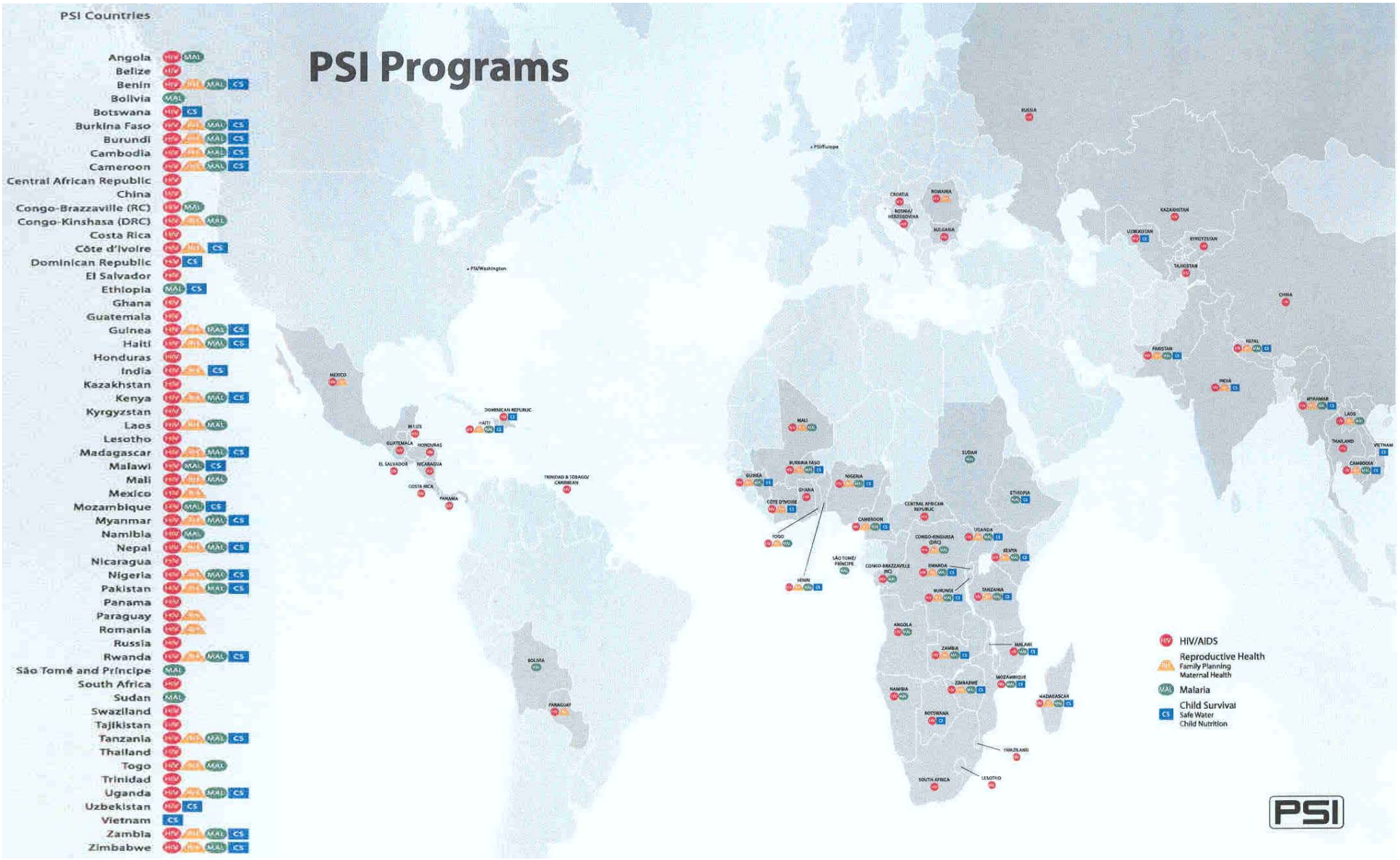
	1987	1998	2003	2005
Public Support, other revenue and gains				
Grants and fees from U.S. government	4,235	31,360	108,676	122,642
Grants and fees from non-U.S. governments	51	23,035	61,729	101,184
Grants and frees from international organizations		2,541	15,327	35,872
Grants and fees from foundations and corporations		--	9,534	12,712
Other sources				13,354
Contributions and support	213	2,864	7,450	7,715
Total public support	4,499	60,110	202,716	293,479
Investment and other income	76	297	1,479	875
Total public support, other revenues, and gains	4,575	60,407	204,195	294,354
Expenses				
Program services	4,406	53,255	184,804	220,922
Management and general	208	6,875	13,691	14,741
Fundraising expenses				847
Total expenses	4,614	60,130	198,495	236,510
Change in Net Assets	<39>	277	5,701	12,085
Net assets, beginning of the year	827	8,740	18,023	23,724
Net assets, end of the year	788	9,017	23,724*	35,809**

*Note Approximately 8% of PSI's 2003 net assets are restricted for program activities in future years under the terms of existing contracts and grant agreements. Of the remainder, approximately $16 million is used as working capital and the balance to launch new initiatives or sustain ongoing programs facing funding gaps.

** Approximately 15% of PSI's 2005 net assets are restricted for programs and activities in future years. Of the remainder, approximately $35 million is used as working capital, and the balance to launch new initiatives or sustain ongoing programs facing funding gaps.

Source: PSI, Biennial Report, 2003-2004, 2005-2006, HBS case 586-013.

Exhibit 5 PSI Program Activities by Country



Source: PSI

E**xhibit 6** PSI's Programs 2006

Program	
Malaria	Between 350 and 500 million episodes of malaria occur annually, resulting in 1-2 million deaths, primarily among rural African children who do not sleep under insecticide treated nets (ITNs) and whose parents can't obtain treatment in a timely manner. In addition to distributing ITNs to prevent the illness, which accounts for the majority of the 21 million malaria episodes that PSI estimates its programs averted in 2005, PSI made accessible effective products to treat the most vulnerable.
Reproductive Health	There are 66 million unintended pregnancies annually, and more than 500,000 women die from pregnancy-related causes. Almost all of these deaths occur in developing countries where the lifetime risk of pregnancy-related death averages 1 in every 65 women. PSI's programs focus on improving the lives of families through family planning and maternal health products and services.
Child Survival	In the developing world, dehydration caused by diarrhea kills an estimated 1.8 million children every year. Rampant micronutrient deficiencies among infants and young children can cause irreversible cognitive and physical impairment. Soil-transmitted parasitic worms cause wasting and other conditions. PSI's child survival programs offer knowledge and products that save lives and improve the health of children. This is accomplished through three programs: safe water (SWS and PuR), treating dehydration (oral rehydration salts and zinc supplements) and child nutrition (sprinkles to prevent iron deficiency de-worming)
HIV	In 2005, almost 5 million people were newly-infected with HIV and 3.1 million died from AIDS. PSI's prevention programs in more than 60 countries increased knowledge and self-risk perception while promoting healthy social norms such as respect for women, sexual responsibility and compassion for those living with HIV.

Source: PSI Biennial Report, 2005-2006

Exhibit 7 PSI Organization Structure

PSI ORGANIZATIONAL CHART

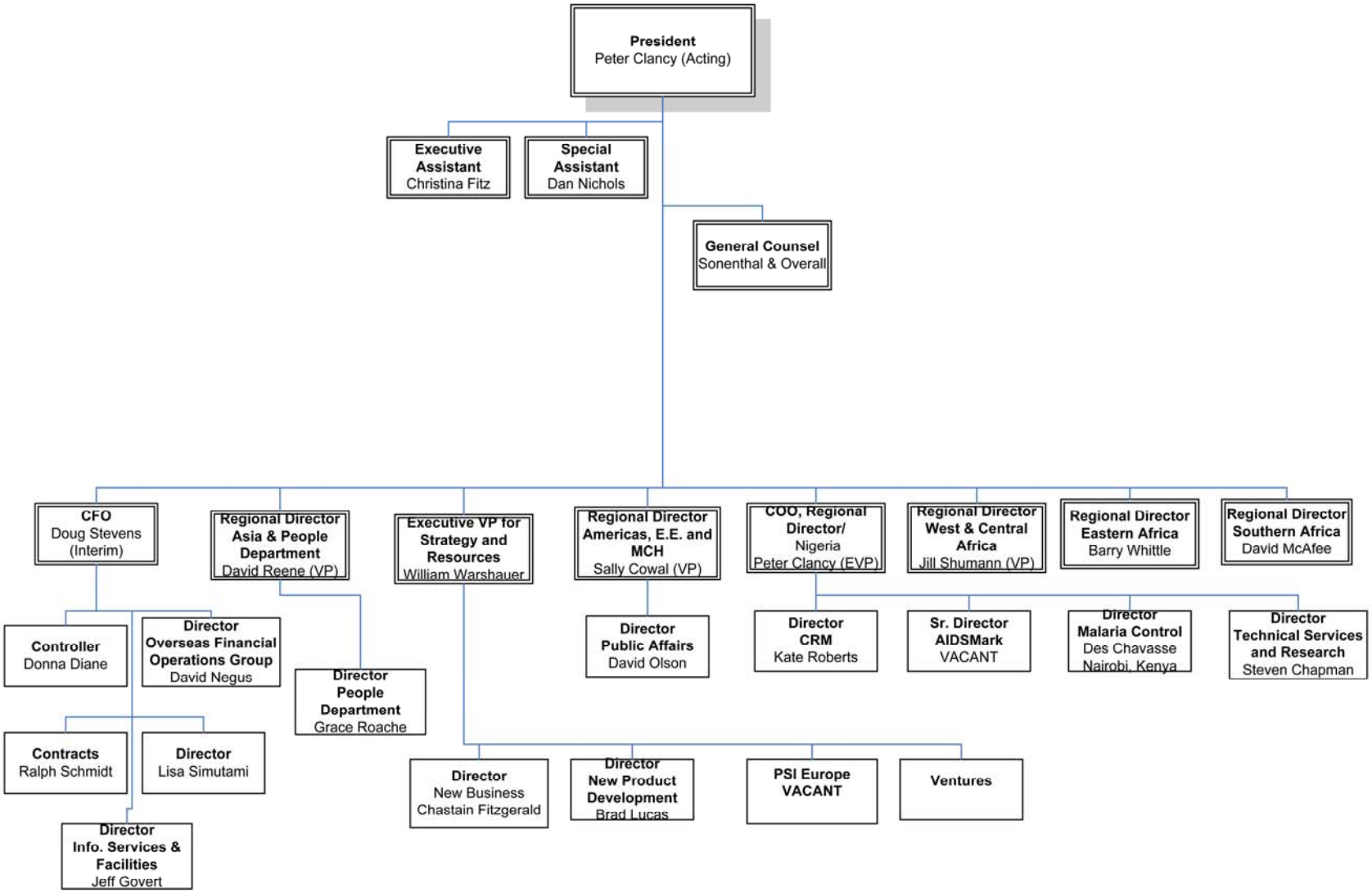


Exhibit 8 PSI Health Impact 2001-2005
Source: PSI

HIV/AIDS Cases averted: The number of cases averted was estimated based on a modified version of the 'AVERT' model, which for its baseline considers HIV and STI prevalence, existing condom use, frequency of sexual contact, abstinence and 'secondary virginity,' number and type of partners, and protective effect of male circumcision.
The efficacy of PSI interventions (VCT clients, abstinence and fidelity programs, sales of male and female condoms and STI kits) is then calculated within these parameters for country target populations. The system estimates primary HIV infections averted (number of cases directly prevented by PSI program activity) but not secondary HIV infections averted (the likely number of infections averted over the following years as a result of these same activities).

Unintended Pregnancies averted: This figure is related to the amount of contraception necessary to avoid one pregnancy. This calculation is based on a formula developed by the Alan Guttmacher Institute in 1996. For example, 120 condoms are required per annum for a couple to be successfully protected (minus a discount for misuse and waste), or 15 cycles of contraceptive pills.

Diarrhea episodes averted: The number of episodes averted was estimated using the Disease Control Priorities Project statistics for morbidity, where for instance the average child under the age of 5 in Africa suffers 3.8 severe episodes per annum, and households using water cleaning materials gain some protection against the spread of diarrhea.

Malarial episodes averted: The figure is based on the type(s) of malaria prevalent in the country, their implied modified case fatality rate, the protective or treatment efficacy of PSI interventions, and the number and type of people using products or services; PSI assumes based on research for example that an insecticide treated bed net is used by 1.3 adults and 0.5 children per night.

In general, PSI is as conservative as possible in its estimate of project impact, in order not to over-state. For example, the malaria community usually says that between one and three million deaths from malaria occur every year. Such wide variance can lead to wide variance in impact measurement, and care should be taken when comparing statements of impact to understand what assumptions authors were using in their calculations. In the case of malaria since the estimate is between one and three million it is tempting to use a 'middle number' of two million, but in keeping with its philosophy, PSI uses a baseline of one million deaths per annum, thus probably

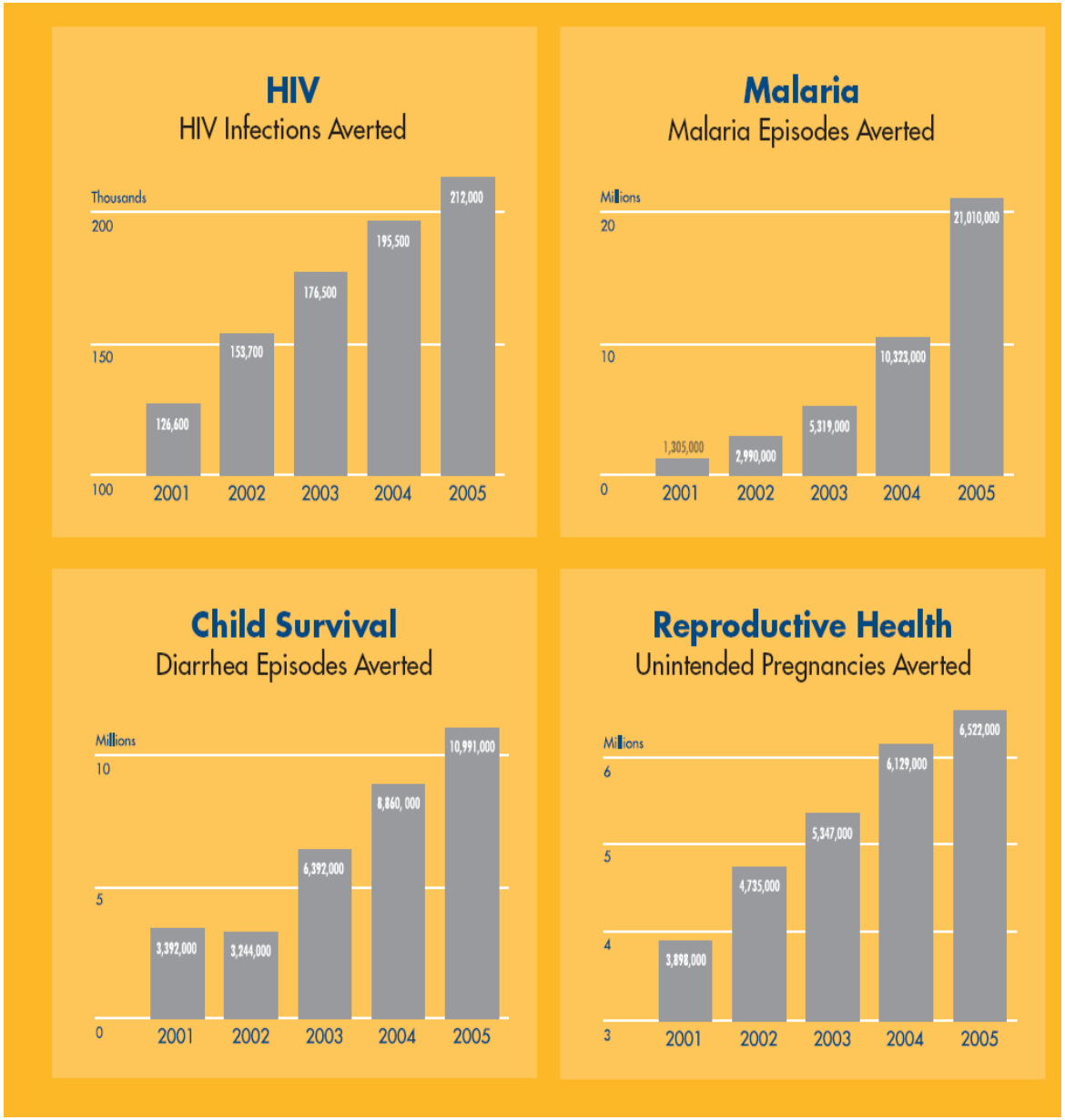


Exhibit 9 Water Purification Performance by Country

Source: PSI

Country	Population (millions)	Improved Water Coverage (%)	Improved Water Coverage, Urban (%)	Improved Water Coverage, Rural (%)	Brand	Launch Date	2005 Sales	2005 PYTW**	Cumulative Sales (Through Dec 05)	Cumulative Liters of Water Treated (Through Dec 05)
SWS										
Afghanistan	28.5	39	63	31	Clorin	Jun-03	367,501	N/A	535,580	535,580,000
Burkina Faso	12.8	61	94	54	Sûr'Eau	Feb-04	1,505	647	21,347	15,241,758
Burundi	7.3	79	92	77	Sûr'Eau	Mar-06	N/A	N/A	N/A	N/A
Ethiopia	75.6	22	81	11	WuhaAgar	Feb-06	N/A	N/A	N/A	N/A
India	1087	86	95	83	Safe Wat	Jun-02	95,498	103,806	208,787	286,904,364
Kenya	33.4	61	83	46	WaterGuard	May-03	832,106	792,165	1,471,855	2,431,478,500
Madagascar	18.1	46	77	35	Sûr'Eau Vaovao	Mar-00	705,554	612,421	2,885,290	5,164,945,218
Malawi	12.6	73	98	68	WaterGuard	Dec-02	666,298	229,207	1,870,474	1,068,040,654
Mozambique	19.4	43	72	26	Certeza	Nov-04	207,517	150,035	223,269	267,922,800
Myanmar	50	78	80	77	WaterGuard	Jun-04	92,193	55,592	119,753	119,753,000
Nepal	26.6	90	96	89	Piyush	Jun-05	132,342	31,894	132,342	52,936,800
Nepal					WaterGuard	Oct-05	152,661	110,374	152,661	183,193,200
Nigeria	128.7	48	67	31	WaterGuard	Nov-04	495,554	223,990	551,440	413,580,000
Rwanda	8.9	74	92	69	Sûr'Eau	Aug-02	66,293	28,506	323,394	230,903,316
Tanzania	37.6	62	85	49	WaterGuard	Jul-02	140,466	105,771	677,005	846,256,250
Uganda	27.8	88	87	56	WaterGuard	Aug-05	95,543	57,612	95,543	95,543,000
Uzbekistan	26.2	82	95	75	Clorin	Jul-04	9,890	N/A	16,320	26,112,000
Vietnam	93.1	85	99	80	SafeWat	Nov-05	26,712	16,107	26,712	26,712,000
Zambia	11.5	58	90	55	Clorin	Nov-98	1,835,088	1,589,186	8,318,303	11,945,083,108
Total SWS							**5,922,721**	**4,107,313**	**17,630,075**	**23,710,185,968**
PUR										
Republic	8.8	95	97	91	PUR	Feb-06	N/A	N/A	N/A	N/A
Haiti	8.4	54	52	56	PUR	Nov-04	1,308,332	7,850	1,560,526	15,605,260
Kenya	33.4	91	83	46	PUR	Feb-06	N/A	N/A	N/A	N/A
Malawi	12.6	73	98	68	PUR WaterGuard	Mar-06	N/A	N/A	N/A	N/A
Pakistan	154.8	91	96	89	PUR	Oct-05	7,166,967	43,002	7,166,967	71,669,670
Uganda	27.8	88	87	56	PUR	Oct-04	520,487	3,123	624,117	6,241,170
Total PUR							**8,995,786**	**53,975**	**9,351,610**	**93,516,100**
Tablets										
Tanzania	37.6	62	85	49	WaterGuard Tabs	Nov-05	14,400,000	187,200	14,400,000	288,000,000
Total Tablets							**14,400,000**	**187,200**	**14,400,000**	**288,000,000**
Total POU Water							**29,318,507**	**4,348,488**	**41,381,685**	**24,091,702,068**

Source: PSI records

Exhibit 10 PSI Packaging

SWS

AQUATABS

PuR

Source: PSI